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## Total Fume and Heavy Metals Emission Factors Applicable to Aluminum-Lithium Alloy Welding

Katie Carr  
*University of New Orleans*

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Total Fume and Heavy Metals Emission Factors Applicable to  
Aluminum-Lithium Alloy Welding

A Thesis

Submitted to the Graduate Faculty of the  
University of New Orleans  
in partial fulfillment of the  
requirements for the degree of

Master of Science  
in  
Engineering

by

Katie Carr

B.S. Louisiana Tech University, 2003

May, 2010



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## Dedication

With love and devotion this research is dedicated to Salvador Diecidue who has been welding since 1948.

## Acknowledgment

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# ABSTRACT

From constructing buildings to manufacturing ships, welding is the structural backbone to numerous industries. With over one hundred welding techniques, primarily driven by the base metals, filler rods, electrodes, and environmental factors, welding is a major process used in industry, commerce, and service sectors. The focus of this research is to understand the fumes generated by the Tungsten Inert-Gas (TIG) welding on Aluminum-Lithium Alloy (Al-Li Alloy), estimate applicable emission factors, and identify the heavy metal concentrations of lead, manganese, and chromium. Although there are numerous metals and various welding procedures this study will focus on three main factors:

1. Base metals comprised of Aluminum Lithium Alloy 2195 and 2219 an age-hardened copper containing aluminum alloy
2. Weld wire 4043 comprised of aluminum silicone and 2319 comprised of copper silicone
3. Weld techniques of Variable Polarity Plasma Arc (VVPA) and Tungsten inert-gas (TIG).

Key Words: Weld Fume Chamber, Emission Factors, Aluminum-Lithium, Total Fume

# 1.0 INTRODUCTION

From constructing buildings to manufacturing ships welding is the structural backbone to numerous industrial, commercial, and service sectors. Welding has numerous variables and various techniques; primarily driven by the base metal, weld rod, electrode, and environmental factors. Welding processes generate weld fume consisting of fine particles and heavy metals which contaminates the workspace environment creating a hazardous working environment for workers. Also, weld fume leaving the work environment further pollutes the surrounding air quality which results in public health concern. Weld fumes are vaporized when the electrode and base metal come in contact during welding operations. As the vaporized particles cool condensation of the particles occurs. The small particles remain suspended in the atmosphere until naturally occurring forces such as air movement, gravity, and electrical fields eventually force the particles to settle to the ground or nearby surfaces. While the particles are in the suspended phase, they are subjected to possible inhalation; therefore creating a health risk. The concentration and composition of the fumes and gases are dependent upon the base metal, filler material, and weld procedure used to perform the weld. Although there are numerous metals and various welding procedures this study will focus on three main factors:

1. Base metals comprised of Aluminum Lithium Alloy 2195 and 2219 an age-hardened copper containing aluminum alloy
2. Weld wire 4043 comprised of aluminum silicone and 2319 comprised of copper silicone
3. Weld techniques of Variable Polarity Plasma Arc (VVPA) and Tungsten inert-gas (TIG).

## 1.1 Scope

This study was conducted at a facility which assembles aluminum lithium alloy using welding techniques. The most predominate welding process and material combinations within this facility were studied. The purpose of this study was to determine the total amount of fume generated and the heavy metal concentrations as a result of welding aluminum lithium using tungsten inert gas and variable polarity plasma arc welding processes. Heavy metal concentrations were limited to lead (Pb), chromium (Cr), and manganese (Mn).

## 1.2 Objective

The main objective of the study was to understand welding emissions resulting from TIG and VVPA welding on Aluminum Lithium Alloy using field experiments within the modified weld fume chamber (Kura). Combinations to be studied included:

1. Base metals comprised of Aluminum Lithium Alloy 2195 and 2219 an age-hardened copper containing aluminum alloy
2. Weld wire 4043 comprised of aluminum silicone and 2319 comprised of copper silicone
3. Weld techniques of Variable Polarity Plasma Arc (VVPA) and Tungsten inert-gas (TIG).

Specific objectives were to determine emission factors for total fume and specific heavy metals (Pb, Mn, Cr) applicable to the above welding scenarios using the following analytical methods:

- Total fume generated by gravimetric analysis of the filters
- Lead, manganese, and chromium by Inductively coupled plasma (ICP)

## 2.0 METHODS AND MATERIALS

### 2.1 Welding Method

#### *2.1.1 Tungsten Inert-Gas*

In tungsten inert-gas or TIG welding a non-consumable tungsten electrode establishes an electric arc on the base metal. The heat of the arc on the base metal produces a weld puddle. As the arc heats, metal filler rod is added to the weld; which when cools creates a weld bead. Shield gas is used to bathe the electrode minimizing the presence of oxygen and other gases thus prohibiting oxidation. Figure 1 depicts a typical TIG welding apparatus.

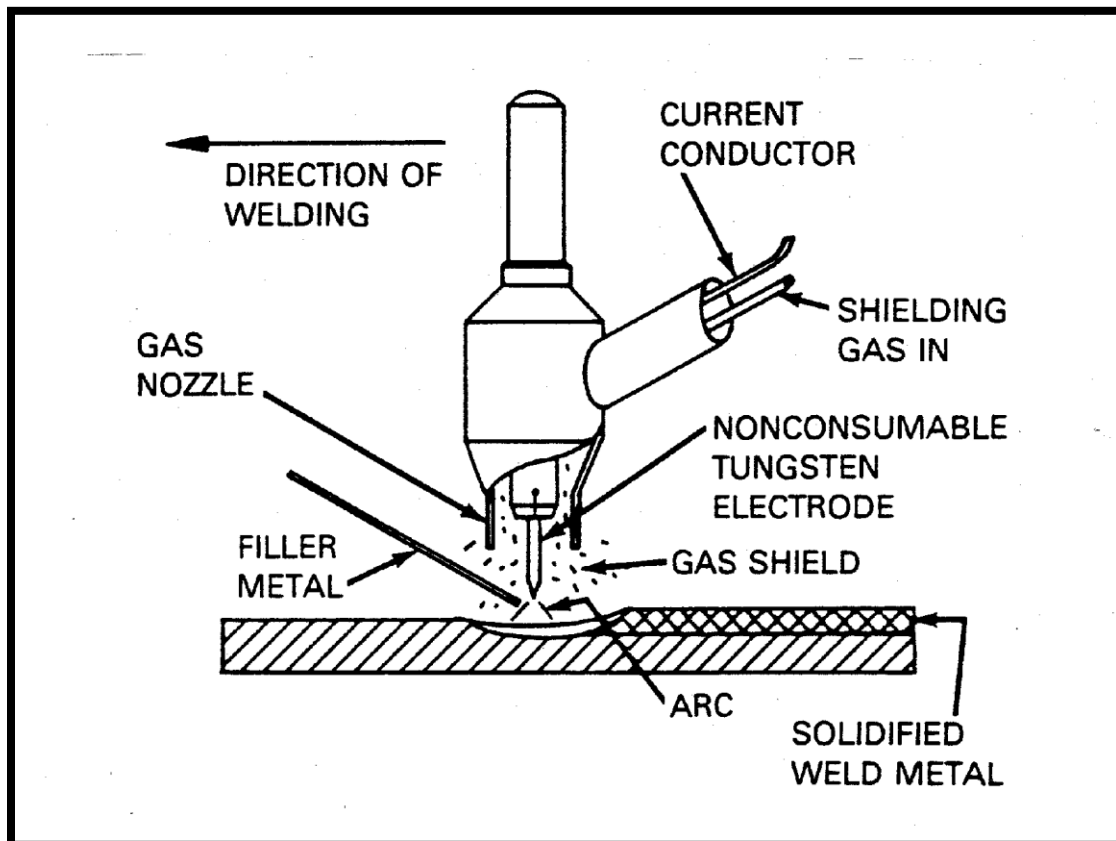


Figure 1: TIG Welding – EPA AP-42 (Henning)

TIG welding benefits include no creation of sparks, fumes, or splatter, operator ease in manipulating the equipment, and low need for post weld cleaning since flux is not used. Since

the filler wire is not passed through the weld arc, but instead fed directly into the weld puddle the fume formation rate is minimized.

### *2.1.2 Variable Polarity Plasma Arc*

Variable Polarity Plasma Arc Welding (VPPA) is similar to TIG as far as the tungsten electrode and basic setup, however the torches used in TIG and VPPA are different. While the arc forms a bell shape during TIG welding, VPPA has a highly focused powerful arc. To initiate the arc in VPPA two power sources are required, one between the electrode and the nozzle and one to sustain a current between the object being welded and the electrode. A pilot arc is established when a stream of gas is ionized forming a plasma plume. When the main power supply is activated a current is established through the ionized gas to the base metal creating a welding arc as illustrated in Figure 2.

Since the arc is highly focused and directionally stable it is less susceptible to magnetic fields and arc wondering allowing for deeper penetration in the heat affected areas. The power source controls the current waveform. Through manipulation of the amount and type of direct current, either electrode positive or negative, the polarity of the arc can be modified.



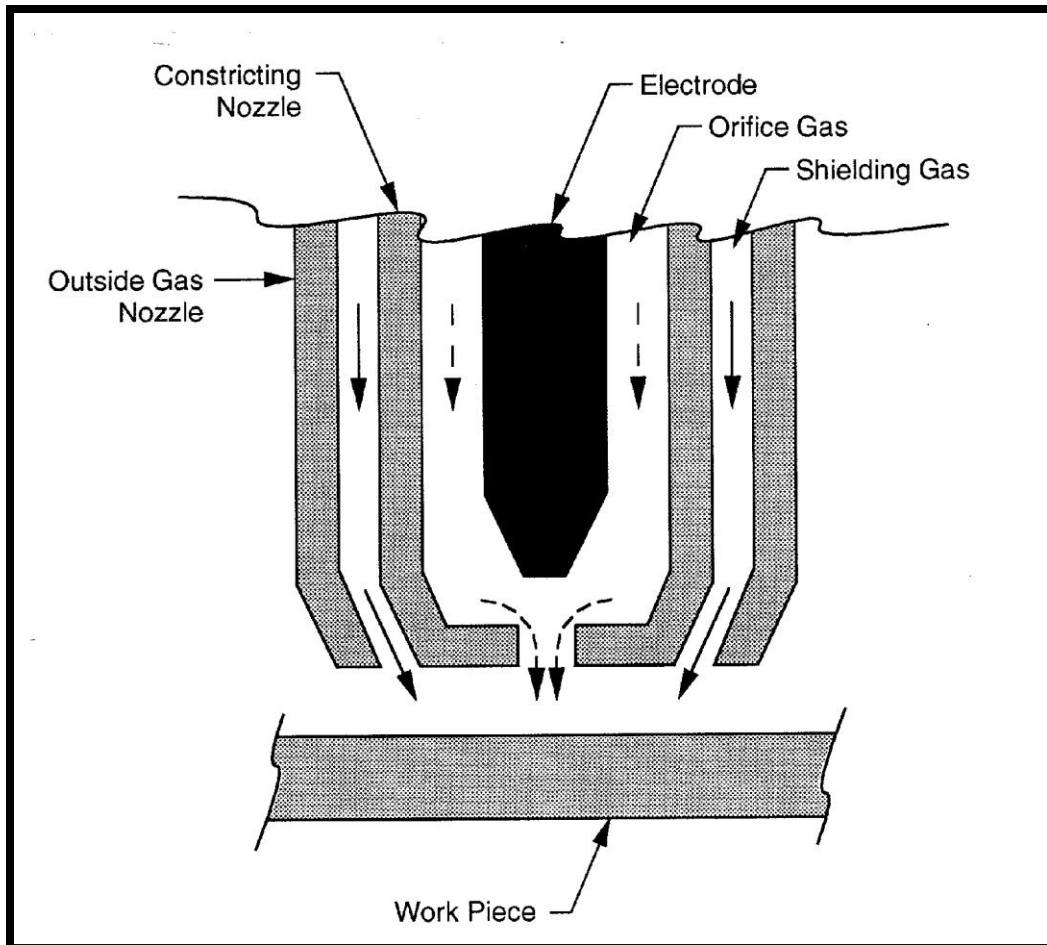


Figure 2: VPPA Welding – EPA AP-42 (Henning)

## 2.2 Materials

### 2.2.1 Base Metal

Base metals are chosen for their ability to respond to thermal and mechanical treatment and the primary alloying element added to the alloy. For this study aluminum copper alloys were chosen as the base material. Aluminum copper alloys have: low density, high strength, high modulus, cryogenic toughness, formability, and weldability making it a preferred metal for the light weight high performance structures such as the space shuttle external fuel tank, F-16 bulkheads, and the Airbus A380. The alloy and wire weight percentage per element is listed in Table 1.

### *2.2.2 Weld Wire*

Base metal material and welding process are the two main factors in choosing a weld wire. The wire must be compatible with the base metal since it becomes part of the work piece during heating. Since the base metal has characteristics of high performance two weld wires were chosen; one containing silicon and copper from the 4xxx series and one filler alloy from 2xxx series. Both wire element compositions are listed in Table 1 below.

### *2.2.3 Shield Gas*

Besides base metal and filler wire shield gas is also required for welding. Shield gas bathes the electrode during welding to assist in maintaining a shroud of protection during welding. While shield gas does create a barrier from impurities, the shield is very delicate. Drafts, changes in the processing environment, other work in the immediate area are some environmental impacts which can interrupt the shield gas' capability. Any interruption can result in an opportunity for oxidation to occur.

### *2.2.4 Electrode*

A non-consumable thoriated tungsten electrode is used in both VPPA and TIG. The electrode contains thorium and therefore contains radioactive material which may pose health and environmental concerns. Thoriated tungsten electrodes operate at temperatures below its melting point allowing for a longer rate of consumption as compared to pure tungsten. (AWS)

Table 1: Base Metal and Weld Wire Composition

-- Denotes the element is not found in the material.

<i>Element ( Weight %)</i>	<i>Alloy</i>		<i>Weld Wire</i>	
	2195	2219	2319	4043
Copper	3.70 - 4.90	5.80 - 6.80	5.80 - 6.80	0.30
Iron	0.15 max	0.30 max	0.80	0.80
Lithium	0.80 - 1.20	--	--	--
Magnesium	0.25 - 0.80	0.20 max	0.020	0.05
Manganese	0.25 max	0.20 - 0.40	0.02 - 0.40	0.05
Silicon	0.12 max	0.20 max	0.20	4.50 - 6.00
Silver	0.25 - 0.60	--	--	--
Titanium	0.10 max	0.02 - 0.10	0.10 - 0.20	0.20
Vanadium	--	0.05 - 0.15	0.05 - 0.15	--
Zinc	0.25 max	0.10 max	0.10	0.10
Zirconium	0.08 - 0.16	0.10 - 0.25	0.10 - 0.25	--
Others	0.25 max	0.20 max	0.20 max	0.20 max
Aluminum	remaining	remaining	remaining	remaining

Some of the elements present in the base metal in Table 1 have been identified by the Environmental Protection Agency (EPA) as harmful if chronic exposure to these pollutants occurs.

### 3.0 Health Effects

Currently, there exists no regulation of aluminum-lithium welding fumes by the Occupational Safety and Health Administration (OSHA). However, the National Institute for Occupational Safety and Health (NIOSH) has defined a recommended exposure limit (REL) for welding fumes as well as total particulates of the lowest feasible concentration. Welding fumes are considered by NIOSH to be potential occupational carcinogens, and as a result a threat to the general public. Through NIOSH values pertaining to obtaining the risk of cancer and respiratory disease the American Conference of Governmental Industrial Hygienists (ACGIH) has assigned welding fumes a threshold limit value (TLV) of 5 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) as a TWA for a normal 8-hour workday and a 40-hour workweek.(ACGIH)

The EPA uses the terms hazard, exposure, risk, and toxicity when identifying human health concerns. These terms can be defined as:

Hazard - the potential a process has to do harm

Exposure – the duration of contact

Risk – the likelihood injury or disease will form under specified conditions

Toxicity – the ability to produce or create disease

It should be noted the public or worker must be exposed to the hazard in order for adverse health effects to occur. The duration, frequency, and concentration of the exposure will define the risk of injury and disease. Routes of exposure to weld fume include inhalation and eye contact.

Exposure can be classified into two categories, acute and chronic exposure as shown in Table 2 below.

Table 2: Exposure Indication Comparison (OSHA)

Exposure	Indication
Acute	eye, nose, and throat irritation, fever, chills, headache, nausea, shortness of breath, muscle pain, and a metallic taste in the mouth.
Chronic	respiratory effects including coughing, wheezing, and decreased pulmonary function.

According to the IARC rats exposed to mild-steel weld fume through inhalation displayed non-specific pulmonary changes with no indications of fibrosis during a 450 day exposure period.

The rats were exposed to 1,000 mg/m<sup>3</sup> for one hour or 400 mg/m<sup>3</sup> for 30 minutes a day, six days a week during a two week test period expressed similar indications as the 450 day exposure.

IARC noted “welding fumes were not associated with an increased incidence of genotoxicity in 11 of 15 vitro assays, and in all three in vivo tests performed for genotoxicity.” (ACGIH)

### 3.1 Short Term Effects

#### *3.1.1 Metal Fume Fever*

As the fume injures the cells lining the airways the body produces an immune reaction altering the proteins in the lung. The altered proteins enter the bloodstream where the body then treats the proteins as allergens. As a result; flu like symptoms ranging from fever, chills, nausea, headache, fatigue, muscle joints and joint pains are exhibited. These indications may also be accompanied by a sweet metallic taste in the mouth distorting the taste of food. Symptoms typically subside within 24 to 48 hours after exposure and a full recovery occurs after four days. (ACGIH)

### *3.1.2 Dermal*

Burns are common when protective clothing is not worn. During welding splatters and drips of molten metallics may occur. If proper PPE is not worn the molten metal may fall onto the skin of the worker creating burns. Burns will heal in seven to ten days but may create a permanent scar if the burn is substantial enough. Wearing proper PPE is the easiest way to prevent burns from occurring.

## **3.2 Long Term Effects**

### *3.2.1 Respiratory System*

While respiratory impairment has been noted in workers exposed; it is unknown if the impairment is a result of weld fume alone or a combination of exposure to other toxicants in the working environment. It is believed smoking potentiated the effects on the respiratory system. Health effects on welders whom ingested weld fume as a result of mild steel may include a variety of possible illnesses and health markers. “Arc welder’s siderosis” is a reversible pneumoconiosis which does not exhibit respiratory markers but may be present when benign pneumoconiosis is developed. (ACGIH)

### *3.2.2 Nervous System*

Manganese is a naturally occurring metal which is highly reactive resembling iron which is a common additive to carbon steel, stainless steel, and weld wire/rods to increase hardness, stiffness, and strength. At proper dosages manganese is an essential trace nutrient for the human body with attributes for healthy skin, bones, and cartilage; however in large concentrations brain and central nervous system damage may be caused. Manganese can cause sicknesses after months of weld fume exposure possibly leading to the formation of manganism or “Welder’s Disease.” (ASOSE)

### *3.2.3 Fertility*

Infertility among welders and those exposed to welding has been noted. Upon further investigation it appears there is an increase in the frequency of abnormalities in semen quality as a result of exposure to welding. Manganese exposure has a toxic effect on sperm production. Deleterious reproductive effects have been attributed to welding in thirteen studies regarding occupational hazards to the male reproductive system. (Palmer)

### *3.2.4 Carcinogenic Effects*

Upon the review of eleven cohort studies and twelve case control studies on lung cancer; of which three cohort studies directly examined manual metal arc welding of iron, mild steel or aluminum; IARC concluded limited evidence of carcinogenic development in humans as a result of welding fumes and gas. It should be noted two of the cohort studies discovered no association between welding fume and cancer; while the other studies recorded an elevated risk for lung cancer. The elevated risk for lung cancer may have been exasperated due to selection bias. Ten out of twelve case control studies noted an association between lung cancer and the exposure to weld fume. These results prompted IRAC's to conclude that welding fume is a possible carcinogenic threat to humans. (ACGIH)

### *3.2.5 Radioactive Exposure*

The thoriated tungsten electrode used in welding contains thorium, which is a radioactive material that has the ability to create health risks at elevated exposure levels. Alpha particles are primarily emitted from thorium; however beta and gamma particles are also emitted. The route of exposure to this low-level radioactive material is primary a result of dust particles. The electrode may be sharpened as part of the preparations required for welding. The dust particles

which are created during sharpening can be inhaled allowing for internal radiation exposure to occur. (AWS)



## 4.0 EXPERIMENTAL EQUIPMENT and METHODS

### 4.1 Weld Fume Chamber

A weld fume chamber meeting the American Welding Standard F1.2:2006 requirements were constructed by Delweld Industries Corporation in Stoystown Pennsylvania as shown in Figure 3. Modifications to the weld fume chamber design include a reduced filter and support screen cross sectional area. The reasoning and logic for this modification is discussed in the section titled filters. The weld fume chamber was designed to capture fume generated during weld process on an eight (8") inch diameter filter.

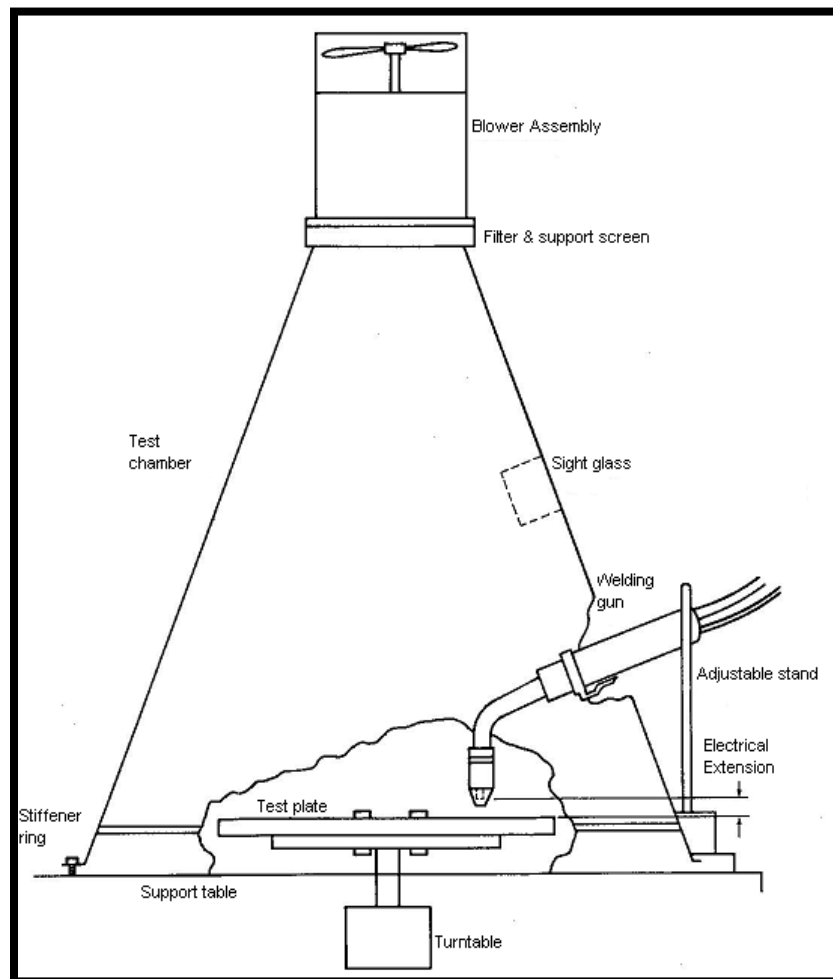


Figure 3: Weld Fume Chamber Schematic –EPA AP-42 (Henning)

The chamber as illustrated in Figures three and four contains two hand holes and a sight glass portal for viewing. The weld torch is placed inside one of the hand holes allowing for welding to be performed without disturbing the capabilities of the weld chamber. An air gap is maintained between the turn table and the shroud of the chamber so that ambient air can be drawn into the weld chamber pushing the fume towards the filter. Other apparatus in the chamber consist of an on/off switch for the blower, an on/off switch and a rotational direction switch for the welding turn table, a volumetric air flow gauge reading in Cubic Feet per Minute (CFM) for air flow drawn into the chamber, and a pressure drop gauge measuring pressure differential across the filter. A manual for the weld fume chamber is included in Appendix B.

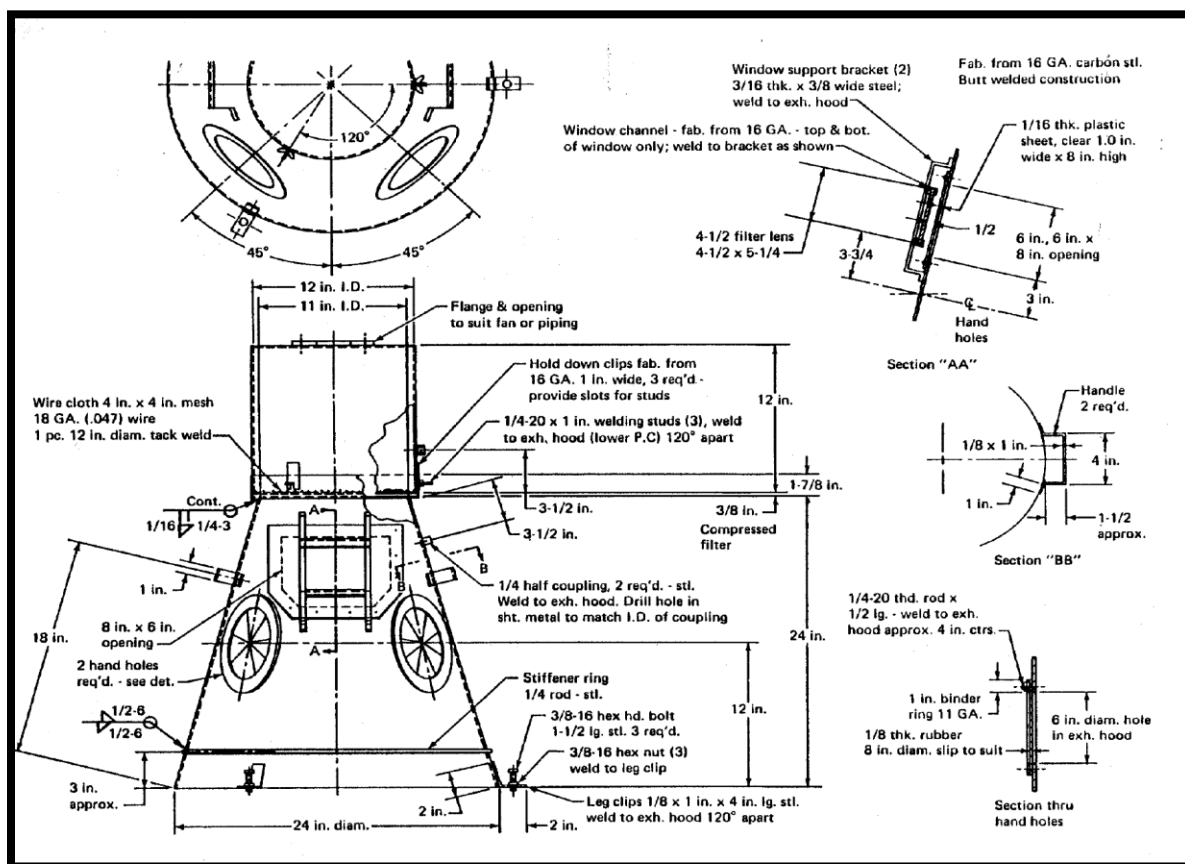


Figure 4: Weld Chamber Schematic -EPA AP-42 (Henning)

Beneath the chamber a blower forces the generated weld fume through the fume chamber exhaust duct at a flow rate of 30 CFM. Testing was conducted for approximately 15 minutes per test. As the filter would gather fume the blower capacity would be increased to compensate for the reduced flow through the filter.

A pre-weighed filter was removed from its plastic bag, placed inside of the filter casing, and clamped down. The casing was then inserted in the fume chamber at the hinged opening of the chamber. A prepared base plate of material was locked onto the turntable inside the chamber. The weld gun was placed through one of the arm holes of the fume chamber and positioned so that the tip of the weld gun could virtually come in contact with the base plate. Weld wire was fed into the gun from a spool. With the welder in position at the sight glass the turntable and blower were activated. The blower speed and the pressure drop modifications were recorded by using a data sheet real time, Appendix C. Wire feed rate, weld duration, shield gas flow rate, welding voltage and current were recorded via electronic data recording device and are included in Appendix D. Welding continued until the panel either became too warped resulting in contact between the weld gun and the base metal or blower speed was maxed out. A pictorial synopsis of these events are portrayed in Photo 1.



Photo 1: Pictorial of Weld Process

Upon completion of the welding process, the blower and weld fume chamber were switched into the off position. The filter cage was removed from the chamber and the filter was carefully removed from the cage, folded and returned to the plastic bag it came from. The bagged filter was then weighed and maintained until analytical testing commenced.

## 4.2 Filter

Lessons learned from prior sampling events using an AWS fume chamber noted an eight inch (8") glass fiber filter was best suited for fume collection. This solution was a result of examining filters which met the sampling needs of VPPA and TIG welding, linear velocity and pressure drop across the filter, operational flows for the chamber and control technologies, filter material capture capability, filter availability, and filter size.

In previously published studies it was noted the largest glass fiber filters specifically designed for use with high volume air samplers capable of capturing greater than 99.9% of 0.3  $\mu\text{m}$  dispersed oil particulate matter was 8"x10". This size restriction created a need to modify the AWS weld fume chamber cross sectional diameter of the filter and support screen from 12" to 8". The round 8" filter shape was chosen in lieu of the larger 8"x10" square shape to minimize the

potential for air flow disturbances. It should be noted other than the restricted cross section of the filter and support screen all other design dimensions were maintained as defined by AWS F1.2:2006. (CTC)

8"x10" glass fiber filters were procured from SKC INC. Product description notes high particle retention, liquid nominal pore size of 1.0  $\mu\text{m}$ , high-temperature tolerance, and binder free borosilicate glass fiber which eliminates interferences. The filters were cut into 8" rounds prior to testing.

### 4.3 Base Plate

Base plate materials for the welding were collected from scrap material. Base plates associated with filters 16, 2, and 15 were created by friction stir welding (FSW) two smaller pieces of the same parent material together. The FSW plates were wiped with alcohol, wire brushed, and wiped again prior to mating. FSW is a welding technique that uses the friction of a pin to mix the base metal it comes in contact with forcing the metal to meld with the adjoining work piece. This process does not use weld rod nor a torch therefore there is no addition of foreign material into the process. The pin used is non-consumable and therefore does not interfere with the base metal composition. Photos one and two show the differences between the two panel types.

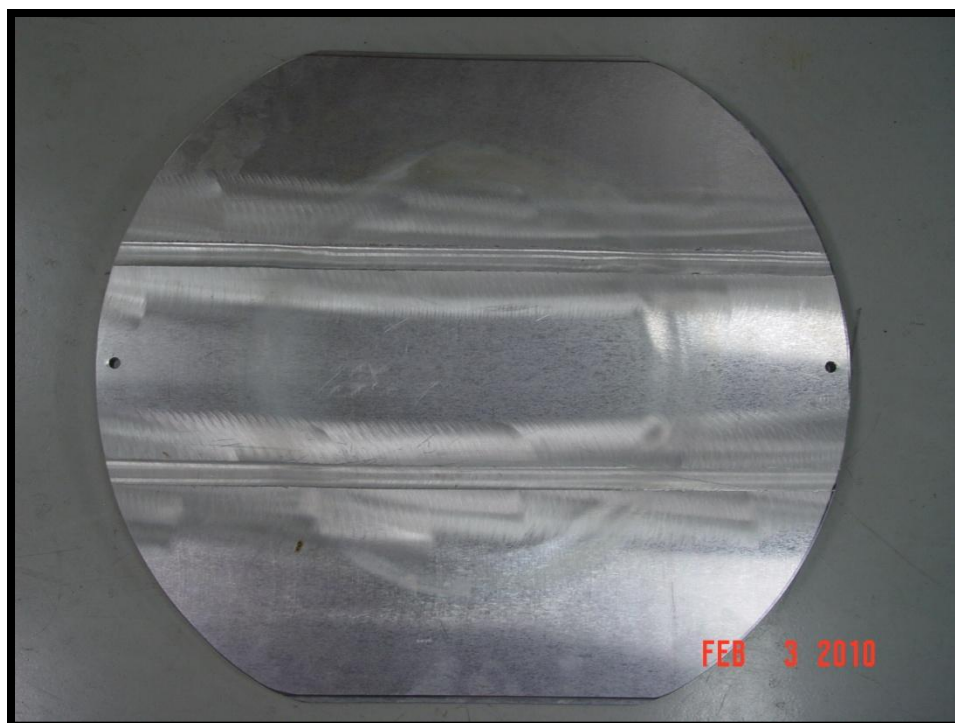


Photo 2: Panel 2 FSW Example



Photo 3: Panel 8 No Modifications

All base metal samples were cleaned prior to installation into the weld chamber. An alcohol wipe was performed on the base metal, followed by a vigorous wire brush scrubbing, followed by a final alcohol wipe. Immediately after the cleaning procedure the base metal was installed into the fume chamber. Gloves were worn to minimize oil transfer from hands onto the metallic base plates.

## 5.0 EXPERIMENTAL METHODS

### 5.1 Weld Fume Collection

Testing was conducted in a controlled environment with monitored temperature and humidity.

While operating the weld fume chamber the American Welding Society's publication of *Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes* an American National Standard AWS F1.2:2006 was adhered to. The weld fume, which collected on the filter, was analyzed for total fume emitted expressed in grams as analytically for heavy metal content; specifically Manganese, Chromium, and Lead.

### 5.2 Sampling Plan

All welding combinations were preformed inside of the weld fume chamber. Multiple combinations of base metal, weld wire and weld techniques were tested. Base metal 2195 is not compatible with weld wire 2319 and therefore this material combination was eliminated from the sampling plan as noted by the n/a in Table 3. Material availability was a concern during testing therefore the sampling frequency was low.

Table 3: Proposed Sampling Plan

	Weld Wire			
	TIG		VPPA	
Base Metal	2319	4043	2319	4043
2219	2	2	2	2
2195	n/a	4	n/a	4

Upon the completion of the test cycle it was noted the filter from the VPPA process was “white” while the filters from the TIG process exhibited a caramel color. Because of this observation it was assumed the TIG process was creating a remarkably increased emission rate then the VPPA process and it was decided to test more TIG samples than VPPA. The 0.320” thick base plate of 2195 warped during testing from excessive heat exposure as shown in Photo 3 and 4. Because of



this warpage it was decided that 0.320" thick plate was too thin for this test and all other base plates of that thickness were eliminated from the sampling plan.

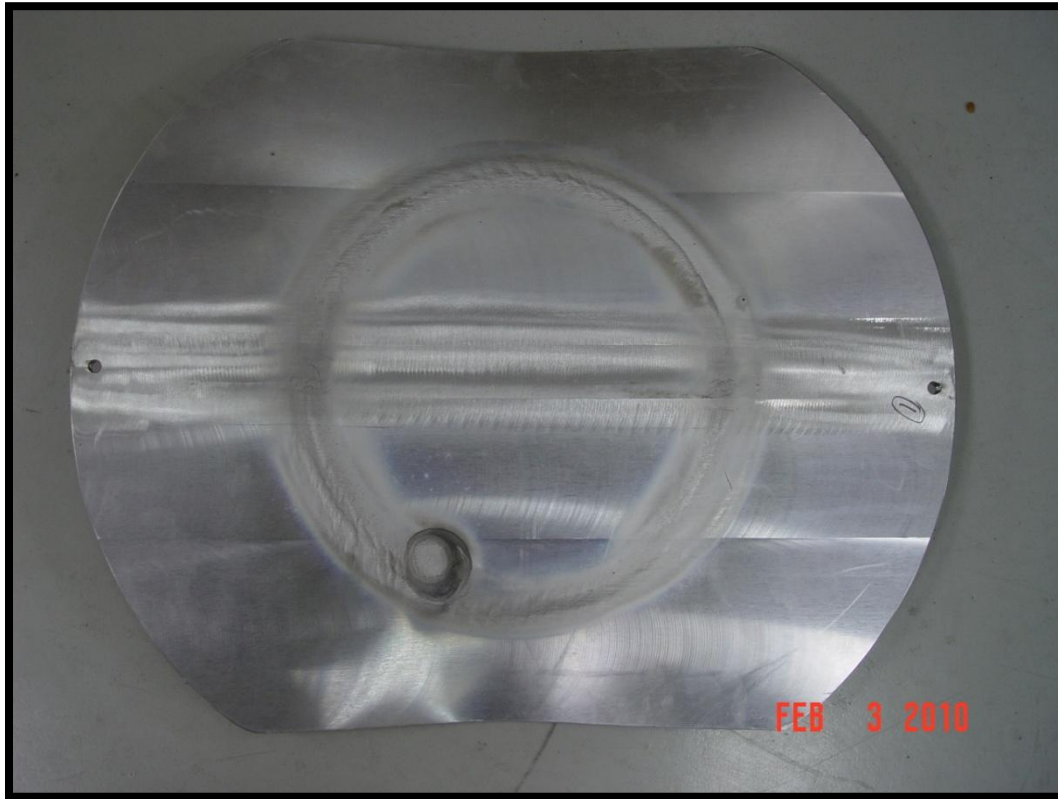


Photo 4: Panel 1 Top View

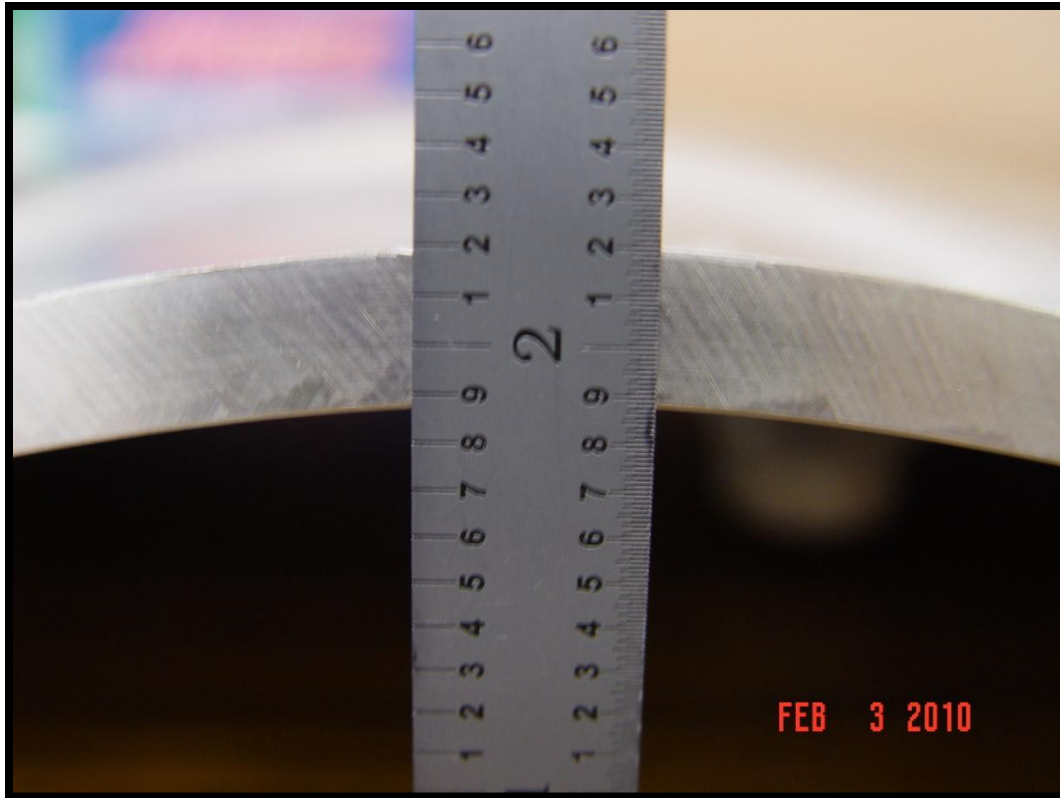


Photo 5: Panel 1 Side View

As a result of the higher emission possibilities of the TIG welding and the warped panels comprised of the thinner base material the sampling plan was modified as shown in Table 4.

Table 4: Actual Sampling Plan

	Weld Wire			
	TIG		VPPA	
Base Metal	2319	4043	2319	4043
2219	2	3	1	1
2195	n/a	5	n/a	2

Both welding processes were run in compliance with the American Welding Society's publication of *Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes* an American National Standard AWS F1.2:2006.

Upon completion of the testing the filters were routed to the lab for Inductively Coupled Plasma testing.

## 5.3 Test Methods

### *5.3.1 Particle Mass Analysis*

Prior to and post welding weights were obtained from each filter. The filters were weighed inside of the plastic bag to preclude any weld dust that may have adhered to the bag during transportation and to reduce the filter's exposure to moisture in the environment. The filters were weighed with a calibrated microbalance.

### *5.3.2 Inductively Coupled Plasma (ICP)*

ICP Atomic Emission Spectrometry simultaneously quantifies analysis after acid digestion of a specified elemental composition. Argon plasma is used to activate atoms to an elevated state through collision with other atoms. As the atoms return to a stable state a characteristic wavelength of radiation is emitted. The concentration of the element in the sample is proportional to the emitted radiation at the elements characteristic wavelength as compared to the known standard. This quantitative technique eliminates numerous elemental interferences.

(Henning) Pace Analytical lab results are in Appendix E.

## 6.0 RESULTS and DISCUSSION

### 6.1 Particle Mass Analysis

Total fume was calculated by subtracting the initial filter weight from the final filter weight.

Filter 20, the blank, was placed in the weld fume chamber with the blower pulling air through the chamber for 15 minutes. Welding was not performed on the blank. The blank filter weight was subtracted from the total fume of each filter to remove the filter weight resulting in total fume as shown in Table 5.

Table 5: Total Fume Weight

Sample	Process	Alloy	Filler Wire	Filter Weight		Total Fume
				Initial	Final	
				grams	grams	grams
1	VPPA	2195	4043	15.0974	15.1247	0.0377
2	VPPA	2195	4043	15.0635	15.0884	0.0353
3	GTAW	2195	4043	15.0858	15.1425	0.0671
4	GTAW	2195	4043	14.9803	15.0323	0.0624
6	VPPA	2219	4043	15.0399	15.0523	0.0228
8	GTAW	2219	4043	15.0205	15.0347	0.0246
9	GTAW	2219	4043	15.0350	15.0352	0.0106
11	VPPA	2219	2319	15.0333	15.0450	0.0221
14	GTAW	2219	2319	15.0250	15.0366	0.0220
15	GTAW	2219	2319	15.1544	15.1576	0.0136
16	GTAW	2195	4043	14.8700	15.1398	0.2802
17	GTAW	2219	4043	14.8000	15.0228	0.2332
18	GTAW	2195	4043	15.0000	15.2108	0.2212
19	GTAW	2195	4043	15.1253	15.2496	0.1347

The duration of the weld and the speed at which the weld wire was fed into the chamber were used to calculate the amount of wire consumed during the weld activity. The inches of wire were converted into grams of wire through a density conversion as shown in Table 6.

Table 6: Weld Wire Consumed

Sample	Weld Wire Speed	Duration of Weld	Wire Consumed	
	(in/min)		(in)	(g)
1	30	13.13	393.8400	54.8619
2	30	16.16	484.7400	67.5243
3	12	10.90	130.8000	17.0302
4	12	15.02	180.2000	23.462
6	30	16.26	487.7400	67.9422
8	15	14.67	220.0275	30.6498
9	15	16.12	241.7850	33.6807
11	30	15.71	471.2450	65.6444
14	15	14.66	219.8300	30.6223
15	15	17.15	257.3000	35.8419
16	11	16.40	180.4000	23.4881
17	11	13.90	152.9385	21.3043
18	12	14.90	178.8000	23.2798
19	12	18.70	224.4000	29.2169

Total grams fume from Table 5 was converted to milligrams and divided by grams of wire consumed to yield mg/g emission rate as shown in Table 7.

Table 7: Weld Fume Emission Factors

Sample	Process	Alloy	Filler Wire	Wire Consumed (g)	Total Fume (g)	Blank Corrected Total Fume (g)	Emission Factor (mg/g)
1	VPPA	2195	4043	54.8619	0.0273	0.0377	0.6872
2	VPPA	2195	4043	67.5243	0.0249	0.0353	0.5228
3	GTAW	2195	4043	17.0302	0.0567	0.0671	3.9401
4	GTAW	2195	4043	23.4620	0.0520	0.0624	2.6596
6	VPPA	2219	4043	67.9422	0.0124	0.0228	0.3356
8	GTAW	2219	4043	30.6498	0.0142	0.0246	0.8026
9	GTAW	2219	4043	33.6807	0.0002	0.0106	0.3147
11	VPPA	2219	2319	65.6444	0.0117	0.0221	0.3367
14	GTAW	2219	2319	30.6223	0.0116	0.0220	0.7184
15	GTAW	2219	2319	35.8419	0.0032	0.0136	0.3794
16	GTAW	2195	4043	23.4881	0.2698	0.2802	11.9294
17	GTAW	2219	4043	21.3043	0.2228	0.2332	10.9461
18	GTAW	2195	4043	23.2798	0.2108	0.2212	9.5018
19	GTAW	2195	4043	29.2169	0.1243	0.1347	4.6103

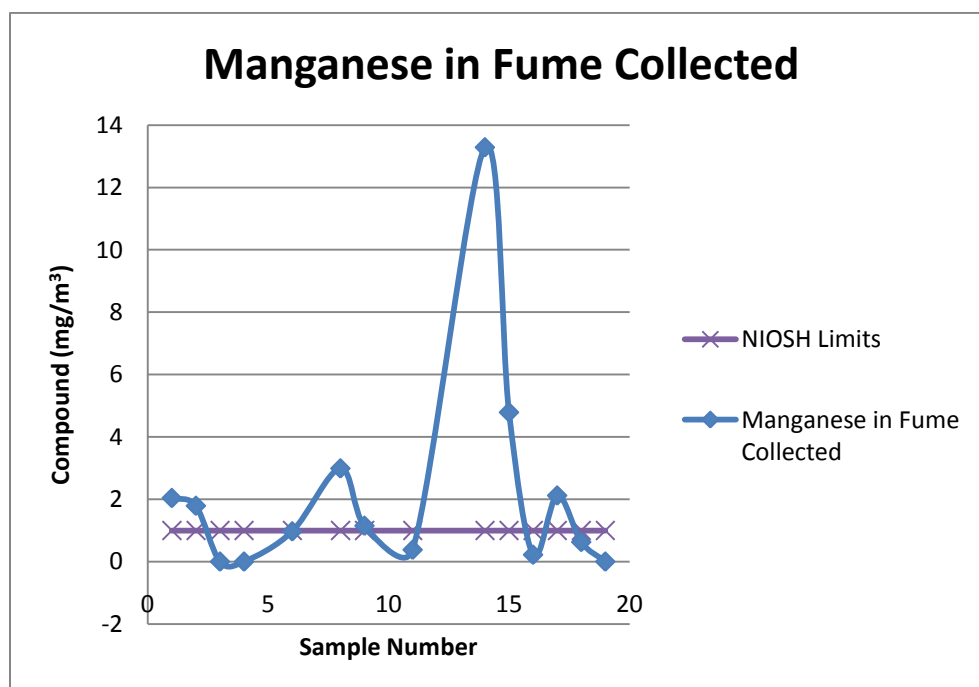
Filter 19 was run at a reduced flow rate of 15 CFM thus violating the testing requirements of the American Welding Society's publication of *Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes* an American National Standard AWS F1.2:2006. Because the flow rate exceeded the lower limit flow rate requirement of 25 CFM filter 19 is considered a no test.

## 6.2 Inductively Coupled Plasma (ICP)

Analytical lab results from the ICP testing reveal levels of Chromium, Lead and Manganese in some filters. Results per Element and the element exposure limit are listed below with a graphic representation attached. Filter 20 was placed inside of the fume chamber, the blower was turned on; however no welding process was performed therefore creating a blank. The blank was tested with the remaining filters and the results of filter 20 were subtracted from the other filters to achieve a chemical composition of the fume with the filter material negated. Results Below Detection Limits (BDL) are noted in the tables below. Manganese, lead, and chromium concentrations are listed below.

Table 8: Mn Emission Factors

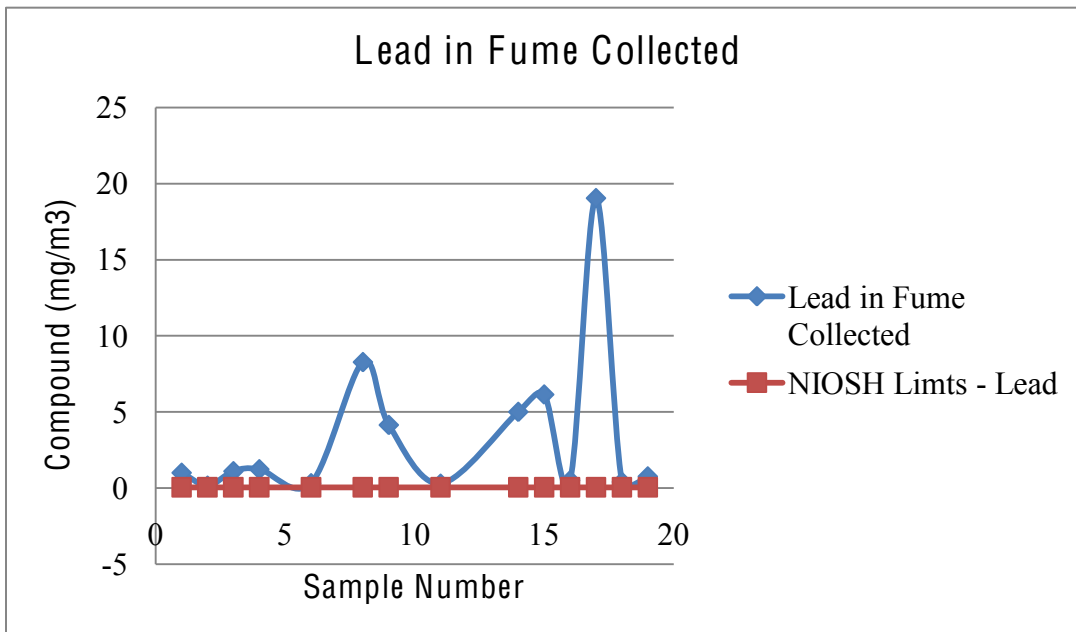
Sample	Process	Alloy	Weld Wire	Wire Consumed (g)	Total Fume (g)	Blank Corrected Total Fume (g)	Blank Corrected Mn (µg)	Mn/TF Ratio (µg/mg)	Mn/Weld Wire Ratio (µg/g)
1	VPPA	2195	4043	54.8619	0.0273	0.0169	2.04	0.1207	0.0372
2	VPPA	2195	4043	67.5243	0.0249	0.0145	1.79	0.1234	0.0265
3	TIG	2195	4043	17.0302	0.0567	0.0463	BDL	BDL	BDL
4	TIG	2195	4043	23.4620	0.0520	0.0416	BDL	BDL	BDL
6	VPPA	2219	4043	67.9422	0.0124	0.0020	0.97	0.4850	0.0143
8	TIG	2219	4043	30.6498	0.0142	0.0038	2.99	0.7868	0.0976
9	TIG	2219	4043	33.6807	0.0002	0.0000	1.15	0.0012	0.0341
11	VPPA	2219	2319	65.6444	0.0117	0.0013	0.38	0.2923	0.0058
14	TIG	2219	2319	30.6223	0.0116	0.0012	13.29	11.0750	0.4340
15	TIG	2219	2319	35.8419	0.0032	0.0000	4.79	0.0048	0.1336
16	TIG	2195	4043	23.4881	0.2698	0.2594	0.22	0.0008	0.0094
17	TIG	2219	4043	21.3043	0.2228	0.2124	2.12	0.0100	0.0995
18	TIG	2195	4043	23.2798	0.2108	0.2004	0.63	0.0031	0.0271
19	TIG	2195	4043	29.2169	0.1243	0.1139	BDL	BDL	BDL



Graph 1: Manganese in Fume Collected

Table 9: Pb Emission Factors

Sample	Process	Alloy	Weld Wire	Wire Consumed (g)	Total Fume (g)	Blank Corrected Total Fume (g)	Blank Corrected Pb (µg)	Pb/TF Ratio (µg/mg)	Pb/Weld Wire Ratio (µg/g)
1	VPPA	2195	4043	54.8619	0.0273	0.0169	1.01	0.0598	0.0184
2	VPPA	2195	4043	67.5243	0.0249	0.0145	0.16	0.0110	0.0024
3	TIG	2195	4043	17.0302	0.0567	0.0463	1.11	0.0240	0.0652
4	TIG	2195	4043	23.4620	0.0520	0.0416	1.24	0.0298	0.0529
6	VPPA	2219	4043	67.9422	0.0124	0.0020	0.32	0.1600	0.0047
8	TIG	2219	4043	30.6498	0.0142	0.0038	8.28	2.1789	0.2701
9	TIG	2219	4043	33.6807	0.0002	0.0000	4.15	0.0042	0.1232
11	VPPA	2219	2319	65.6444	0.0117	0.0013	0.29	0.2231	0.0044
14	TIG	2219	2319	30.6223	0.0116	0.0012	5.01	4.1750	0.1636
15	TIG	2219	2319	35.8419	0.0032	0.0000	6.15	0.0062	0.1716
16	TIG	2195	4043	23.4881	0.2698	0.2594	0.51	0.0020	0.0217
17	TIG	2219	4043	21.3043	0.2228	0.2124	19.05	0.0897	0.8942
18	TIG	2195	4043	23.2798	0.2108	0.2004	0.41	0.0020	0.0176
19	TIG	2195	4043	29.2169	0.1243	0.1139	0.77	0.0068	0.0264

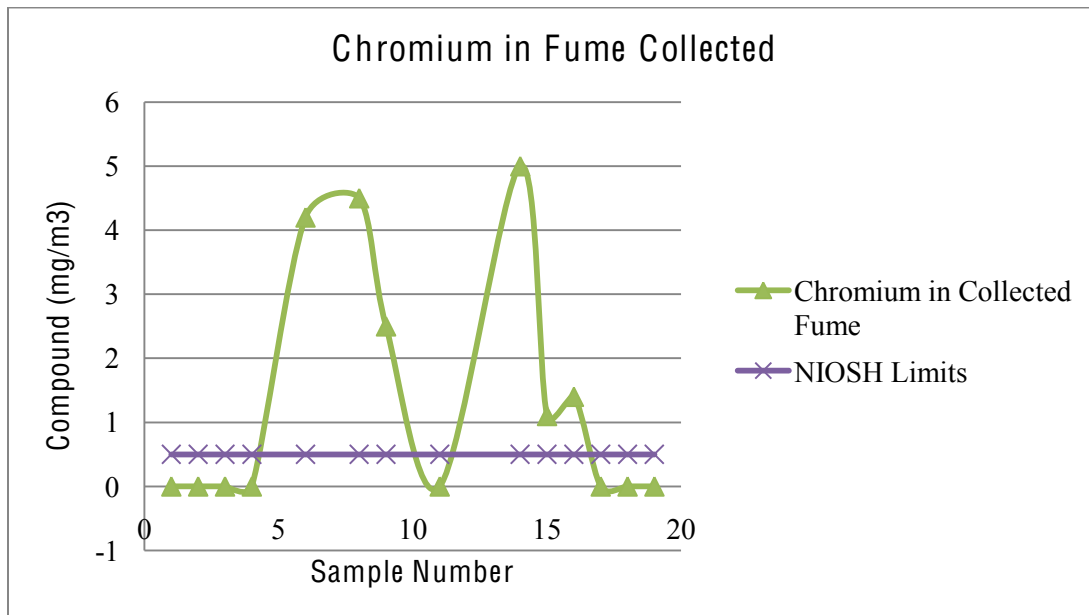


Graph 2: Lead in Fume Collected



Table 10: Cr Emission Factors

Sample	Process	Alloy	Weld Wire	Weld Wire Consumed (g)	Total Fume (g)	Blank Corrected Total Fume (g)	Blank Corrected Cr (µg)	Cr/TF Ratio (µg/mg)	Cr/Weld Wire Raio (µg/g)
1	VPPA	2195	4043	54.8619	0.0273	0.0169	BDL	BDL	BDL
2	VPPA	2195	4043	67.5243	0.0249	0.0145	BDL	BDL	BDL
3	TIG	2195	4043	17.0302	0.0567	0.0463	BDL	BDL	BDL
4	TIG	2195	4043	23.4620	0.0520	0.0416	BDL	BDL	BDL
6	VPPA	2219	4043	67.9422	0.0124	0.0020	4.2000	2.1000	0.0618
8	TIG	2219	4043	30.6498	0.0142	0.0038	4.5000	1.1842	0.1468
9	TIG	2219	4043	33.6807	0.0002	0.0000	2.5000	0.0025	0.0742
11	VPPA	2219	2319	65.6444	0.0117	0.0013	BDL	BDL	BDL
14	TIG	2219	2319	30.6223	0.0116	0.0012	5.0000	4.1667	0.1633
15	TIG	2219	2319	35.8419	0.0032	0.0000	1.1000	0.0011	0.0307
16	TIG	2195	4043	23.4881	0.2698	0.2594	1.4000	0.0054	0.0596
17	TIG	2219	4043	21.3043	0.2228	0.2124	BDL	BDL	BDL
18	TIG	2195	4043	23.2798	0.2108	0.2004	BDL	BDL	BDL
19	TIG	2195	4043	29.2169	0.1243	0.1139	BDL	BDL	BDL



Graph 3: Chromium in Fume Collected

Chromium, Lead, and Manganese are all present in levels over the limits according to tables 8-10 placing the worker and the public at risk.

## 7.0 Lessons Learned

### 7.1 Panel Thickness Limitations

Material thickness became a limiting factor during testing. To achieve a weld duration of 15 minutes tight weld passes were formed on the panel as shown in Photo 6. These tight redundant passes coupled with the high heat requirements the welding process required resulted in the thinner panels warping as shown in Photo 5.

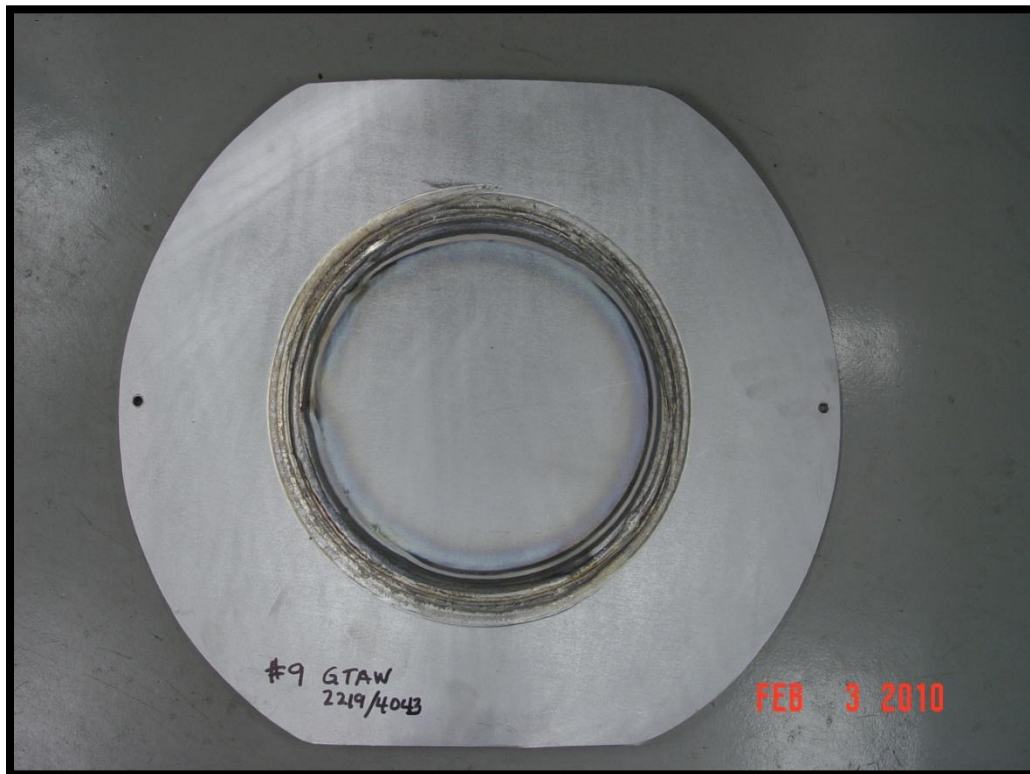


Photo 6: Filter 9 Post Weld

With limited resources some of the panels were recycled. For example filter 6 was welded on 2219 base plate with 4043 weld wire using VPPA welding. After the welding was complete; the welded surface was sanded smooth. The panel was then flipped and the reverse side received

VPPA welding using 2319 weld wire. The side of the panel which filter 11 was tested with was then faced thus removing the weld all together. Facing is a way of removing a layer of the metallic surface exposing a pristine layer of material. While the team was successful in facing and reusing the panel it is not ideal and may introduce contaminants and other variables into the process.

## 7.2 Blank

Placing the control filter into the fume chamber may have introduced some residual contaminants onto the filter. A true control which did not come in contact with the weld fume chamber should have been analyzed instead of a filter that had been placed into the chamber and only had the blower ran without a welding process.

## 7.3 Sampling Plan

Some combinations of base material, weld wire and welding technique were limited to one data point. Additional testing should be preformed to strength the dataset and add reliability to the data. The sampling plan may have been increased if the weld pattern used was spaced enough to allow multiple welds on the same panel. Assuming a wide circular pattern was performed followed by a tighter pass on the second run it may be possible to achieve multiple weld passes on the same panel. Thorough cleaning of the base metal would be required to prevent contamination between weld passes.

## 8.0 SUMMARY

### 8.1 Particle Mass Analysis

Emission rate results were averaged, when required, for the 6 possible combinations of base material, weld wire and welding process as shown in Table 11. From this Table it is evident TIG welding on 2195 base plate with 4043 weld wire produces the highest emission rate from the combinations studied. It should be noted currently there are not any published emission rate results for TIG or VPPA welding on Aluminum-Lithium panels; therefore these test results are not comparable to a historic database.

Table 11: Emission Rate per Test Combination

Welding type	Base Metal	Weld Wire	AVG Total Fume (TF)	AVG TF/WW Ratio
TIG	2195	4043	0.1531	6.5283
TIG	2219	4043	0.0895	4.0212
VPPA	2195	4043	0.0365	0.6050
VPPA	2219	4043	0.0228	0.3356
VPPA	2219	2319	0.0221	0.3367
TIG	2219	2319	0.0178	0.5489

### 8.2 Inductively Coupled Plasma (ICP)

Manganese concentration results were averaged, when required, for the 6 possible combinations of base material, weld wire and welding process as shown in Table 12. From this table it is evident TIG welding on 2219 base plate with 2319 weld wire produces the highest manganese concentrations from the combinations studied.

Table 12: Manganese Average Concentrations

Welding type	Base Metal	Weld Wire	AVG Mn Fume	AVG Mn/TF Ratio	AVG Mn/WW Ratio
TIG	2219	2319	9.0400	0.3044	0.2838
TIG	2219	4043	2.0867	0.0439	0.0771
VPPA	2195	4043	1.9150	0.0524	0.0318
VPPA	2219	4043	0.9700	0.0425	0.0143
VPPA	2219	2319	0.3800	0.0172	0.0058
TIG	2195	4043	0.1700	0.0007	0.0073

Lead concentration results were averaged, when required, for the 6 possible combinations of base material, weld wire and welding process as shown in Table 13. From this table it is evident TIG welding on 2219 base plate with 4043 weld wire produces the highest lead concentrations from the combinations studied.

Table 13: Lead Average Concentrations

Welding type	Base Metal	Weld Wire	AVG Pb Fume	AVG Pb/TF Ratio	AVG Pb/WW Ratio
TIG	2219	4043	10.4933	0.1408	0.4292
TIG	2219	2319	5.5800	0.1169	0.1676
TIG	2195	4043	0.8080	0.0092	0.0367
VPPA	2195	4043	0.5850	0.0157	0.0104
VPPA	2219	4043	0.3200	0.0140	0.0047
VPPA	2219	2319	0.2900	0.0131	0.0044

Chromium concentration results were averaged, when required, for the 6 possible combinations of base material, weld wire and welding process as shown in Table 14. From this table it is evident VPPA welding on 2219 base plate with 4043 weld wire produces the highest chromium concentrations from the combinations studied.

Table 14: Chromium Concentrations Avg

Welding type	Base Metal	Weld Wire	AVG Cr Fume	AVG Cr/TF Ratio	AVG Cr/WW Ratio
VPPA	2219	4043	4.2000	0.1842	0.0618
TIG	2219	2319	3.0500	0.1142	0.0970
TIG	2219	4043	2.3333	0.0618	0.0737
TIG	2195	4043	0.2800	0.0010	0.0119
VPPA	2219	2319	nd	nd	nd
VPPA	2195	4043	nd	nd	nd

Manganese, Lead, and Chromium concentrations all exceeded the exposure limit placing the worker and the public at risk. Of all combinations tested base metal 2219 exceeded base metal 2195 in all categories tested. 4043 weld wire had higher chromium and lead concentrations; however 2319 weld wire had higher manganese concentrations and resulted in increased emissions. TIG welding produced more emissions and elevated concentrations than VPPA welding.

## 9.0 REFERENCES

1. American Welding Society. F1.2:2006. *Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes*
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3. Henning, Lance. *Development of Particulate and Hazardous Emission Factors for Electric Arc Welding*; U.S. Environmental Protection Agency; U.S. Government Printing Office: Washington, DC, 1994; EPA 68-D2-0159.
4. Concurrent Technologies Corporation. *Shipbuilding and Ship Repair Industry Initiative to Prepare For and Comply with the Residual Risk Ruling Control Technologies Demonstration Final Report*. 2008.
5. ACGIH. *Threshold limit values for chemical substances and physical agents and biological exposure indices*. Cincinnati, OH: American Conference of Governmental Industrial Hygienists. 1994
6. OSHA. *Occupational Safety and Health Guideline for Welding Fumes*.  
<http://www.osha.gov/SLTC/healthguidelines/weldingfumes/recognition.html>
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8. American Welding Society. *Thoriated Tungsten Electrodes*. Safety and Health Fact Sheet No. 27. Oct. 2003.
9. Palmer, Winifred and Eaton, James. *Effects of Welding on Health, XI*. American Welding Society. 2001.



10. Kura, Jackens, and Keay. *New Weld Fume Chamber Design to Assess HAP Emissions Potential and Promote Cleaner Production*. International Workshop Advances in Cleaner Production. 2009.
11. Department of Health and Human Services. *NIOSH Pocket Guide to Chemical Hazards*. 2005-149. 2005.

## 10.0 Appendices

### Appendix A

#### MSDS Sheets

**MSDS Database**

Rec'd Date :

11/18/1996

Input Date :

03/30/1994

MSDS No : 6372 - Rev. Date :  
Stock Number : Look Up List  
Stock Name : WELDING ROD-THORIATED TUNGSTEN SINTERED THORIATED  
Stock Name 2 : SINTERED THORIATED TUNGSTEN  
Mfr : CUT-RITE INC  
Mfr Phone No : Mfr ID No :  
Comments :

Approved : ☒ Yes ☐ No  
On-Site : ☐ Yes ☒ No  
OP 30 : ☐ Yes ☒ No

CAS No	Chem Name	Percent	Notes:
7440-33-7	TUNGSTEN	98	
NS	THORIUM	2	

Physical Hazards : DOT Codes Class  
Health Hazards : INHALATION

Vapor Pressure (mmHg) Specific Gravity Percent Volatile by Vol.

MSDS No : 7285 - Rev. Date :  
Stock Number : Look Up List  
Stock Name : TUNGSTEN THORIA ALLOY (TUNGSTEN ALLOY)  
Stock Name 2 : THORIATED TUNGSTEN  
Mfr : METAL SAMPLES CO INC  
Mfr Phone No : 205-358-4202 Mfr ID No :  
Comments :

Approved : ☒ Yes ☐ No  
On-Site : ☒ Yes ☐ No  
OP 30 : ☐ Yes ☒ No

CAS No	Chem Name	Percent	Notes:
7440-33-7	TUNGSTEN	>96	
NR	THORIA	<4	

Physical Hazards : None DOT Codes Class  
Health Hazards : None Not Regulated

Vapor Pressure (mmHg) Specific Gravity Percent Volatile by Vol.

NR 19.3 NR

MSDS No : 9223 - Rev. Date : 01/01/2007  
Stock Number : Look Up List  
Stock Name : 2% THORIATED TUNGSTEN ELECTRODES

Approved : ☒ Yes ☐ No

MSDS No : 8967 - Rev. Date : 05/05/1999

Stock Number : Look Up List

Stock Name : ALUMINUM LITHIUM ALLOY

Stock Name 2 :

Mfr : McCook Metals L.L.C. (EX RENOLDS ALUMINUM)

Mfr Phone No : 708-485-9000

Mfr ID No: 2094, 2095, 2195, ET AL

Comments:

Yes No  
Approved : ☒ ☐  
On-Site : ☒ ☐  
OP 30 : ☐ ☒

CAS No	Chem Name	Percent	Notes:
7429-90-5	ALUMINUM	>91	
7439-93-2	LITHIUM	<3.5	
7439-95-4	MAGNESIUM	<6	
7440-22-4	SILVER	<1	
7440-50-8	COPPER	<6.5	
7440-66-6	ZINC	<1	

Physical Hazards : Non-Hazard

DOT Codes Class

Not Regulated

Health Hazards : Non-Hazard

Vapor Pressure (mmHg)  
N/R

Specific Gravity  
2.45-2.8

Percent Volatile by Vol.  
N/R

Show All

Search

Done



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## MATERIAL SAFETY DATA SHEET

Original: November 29, 1984

Supersedes: September 1, 2006

Revised: September 14, 2006Product Name: **ALUMINUM WELDING WIRE AND METALLIZING WIRE**

Emergency Phone: 1-717-637-8911 or 1-800-424-9300

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical Formula: Mixture.

Other Designations: AlcoTec ALMIGWELD (Aluminum spooled electrode)

AlcoTec ALTIGWELD (Aluminum straight length welding rod)

Aluminum Metallizing Wire (coils and spools)

AlumaArc (Aluminum spooled electrode and straight length welding rod)

Manufacturer: AlcoTec Wire Corporation, 2750 Aero Park Drive, Traverse City, MI 49686-9263 USA

Product Use: Welding, Filler Metal, Metallizing, Brazing

### 2. COMPOSITION INFORMATION ON INGREDIENTS

Alloy Ingredients: (% by weight shown as a maximum or a range, except for Aluminum, which is a minimum % by weight)

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Others Each <sup>1</sup>	Others Total	Al
1100	0.95	= Si + Fe	0.05-0.20	0.05	--	--	--	0.10	--	0.05	0.15	99.00
1350	0.10	0.40	0.05	0.01	--	0.01	--	0.05	--	0.03 <sup>3</sup>	0.10	99.50
1188	0.06	0.06	0.005	0.01	0.01	--	--	0.03	0.01	0.01 <sup>4</sup>	--	99.88
1199	0.006	0.006	0.006	0.002	0.006	--	--	0.006	0.002	0.002 <sup>7</sup>	--	99.99
2319	0.20	0.30	5.8-6.8	0.20-0.40	0.02	--	--	0.10	0.10-0.20	0.05 <sup>5</sup>	0.15	Rmnd <sup>2</sup>
4043	4.5-6.0	0.8	0.30	0.05	0.05	--	--	0.10	0.20	0.05	0.15	Rmnd <sup>2</sup>
4047 (718)	11.0-13.0	0.8	0.30	0.15	0.10	--	--	0.20	--	0.05	0.15	Rmnd <sup>2</sup>
4145 (716)	9.3-10.7	0.8	3.3-4.7	0.15	0.15	0.15	--	0.20	--	0.05	0.15	Rmnd <sup>2</sup>
4643	3.6-4.6	0.8	0.10	0.05	0.10-0.30	--	--	0.10	0.15	0.05	0.15	Rmnd <sup>2</sup>
5183	0.40	0.40	0.10	0.50-1.0	4.3-5.2	0.05-0.25	--	0.25	0.15	0.05	0.15	Rmnd <sup>2</sup>
5356	0.25	0.40	0.10	0.05-0.20	4.5-5.5	0.05-0.20	--	0.10	0.06-0.20	0.05	0.15	Rmnd <sup>2</sup>
5554	0.25	0.40	0.10	0.50-1.0	2.4-3.0	0.05-0.20	--	0.25	0.05-0.20	0.05	0.15	Rmnd <sup>2</sup>
5556	0.25	0.40	0.10	0.50-1.0	4.7-5.5	0.05-0.20	--	0.25	0.05-0.20	0.05	0.15	Rmnd <sup>2</sup>
5654	0.45	= Si + Fe	0.05	0.01	3.1-3.9	0.15-0.35	--	0.20	0.05-0.15	0.05	0.15	Rmnd <sup>2</sup>
206.0	0.10	0.15	4.2-5.0	0.20-0.50	0.15-0.35	--	0.05	0.10	0.15-0.30	0.05 <sup>6</sup>	0.15	Rmnd <sup>2</sup>
C355.0 (4009)	4.5-5.5	0.20	1.0-1.5	0.10	0.40-0.6	--	--	0.10	0.20	0.05	0.15	Rmnd <sup>2</sup>
A356.0 (4008, 4010)	6.5-7.5	0.20	0.20	0.10	0.25-0.45	--	--	0.10	0.20	0.05	0.15	Rmnd <sup>2</sup>
357.0	6.5-7.5	0.15	0.05	0.03	0.45-0.6	--	--	0.05	0.20	0.05	0.15	Rmnd <sup>2</sup>

#### Notes:

<sup>1</sup> Beryllium shall not exceed 0.0003 percent.<sup>2</sup> Rmnd = remainder.<sup>3</sup> 1350 may contain Gallium, 0.03% (max.), Boron 0.05% (max.), and Vanadium plus Titanium, 0.02% (max.).<sup>4</sup> 1188 may contain Gallium, 0.03% (max.), and Vanadium, 0.05% (max.).<sup>5</sup> 2319 contains Vanadium, 0.05-0.15% and Zirconium, 0.10-0.25%.<sup>6</sup> 206.0 may contain Tin, 0.05% (max.).<sup>7</sup> 1199 may contain 0.005% each (max.) of Gallium and Vanadium.

#### AlcoTec Wire Corporation

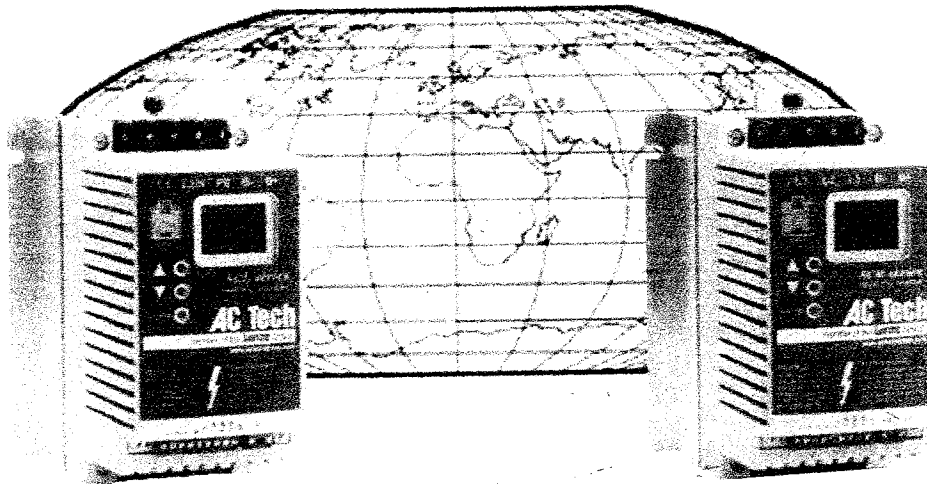
2750 Aero Park Drive • Traverse City, MI 49686-9263 USA • Phone (231) 941-4111

Sales and Marketing Fax (231) 941-9154 • Administrative and Quality Control Fax (231) 941-1040

alcotec@alcotec.com E-mail www.alcotec.com Web site

## Appendix B

### Weld Fume Chamber Manual



# **SCL/SCM Series**

## **Installation and Operation Manual**

# **Sections**

- I. Safety and Equipment Protection
- II. Power Requirements
- III. Control Panel Description
- IV. Rotron Air Flow Meter FM20C125Q
- V. AC Tech Variable Frequency Drive
- VI. Ametek Rotron Blower DR454R72M
- VII. Atlas XT-100 Welding Positioner



# SAFETY



**Do not insert hands into test chamber, with turntable moving, before confirming that area is free of objects that could cause fingers or hands to be caught. ALWAYS disconnect power from unit before attempting to load or unload items from turntable. Unplug cord from power source, or use RED E-STOP switch on control panel. This switch will shut off power to all systems.**



**WARNING**

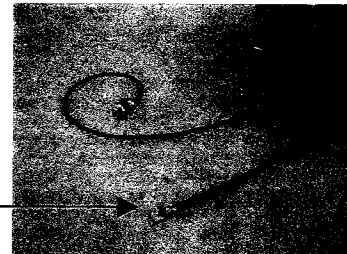
**Never watch weld arc through the clear window only. Arc light may lead to inflammation of the eyes and/ or burning of the skin. Use shaded viewing lens provided, or appropriate welding shield.**

## Equipment Protection



**CAUTION**

**Always connect weld ground, to ground cable provided. Make certain that lug end of cable is away from test chamber structure. Turntable is insulated from the chamber, and chamber cart. Grounding through these members could permanently damage electronic components in the controller.**



# **Power Requirements**

**An adequate power supply with proper protection must be provided. The supply circuit must have a circuit breaker, or a disconnect switch with fuses. General requirements are listed on this page. If necessary, refer to Section V (drive model number SM015S) for more specific information.**

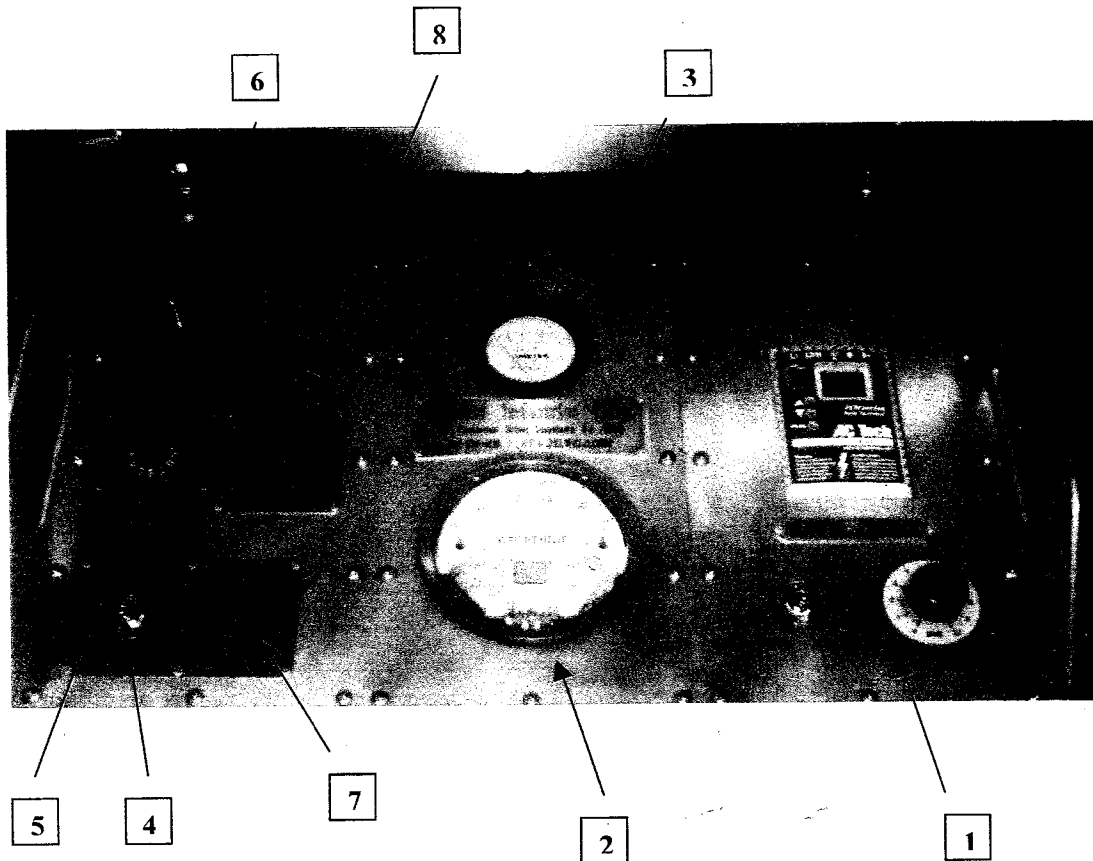
**110/120 Vac 1 phase**

**circuit breaker/fuse rating: 35 A**

## **NOTE:**

**A 2 pole-3 wire plug is installed on the power cord. If necessary, this plug can be changed, by qualified personnel, to accommodate existing or preferred outlets, providing that they are properly rated.**

# Control Panel Description



1. Adjustable Frequency Drive:
  - On/Off switch starts and stops blower motor
  - Dial controls blower speed
2. Magnehelic pressure differential gage
3. Flow Meter Gauge
4. Turntable On/Off switch
5. Turntable rotation speed control
6. Turntable rotation direction switch (fwd/rev)
7. Turntable fuse
8. E-STOP Switch

# OPERATION & MAINTENANCE MANUAL



## ROTRON® INDUSTRIAL PRODUCTS

75 North Street, Saugerties, NY 12477 U.S.A.

Telephone: 845-246-3401 Fax: 845-246-3802

e-mail: [rotronindustrial@ametek.com](mailto:rotronindustrial@ametek.com) website: [www.rotronindustrial.com](http://www.rotronindustrial.com)

## Air Flow Meter

Thank you for purchasing an AMETEK Rotron Flow Meter. When matched with the correct Rotron blower, and properly installed and maintained, this meter will quickly and accurately measure the pipe flow. To ensure good results, please take the time to read these instructions before starting the installation of your air flow meter.

### Sizing for Optimal Efficiency

CURRENT MODELS		FLOW RANGE (SCFM)	THREADS	LENGTH	WIDTH	GAUGE PART #	BODY STYLE	PRIOR MODELS	
MODEL	PART #							MODEL	PART #
FM20C030Q	550599	6-30	2.0" 11.5 NPSC	6.94"	5.49"	550321	A	FM20A030Q	550312
FM20C045Q	550600	9-45				550322		FM20A045Q	550313
FM20C065Q	550601	13-65				550323		FM20A065Q	550314
FM20C125Q	550602	25-125	2.0" 11.5 NPSC	5.34"	5.49"	550290	B	FM20A125Q	550256
FM20C175Q	550603	35-175				550291		FM20A175Q	550255
FM20C225Q	550604	45-225				550292		FM20A225Q	550254
FM30C250Q	550605	50-250	3.0" 8.0 NPSC	7.38"	7.62"	550293	C	FM30A250Q	550259
FM30C350Q	550606	70-350				550294		FM30A350Q	550258
FM30C475Q	550607	95-475				550295		FM30A475Q	550257
FM40C450Q	550608	90-450	4.0" 8.0 NPSC	7.68"	8.62"	550296	D	FM40A450Q	550262
FM40C600Q	550609	120-600				550297		FM40A600Q	550261
FM40C850Q	550610	170-850				550298		FM40A850Q	550260

### Installation

- Piping** – The flow meter should be installed horizontally on the inlet side of the blower. Since this device is directional, please observe the flow direction arrow. Rotron suggests using a length of straight pipe equivalent to three to five pipe diameters prior to the meter for any elbows, valves, etc., unless there is a tee. If there is a tee, the suggested equivalent length is eight to ten pipe diameters. The flow meter should have two pipe diameters of straight pipe after the flow exits the meter before any elbows, tees, valves, etc.
- Continuous Service** – Moisture and debris should not be allowed to enter the tubes leading into the gauge, as it may affect the gauge. Orient the gauge between 10 o'clock and 2 o'clock when viewed from end. (See Figure 1).

If the gauge does not read zero, gently press down on gauge cover while turning counterclockwise to remove cover. Zero the gauge with the Allen wrench and reattach cover.

INSTALL GAUGE  
10 O'CLOCK TO 2 O'CLOCK

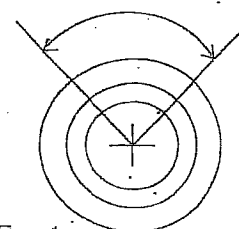


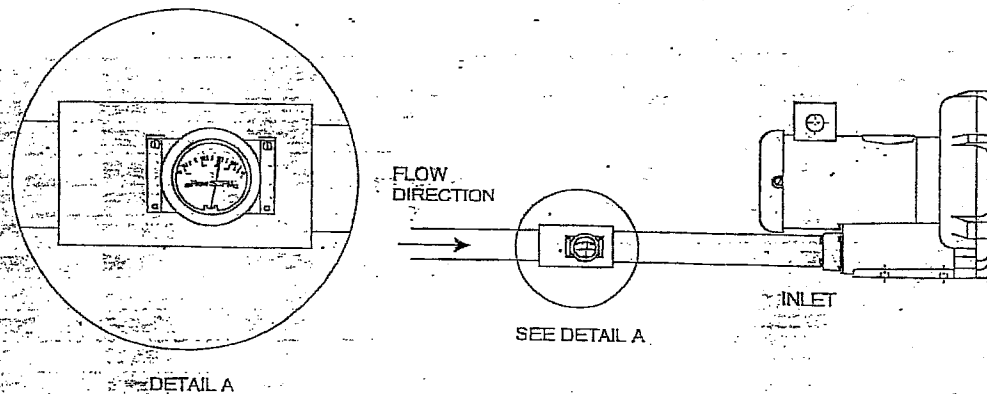
Figure 1

3. Interchangeability - Gauges within a body style are interchangeable to better match your systems actual flow rate to the Gauge Scale. For example:

Body Style	Gauges Available	Flow Range Available
A	550599	6-30 SCFM
A	550600	9-45 SCFM
A	550601	13-65 SCFM

Similar options for each body style are available. Gauges may be purchased separately and field installed without removing the flow meter from the piping.

### Typical Arrangement



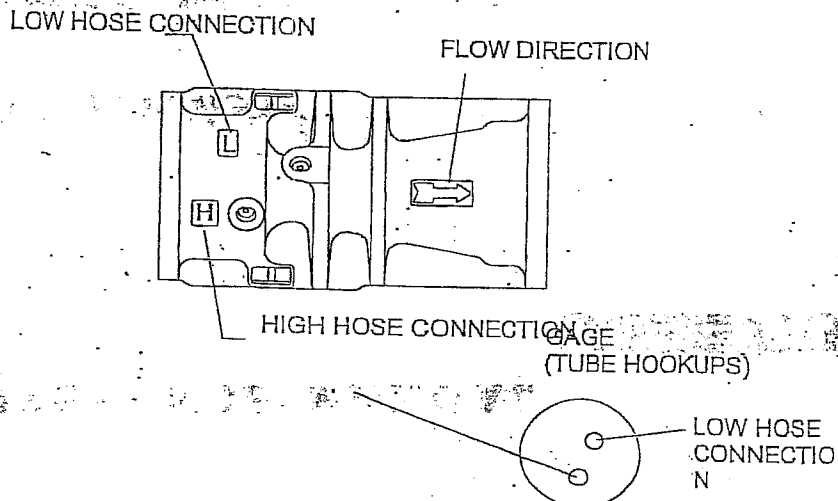
### Operation

Rotron's Flow Meter is a venturi style design. After air enters the inlet, the pressure is measured in the high-pressure tap. The second tap measures the pressure at the throat. The differential between the taps registers across a specially calibrated gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

### Maintenance

This air flow meter has been designed to require minimal maintenance. During normal operation, little maintenance is required. Care should be taken to ensure no debris enters the meter.

If the tubes become plugged, remove and clean. Do not switch the low and high hoses. Note proper orientation of hoses.



## ROTRON Regenerative Blowers

### Measurement Accessories

#### Blower Connection Key

NPT – American National Standard Taper Pipe Thread (Male)

NPSC – American National Standard Straight Pipe Thread for Coupling (Female)

SO – Slip On (Smooth – No Threads)

### Air Flow Meter

#### FEATURES

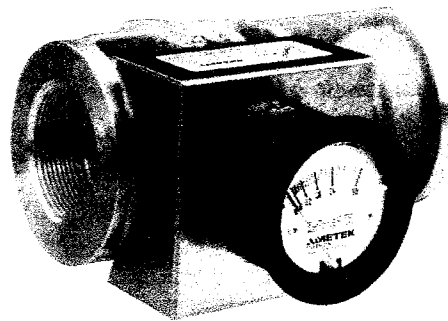
- Direct reading in SCFM
- Low pressure drop (2-4" typical) across the flow meter
- Non-clogging, low impedance air stream
- Light weight aluminum
- No moving parts
- Large easy-to-read dial
- Accurate within 2% at standard conditions
- Good repeatability
- Available in 2", 3" and 4" sizes
- Factory configured for quick installation
- .048" Allen key supplied for gauge adjustment

#### OPTIONS

- Corrosion-resistant version with Chem-Tough™ or in stainless steel
- FDA-approved Food Tough™ surface conversion

#### BENEFITS

- **OPTIMIZE SYSTEM EFFICIENCY**  
Measuring the correct air flow can assist you in fine-tuning to your system's optimal efficiency.
- **BALANCE MULTI-PIPING SYSTEMS**  
When evacuating CFM from more than one pipe, different run lengths or end system impedance can cause one pipe to handle more CFM than the other. With an accurate CFM reading, piping can be balanced by bleeding air in/out or by creating an extra impedance.
- **DETECT CHANNELING OR PLUGGING**  
For systems in which channeling or plugging can occur, a change in the CFM measured can help indicate the unseen changes in your system.



Current Models		Flow Range (SCFM)	B Threads	C Length	D Width	E	F
Model	Part #						
FM20C030Q	550599	6-30	2" - 11.5 NPSC	7.18"	7.0"	2.0"	3.75"
FM20C045Q	550600	9-45					
FM20C065Q	550601	13-65					
FM20C125Q	550602	25-125					
FM20C175Q	550603	35-175					
FM20C225Q	550604	45-225					
FM30C250Q	550605	50-250	3" - 8 NPSC	7.52"	7.4"	2.5"	4.43"
FM30C350Q	550606	70-350					
FM30C475Q	550607	95-475					
FM40C450Q	550608	90-450	4" - 8 NPSC	8.00"	7.7"	2.7"	5.43"
FM40C600Q	550609	120-600					
FM40C850Q	550610	170-850					

Rev. 2/04

G-5

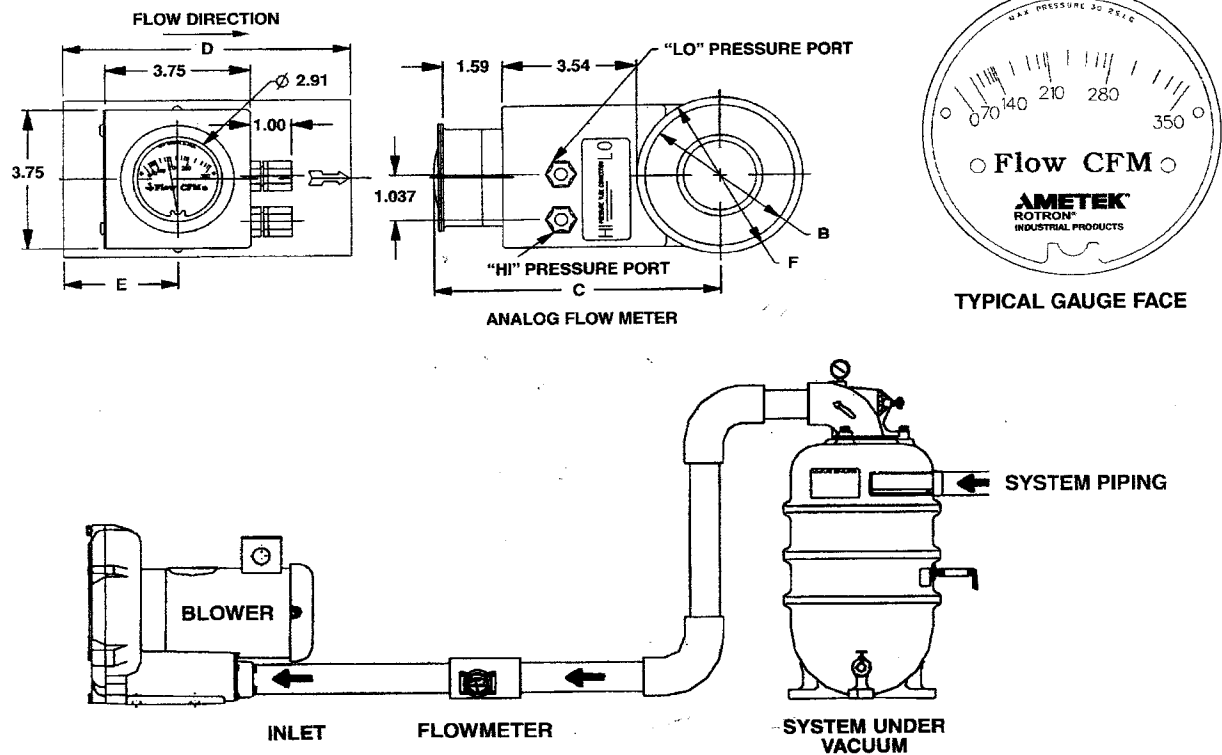
AMETEK Technical and Industrial Products, Kent, OH 44240 • e mail: rotronindustrial@ametek.com • internet: www.ametekrmd.com

## ROTRON Regenerative Blowers

Blower Model Reference Key	
A = SPIRAL	E = DR/EN/CP 656, 6, 623, S7
B = DR/EN/CP 068, 083, 101, 202	F = DR/EN/CP 707, 808, 858, S9, P9 (Inlet Only)
C = DR/EN/CP 303, 312, 313, 353	G = DR/EN/CP 823, S13, P13 (Inlet Only)
D = DR/EN/CP 404, 454, 513, 505, 555, 523	H = DR/EN/CP 909, 979, 1223, 14, S15, P15 (Inlet Only)

## Measurement Accessories

### TYPICAL FLOW METER ARRANGEMENT



### HIGH TEMPERATURE/PRESSURE CORRECTION

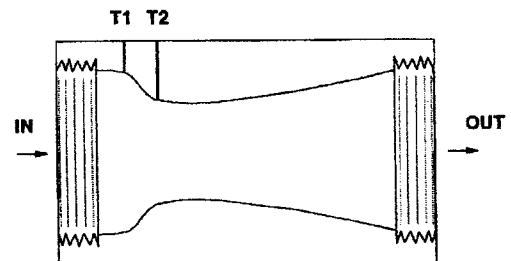
$$SCFM_2 = \frac{SCFM_1}{\sqrt{\left(\frac{14.7}{P_{f2}}\right) \times \left(\frac{530}{T_{f2} + 460}\right)}}$$

$P_{f2}$  = Absolute Pressure in PSIA

$T_{f2}$  = Temperature in °F

- Use on inlet to limit need to correct for high pressure or elevated outlet temperature
- Standard model limits = 140°F and 30 PSIG

### HOW IT WORKS



Rotron's flow meter is a venturi style design. After air enters the inlet, the pressure is measured in the T1 tap. The second tap, T2, measures the pressure at the throat. The differential between T1 and T2 registers across a special calibrated CFM gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

Rev. 2/04

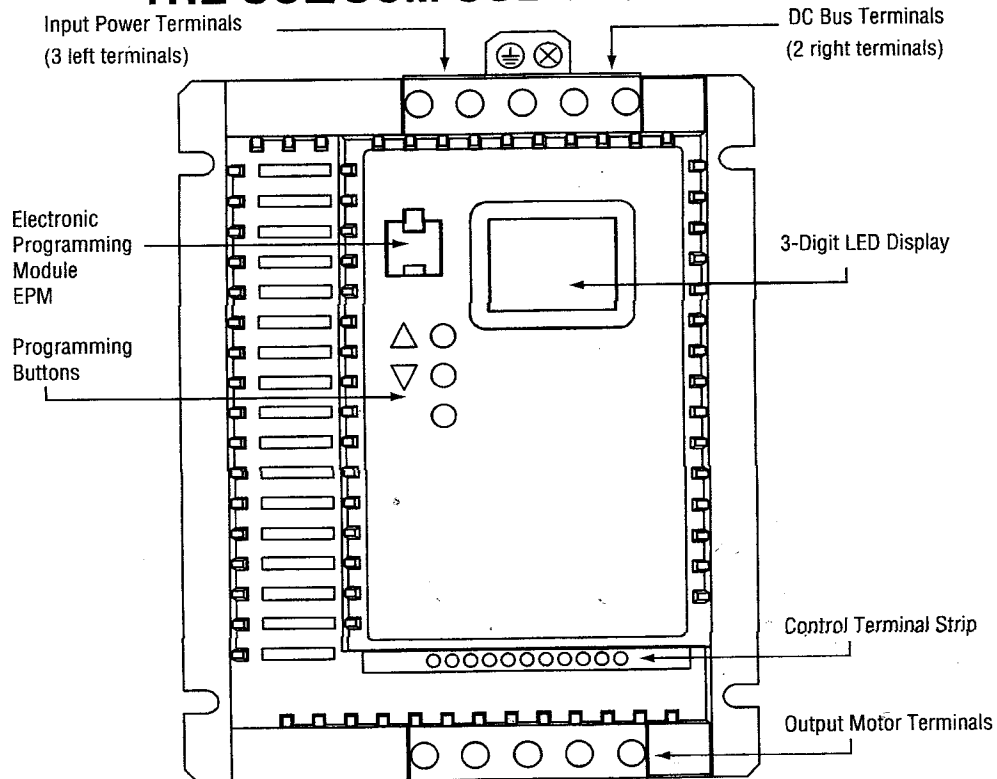
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# THE SCL/SCM SUB-MICRO DRIVE



## Safety Information

All safety information given in these Operating Instructions has the same layout:

	<p><b>Signal Word!</b> (characterizes the severity of the danger)</p> <p>Note (describes the danger and informs on how to proceed)</p>
Icon	Signal Words
<p>Warning of hazardous electrical voltage</p>	<p><b>DANGER!</b> Warns of <b>impending danger</b>. Consequences if disregarded: Death or severe injuries.</p>
<p>Warning of a general danger</p>	<p><b>WARNING!</b> Warns of <b>potential, very hazardous situations</b>. Consequences if disregarded: Death or severe injuries.</p>
<p>Warning of damage to equipment</p>	<p><b>STOP!</b> Warns of <b>potential damage to material and equipment</b>. Consequences if disregarded: Damage to the controller/drive or its environment.</p>
<p>Information</p>	<p><b>Note</b> Designates a general, useful note. If you observe it, handling the controller/drive system is made easier.</p>

# **1 GENERAL**

## **1.1 Products Covered in This Manual**

This manual covers the AC Tech SCL and SCM Series Variable Frequency Drives.

## **1.2 Product Changes**

AC Technology Corporation reserves the right to discontinue or make modifications to the design of its products without prior notice, and holds no obligation to make modifications to products sold previously. AC Technology Corporation also holds no liability for losses of any kind which may result from this action. Instruction manuals with the most up-to-date information are available for download from the AC Tech website ([www.actech.com](http://www.actech.com)).

## **1.3 Warranty**

AC Technology Corporation warrants the SCL/SCM Series AC motor control to be free of defects in material and workmanship for a period of 24 months from the date of shipment from AC Tech's factory. If, under normal use, an SCL/SCM motor control becomes defective within the stated warranty time period, contact AC Technology's Service Department for instructions on obtaining a warranty replacement unit. AC Technology Corporation reserves the right to make the final determination as to the validity of a warranty claim, and sole obligation is to repair or replace only components which have been rendered defective due to faulty material or workmanship. No warranty claim will be accepted for components which have been damaged due to mishandling, improper installation, unauthorized repair and/or alteration of the product, operation in excess of design specifications or other misuse, or improper maintenance. AC Technology Corporation makes no warranty that its products are compatible with any other equipment, or to any specific application, to which they may be applied and shall not be held liable for any other consequential damage or injury arising from the use of its products.

**This warranty is in lieu of all other warranties, expressed or implied. No other person, firm or corporation is authorized to assume, for AC Technology Corporation, any other liability in connection with the demonstration or sale of its products.**

## **1.4 Receiving**

Inspect all cartons for damage which may have occurred during shipping. Carefully unpack equipment and inspect thoroughly for damage or shortage. Report any damage to carrier and/or shortages to supplier. All major components and connections should be examined for damage and tightness, with special attention given to PC boards, plugs, knobs and switches.

## **1.5 Safety Information**


Some parts of AC Tech controllers can be electrically live and some surfaces can be hot. Non-authorized removal of the required cover, inappropriate use, and incorrect installation or operation creates the risk of severe injury to personnel or damage to equipment. All operations concerning transport, installation, and commissioning as well as maintenance must be carried out by qualified, skilled personnel familiar with the installation, assembly, commissioning, and operation of variable frequency drives and the application in which the drive is used.

## INSTALLATION

Ensure proper handling and avoid excessive mechanical stress. Do not bend any components and do not change any insulation distances during transport, handling, installation or maintenance.

Do not touch any electronic components or contacts. This drive contains electrostatically sensitive components, which can easily be damaged by inappropriate handling. Static control precautions must be adhered to during installation, testing, servicing and repairing of this drive and associated options. Component damage may result if proper procedures are not followed.

This drive has been tested by Underwriters Laboratory (UL) and is an approved component in compliance with UL508C Safety Standard.

 <b>Warnings!</b>	<ul style="list-style-type: none"><li>• Suitable for use on a circuit as described in Section 7.0 of this manual.</li><li>• Use minimum 75°C copper wire only.</li><li>• Shall be installed in a Pollution Degree 2 macro-environment.</li></ul>
---	--

This drive must be installed and configured in accordance with both national and international standards. Local codes and regulations take precedence over recommendations provided in this and other AC Tech documentation.

The drive is considered a component for integration into a machine or process. It is neither a machine nor a device ready for use in accordance with European directives (reference machinery directive and electromagnetic compatibility directive). It is the responsibility of the end user to ensure that the machine meets the applicable standards.

## ELECTRICAL CONNECTION

When working on live drive controllers, applicable national safety regulations must be observed. The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, protective earth [PE] connection). While this document does make recommendations in regards to these items, national and local codes must be adhered to.

The documentation contains information about installation in compliance with EMC (shielding, grounding, filters and cables). These notes must also be observed for CE-marked controllers. The manufacturer of the system or machine is responsible for compliance with the required limit values demanded by EMC legislation.

## APPLICATION

The drive must not be used as a safety device for machines where there is a risk of personal injury or material damage. Emergency Stops, over-speed protection, acceleration and deceleration limits, etc must be made by other devices to ensure operation under all conditions.

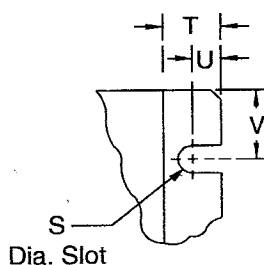
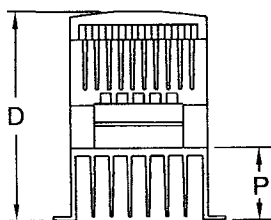
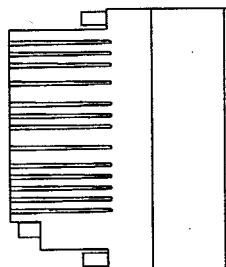
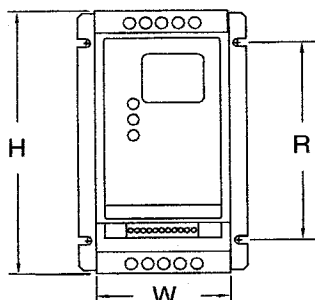
The drive does feature many protection devices which are aimed at protecting the drive and the driven equipment by generating a fault and shutting the drive and motor down by removing power. Mains power variances can also result in shutdown of the drive. When the fault condition disappears or is cleared, the drive can be configured to automatically restart, it is the responsibility of the user, OEM and/or integrator to ensure that the drive is configured for safe operation.

#### **1.6 Customer Modification**

AC Technology Corporation, its sales representatives and distributors, welcome the opportunity to assist our customers in applying our products. Many custom options are available to aid in this function. AC Technology Corporation cannot assume responsibility for any modifications not authorized by its engineering department.

## 2 SCL/SCM DIMENSIONS

Dimensions for the SCL/SCM models rated 0.33 - 1.5Hp (0.25 - 1.1kW).



Mounting Tab Detail

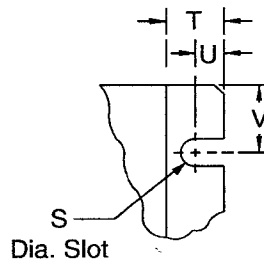
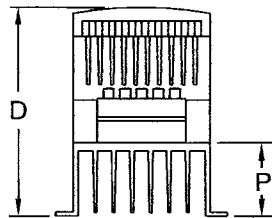
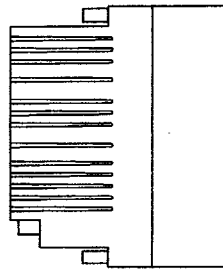
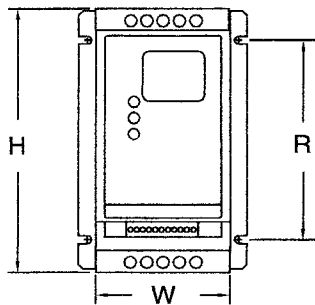
If  $R < 6.30"$  (160)  
 $S = 0.19"$  (5)  
 $T = 0.38"$  (10)  
 $U = 0.18"$  (5)  
 $V = 0.66"$  (17)

If  $R = 6.30"$  (160)  
 $S = 0.28"$  (7)  
 $T = 0.50"$  (13)  
 $U = 0.24"$  (6)  
 $V = 0.90"$  (23)

HP	kW	INPUT VOLTAGE	INPUT PHASE	SCM MODEL	SCL MODEL	H	W	D	P	R
0.33	0.25	120	1	SM004S	N/A	5.75 (146)	2.88 (74)	3.26 (83)	0.28 (7)	4.37 (111)
		208 / 240	1	SM204S	SL204S	5.75 (146)	2.88 (74)	3.26 (83)	0.28 (7)	4.37 (111)
0.5	0.37	120	1	SM005S	N/A	5.75 (146)	2.88 (74)	3.26 (83)	0.28 (7)	4.37 (111)
		208 / 240	1	SM205S	SL205S	5.75 (146)	2.88 (74)	3.26 (83)	0.28 (7)	4.37 (111)
		208 / 240	3	SM205	N/A	5.75 (146)	2.88 (74)	3.26 (83)	0.28 (7)	4.37 (111)
		400 / 480	3	SM405	N/A	5.75 (146)	2.88 (74)	3.94 (100)	0.80 (20)	4.37 (111)
0.75	0.55	208 / 240	1	SM208S	SL208S	5.75 (146)	2.88 (74)	3.63 (92)	0.63 (16)	4.37 (111)
1	0.75	120	1	SM010S	N/A	5.75 (146)	3.76 (95)	4.88 (124)	1.50 (38)	4.37 (111)
		208 / 240	1	SM210S	SL210S	5.75 (146)	2.88 (74)	3.63 (92)	0.63 (16)	4.37 (111)
		208 / 240	3	SM210	N/A	5.75 (146)	2.88 (74)	3.63 (92)	0.63 (16)	4.37 (111)
		480 / 590	3	SM410	N/A	5.75 (146)	2.88 (74)	4.74 (120)	1.60 (41)	4.37 (111)
1.5	1.1	120	1	SM015S	N/A	5.75 (146)	3.76 (96)	4.88 (124)	1.50 (38)	4.37 (111)
		208 / 240	1	SM215S	SL215S	5.75 (146)	3.76 (96)	4.88 (124)	1.50 (38)	4.37 (111)
		208 / 240	3	SM215	N/A	5.75 (146)	2.88 (73)	5.56 (141)	2.56 (65)	4.37 (111)
		400 / 480	3	SM415	N/A	5.75 (146)	2.88 (73)	5.74 (146)	2.56 (65)	4.37 (111)

Dimensions shown are in inches and (mm).

Dimensions for the SCL/SCM models rated 2 - 15Hp (1.5 - 11kW).



If  $R < 6.30"$  (160)  
 $S = 0.19"$  (5)  
 $T = 0.38"$  (10)  
 $U = 0.18"$  (5)  
 $V = 0.66"$  (17)

If  $R = 6.30"$  (160)  
 $S = 0.28"$  (7)  
 $T = 0.50"$  (13)  
 $U = 0.24"$  (6)  
 $V = 0.90"$  (23)

Mounting Tab Detail

HP	KW	INPUT VOLTAGE	INPUT PHASE	SCM MODEL	SCL MODEL	H	W	D	P	R
2	1.5	208 / 240	1	SM220S	SL220S	5.75 (146)	3.76 (95)	4.88 (124)	1.50 (38)	4.37 (111)
		208 / 240	3	SM220	N/A	5.75 (146)	2.88 (74)	5.56 (141)	2.56 (65)	4.37 (111)
		400 / 480	3	SM420	N/A	5.75 (146)	2.88 (74)	5.74 (146)	2.56 (65)	4.37 (111)
3	2.2	208 / 240	1	SM230S	SL230S	5.75 (146)	3.76 (95)	5.53 (140)	2.18 (55)	4.37 (111)
		208 / 240	3	SM230	N/A	5.75 (146)	3.76 (95)	5.53 (140)	2.18 (55)	4.37 (111)
		400 / 480	3	SM430	N/A	5.75 (146)	3.76 (95)	5.24 (133)	1.90 (48)	4.37 (111)
5	4.0	208 / 240	3	SM250	N/A	5.75 (146)	3.76 (95)	6.74 (171)	3.40 (160)	3.25 (83)
		400 / 480	3	SM450	N/A	5.75 (146)	3.76 (95)	6.74 (171)	3.40 (160)	3.25 (83)
7.5	5.5	208 / 240	3	SM275	N/A	7.75 (197)	5.02 (128)	7.18 (182)	3.40 (86)	4.81 (122)
		400 / 480	3	SM475	N/A	5.75 (146)	3.76 (95)	6.74 (171)	3.40 (160)	3.25 (83)
10	7.5	208 / 240	3	SM2100	N/A	7.75 (197)	5.02 (128)	7.18 (182)	3.40 (86)	4.81 (122)
		400 / 480	3	SM4100	N/A	7.75 (197)	5.02 (128)	7.18 (182)	3.40 (86)	4.81 (122)
15	11	208 / 240	3	SM2150	N/A	9.75 (248)	6.68 (170)	8.00 (203)	3.40 (86)	6.30 (160)
		400 / 480	3	SM4150	N/A	7.75 (197)	5.02 (128)	7.18 (182)	3.60 (91)	4.81 (122)

Dimensions shown are in inches and (mm)

### 3 SCL/SCM MODEL DESIGNATION CODE

The SCL/SCM model number gives a full description of the basic drive unit.

**EXAMPLE:** SL210S = SCL Series, 208/240 Vac, 1 HP, single phase input

	SL	2	10	S
<b>Series:</b>				
SL = SCL Series Variable Speed AC Motor Drive with integral line filter				
SM = SCM Series Variable Speed AC Motor Drive				
<b>Input Voltage:</b>				
0 = 120 Vac (For 110, 115, and 120 Vac; 50 or 60 Hz)				
2 = 208/240 Vac (For 208, 220, 230, and 240 Vac; 50 or 60 Hz)				
4 = 400/480 Vac (For 380, 415, 460, and 480 Vac; 50 or 60 Hz)				
<b>Rating:</b>				
4 = 0.33 Hp (0.25      15 = 1.5 Hp (1.1 kW)      75 = 7.5 Hp (5.5 kW)				
5 = 0.50 Hp (0.37      20 = 2 Hp (1.5 kW)      100 = 10 Hp (7.5 kW)				
8 = 0.75 Hp (0.55      30 = 3 Hp (2.2 kW)      150 = 15 Hp (11 kW)				
10 = 1 Hp (0.75 kW)      50 = 5 Hp (4.0 kW)				
<b>Input Phase:</b>				
S = Single phase input only.				
No character indicates three phase input only				

### 4 SCL/SCM SPECIFICATIONS

Conformity	CE	Low Voltage Directive (73/23/EEC)
Approvals	UL 508C	Underwriters Laboratories - Power Conversion Equipment
Storage Temperature	-20° to 70° C	
Ambient Operating Temperature	0° to 40° C (derate 2.5% per °C above 40°)	
Ambient Humidity	< 95% (non-condensing)	
Altitude	3300 ft (1000 m) above sea level (derate 5% per additional 3300 ft)	
Input Line Voltages	120, 208/240, 400/480 Vac	
Input Voltage Tolerance	+10%, -15%	
Input Frequency Tolerance	48 to 62 Hz	
Output Wave Form	Sine Coded PWM	
Output Frequency	0 - 240 Hz	
Carrier Frequency	4 kHz to 10 kHz (10 kHz requires derating; see parameter P02)	
Service Factor	1.00 (up to 8 kHz carrier; derate for 10 kHz; see parameter P02)	
Efficiency	Up to 98%	
Power Factor (displacement)	0.96 or better	
Overload Current Capacity	150% for 60 seconds, 180% for 30 seconds	
Speed Reference Follower	0-10 VDC, 4-20 mA	
Digital Outputs	(1) Normally open relay; contacts rated 3 amps at 250 Vac (1) Digital output (current-sourcing); rated 50 mA at 12 VDC	
Earth Leakage Current (EN 50178)	SCL: > 3.5 mA to PE    SCM: < 3.5 mA to PE	



## 5 SCL/SCM RATINGS

SCM MODEL NUMBER	SCL MODEL NUMBER	FOR MOTORS		INPUT (50 - 60 Hz)			OUTPUT (3 phase)	HEAT LOSS <sup>1</sup> (WATTS)
		RATED		INPUT PHASE	CURRENT (AMPS)	POWER (kVA)	CURRENT (AMPS)	
		HP	kW					
120 Vac INPUT MODELS				120 Vac			0 - 230 Vac	
SM004S	N / A	0.33	0.25	1	6.8	0.8	1.7	29
SM005S	N / A	0.50	0.37	1	9.2	1.1	2.4	33
SM010S	N / A	1	0.75	1	16.6	2.0	4.2	57
SM015S	N / A	1.5	1.1	1	24	2.9	6.0	86
208 / 240 Vac INPUT MODELS				208 / 240 Vac			0 - 208 / 230 Vac	
SM204S	SL204S	0.33	0.25	1	3.9 / 3.4	0.8	1.9 / 1.7	23
SM205S	SL205S	0.50	0.37	1	5.8 / 5.0	1.2	2.8 / 2.4	31
SM205	N / A	0.50	0.37	3	3.1 / 2.7	1.1	2.8 / 2.4	31
SM208S	SL208S	0.75	0.55	1	6.9 / 6.0	1.4	3.7 / 3.2	34
SM210S	SL210S	1	0.75	1	10.6 / 9.2	2.2	4.8 / 4.2	47
SM210	N / A	1	0.75	3	5.8 / 5.1	2.1	4.8 / 4.2	47
SM215S	SL215S	1.5	1.1	1	13.9 / 12.0	2.9	6.9 / 6.0	68
SM215	N / A	1.5	1.1	3	8.0 / 6.9	2.9	6.9 / 6.0	68
SM220S	SL220S	2	1.5	1	18.4 / 16.0	3.1	8.1 / 7.0	71
SM220	N / A	2	1.5	3	9.1 / 7.9	3.3	8.1 / 7.0	71
SM230S	SL230S	3	2.2	1	24 / 21	4.1	11.0 / 9.6	108
SM230	N / A	3	2.2	3	12.4 / 10.8	4.5	11.0 / 9.6	108
SM250	N / A	5	4.0	3	19.6 / 17.1	7.1	17.5 / 15.2	173
SM275	N / A	7.5	5.5	3	28 / 25	10.3	25 / 22	286
SM2100	N / A	10	7.5	3	34 / 32	13.1	30 / 28	379
SM2150	N / A	15	11	3	54 / 48	20.0	48 / 42	476
400 / 480 Vac INPUT MODELS				400 / 480 Vac			0 - 400 / 460 Vac	
SM405	N / A	0.50	0.37	3	1.6 / 1.4	1.1	1.3 / 1.1	31
SM410	N / A	1	0.75	3	3.0 / 2.5	2.1	2.5 / 2.1	47
SM415	N / A	1.5	1.1	3	4.3 / 3.6	3.0	3.6 / 3.0	58
SM420	N / A	2	1.5	3	4.8 / 4.0	3.3	4.1 / 3.4	63
SM430	N / A	3	2.2	3	6.4 / 5.4	4.5	5.8 / 4.8	92
SM450	N / A	5	4.0	3	10.6 / 8.8	7.1	9.4 / 7.8	155
SM475	N / A	7.5	5.5	3	14.2 / 12.4	10.3	12.6 / 11.0	254
SM4100	N / A	10	7.5	3	18.1 / 15.8	13.1	16.1 / 14.0	310
SM4150	N / A	15	11	3	27 / 24	20.0	24 / 21	390

1 Values shown for 6kHz carrier frequency at full speed and full load.

<sup>1</sup> Values shown for 6kHz carrier frequency at full speed and full load.

## 6 INSTALLATION



### NOTE

SCL/SCM Series drives are intended for inclusion within other equipment, by professional electrical installers according to EN 61000-3-2. They are **not** intended for stand-alone operation.



### WARNING!

Drives must **not** be installed where subjected to adverse environmental conditions such as: combustible, oily, or hazardous vapors or dust; excessive moisture or dirt; vibration; excessive ambient temperatures. Consult AC Technology for more information on the suitability of a drive to a particular environment.

SCL/SCM models are suitable for UL Pollution Degree 2 environment only, and **MUST** be installed in an electrical enclosure that will provide complete mechanical protection and will maintain the internal temperature within the drive's ambient operating temperature rating. All drive models **MUST** be mounted in a vertical position for proper heatsink cooling.

Maintain a minimum spacing around the drive of at least 1 inch (25 mm) on each side and 2 inches (50 mm) on the top and bottom for units up to 5 Hp (4 kW), and 2 inches (50 mm) on each side and 4 inches (100 mm) on the top and bottom for larger units. Allow more spacing if the drive is mounted next to other heat-producing equipment. Do not mount drives above other drives or heat producing equipment. Fans or blowers should be used to insure proper cooling in tight quarters.

In order to properly size an enclosure, the heat generated by the drive(s) must be known. Refer to the HEAT LOSS column in Section 5.0, *SCL/SCM RATINGS*. An enclosure manufacturer can then determine the required enclosure size based on the total heat generated inside the enclosure (from the drive(s) and other heat sources), the maximum allowable temperature inside the enclosure, the maximum ambient temperature outside the enclosure, and the enclosure properties.

The SCL/SCM Series is UL approved for solid state motor overload protection. Therefore, a separate thermal overload relay is not required for single motor applications.

### 6.1 Installation After a Long Period of Storage



### STOP!

Severe damage to the drive can result if it is operated after a long period of storage or inactivity without reforming the DC bus capacitors!

If input power has not been applied to the drive for a period of time exceeding three years (due to storage, etc), the electrolytic DC bus capacitors within the drive can change internally, resulting in excessive leakage current. This can result in premature failure of the capacitors if the drive is operated after such a long period of inactivity or storage.

In order to reform the capacitors and prepare the drive for operation after a long period of inactivity, apply input power to the drive for 8 hours prior to actually operating the motor.

## 7 INPUT AC POWER REQUIREMENTS



### **DANGER!**

Hazard of electrical shock! Capacitors retain charge after power is removed. Before servicing the drive, disconnect incoming power and wait until the voltage between terminals B+ and B- is 0 VDC.

The input voltage must match the nameplate voltage rating of the drive. Voltage fluctuation must not vary by greater than 10% overvoltage or 15% undervoltage.



### **NOTE**

Drives with dual input voltage ratings must be programmed for the proper supply voltage (refer to Parameter 01 - LINE VOLTAGE SELECTION in Section 15, *DESCRIPTION OF PARAMETERS*).

The drive is suitable for use on a circuit capable of delivering not more than 5,000 RMS symmetrical amperes at the drive's rated voltage.

If the kVA rating of the AC supply transformer is greater than 10 times the input kVA rating of the drive(s), an isolation transformer or 2-3% input line reactor must be added to the line side of the drive(s).

Three phase voltage imbalance must be less than 2.0% phase to phase. Excessive phase to phase imbalance can cause severe damage to the drive.

Motor voltage should match line voltage in normal applications. The drive's maximum output voltage will equal the input voltage. Use extreme caution when using a motor with a voltage rating which is different from the input line voltage.

### **7.1 Input Voltage Ratings**

**SM000S Series** drives are rated for 120 Vac single phase, 50-60 Hz input. The drive will function with input voltage of 120 Vac (+10%, -15%) at 48 to 62 Hz.

**SM200S & SL200S Series** drives are rated for 208/240 Vac, single phase, 50-60 Hz input. The drive will function with input voltage of 208 to 240 Vac (+10%, -15%), at 48 to 62 Hz.

**SM200 Series** drives are rated for 208/240 Vac, three phase, 50-60 Hz input. The drive will function with input voltage of 208 to 240 Vac (+10%, -15%) at 48 to 62 Hz.

**SM400 Series** drives are rated for 400/480 Vac, three phase, 50-60 Hz input. The drive will function with input voltage of 400 to 480 Vac (+10%, -15%) at 48 to 62 Hz.



### **NOTE**

Parameter 01 - LINE VOLTAGE SELECTION must be programmed according to the applied input voltage. Refer to Section 15, *DESCRIPTION OF PARAMETERS*.

## 7.2 Input Fusing Requirements

A circuit breaker or a disconnect switch with fuses must be provided in accordance with the National Electric Code (NEC) and all local codes. Refer to the following tables for proper ratings:

<b>INPUT FUSE &amp; CIRCUIT BREAKER RATINGS</b> (for installation to UL and EN 60204-1)							
120 Vac 1 phase		208/240 Vac 1 phase		208/240 Vac 3 phase		400/480 Vac 3 phase	
SM004S	10 A	S_204S	10 A			SM405	10 A
SM005S	15 A	S_205S	10 A	SM205	10 A		
		S_208S	10 A				
SM010S	25 A	S_210S	15 A	SM210	10 A	SM410	10 A
SM015S	35 A	S_215S	20 A	SM215	12 / 10 A	SM415	10 A
		S_220S	25 / 20 A	SM220	15 / 12 A	SM420	10 A
		S_230S	30 / 25 A	SM230	20 / 15 A	SM430	10 A
				SM250	30 / 25 A	SM450	15 / 12 A
				SM275	45 / 40 A	SM475	20 / 20 A
				SM2100	50 / 50 A	SM4100	30 / 25 A
				SM2150	80 / 75 A	SM4150	40 / 35 A



### NOTE

- Applicable national and local electrical codes take precedence over recommendations in these tables.
- Use UL Class CC fast-acting, current limiting type fuses. Select fuses with low  $I^2T$  values, rated at 200,000 AIC. Recommended fuses are Bussman KTK-R, JJN, and JJS. Similar fuses with equivalent ratings by other manufacturers may also be acceptable.



### WARNING!

This product can cause a DC current in the protective conductor. Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only an RCD of Type B is allowed on the supply side of this product. Otherwise, another protective measure shall be applied, such as separation from the environment by double or reinforced insulation, or isolation from the supply system by a transformer.

Observe the following when using RCDs:

1. Only install the RCD between the supply mains and drive controller.
2. The RCD can be activated by:
  - capacitive leakage currents between the cable screens during operation (especially with long, screened motor cables)
  - connecting several drives to the mains at the same time
  - additional RFI filters

### 7.3 Input Wire Size Requirements

INPUT WIRE SIZE REQUIREMENTS											
120 Vac 1 phase			208/240 Vac 1 phase			208/240 Vac 3 phase			400/480 Vac 3 phase		
MODEL	AWG	mm <sup>2</sup>	MODEL	AWG	mm <sup>2</sup>	MODEL	AWG	mm <sup>2</sup>	MODEL	AWG	mm <sup>2</sup>
SM004S	14	2.5	S_204S	14	2.5	SM205	14	2.5	SM405	14	2.5
SM005S	14	2.5	S_205S	14	2.5						
			S_208S	14	2.5						
SM010S	12	4.0	S_210S	14	2.5						
SM015S	10	6.0	S_215S	14	2.5						
			S_220S	12	4.0						
			S_230S	10	6.0						
						SM210	14	2.5	SM410	14	2.5
						SM215	14	2.5	SM415	14	2.5
						SM220	14	2.5	SM420	14	2.5
						SM230	14	2.5	SM430	14	2.5
						SM250	12	4.0	SM450	14	2.5
						SM275	8	10	SM475	12	4.0
						SM2100	8	10	SM4100	10	6.0
						SM2150	6	16	SM4150	8	10

### 7.4 Installation According to EMC Requirements

The SCM and SCL Series can be installed to meet the European standards for Electromagnetic Compatibility (EMC) requirements. These requirements govern the permissible electromagnetic emissions and immunity, both radiated and conducted, of a drive system.

The EMC requirements apply to the final installation in its entirety, not to the individual components used. Because every installation is different, the recommended installation should follow these guidelines as a minimum. Additional equipment (such as ferrite core absorbers on power conductors) or alternative wiring practices may be required to meet conformance in some installations.

**Filter:** The input to the drive (or group of drives) must include a filter to reduce the electrical noise reflected back to the AC Line. The SCL Series includes a filter that has been tested to meet the industrial standards set by the EU, EN 61800-3 for conducted emissions and EN 55011 for radiated emissions to class A compliance when installed in a control cabinet with a motor cable  $\leq 10\text{m}$ . The SCM can be installed to meet these same standards when used with an appropriately installed external line filter.

<p>EMC Compliance with EN 61800-3/A11</p>	
<p><b>Installation:</b> Shielded cable must be used for all control and power cables and exposed wiring must be kept as short as possible.</p>	
<p>[A] Screen clamps [B] Control cable [C] Low-capacitance motor cable (core/core <math>\leq 75\text{ pF/m}</math>, core/screen <math>\leq 150\text{ pF/m}</math>) [D] Electrically conductive mounting plate [E] Filter</p>	

## 8 POWER WIRING



### **DANGER!**

Hazard of electrical shock! Capacitors retain charge after power is removed. Before servicing the drive, disconnect the incoming power and wait until the voltage between terminals B+ and B- is 0 VDC.

Note the drive input and output current ratings and the check applicable electrical codes for required wire type and size, grounding requirements, over-current protection, and incoming power disconnect, before wiring the drive. Size conservatively to minimize voltage drop.

Input fusing and a power disconnect switch or contactor **MUST** be wired in series with terminals L1 and L2/N (on single-phase input models), or terminals L1, L2, and L3 (on three-phase input models). This disconnect must be used to power down the drive when servicing, or when the drive is not to be operated for a long period of time, but should not be used to start and stop the motor.

**Repetitive cycling of a disconnect or input contactor (more than once every two minutes) may cause damage to the drive.**

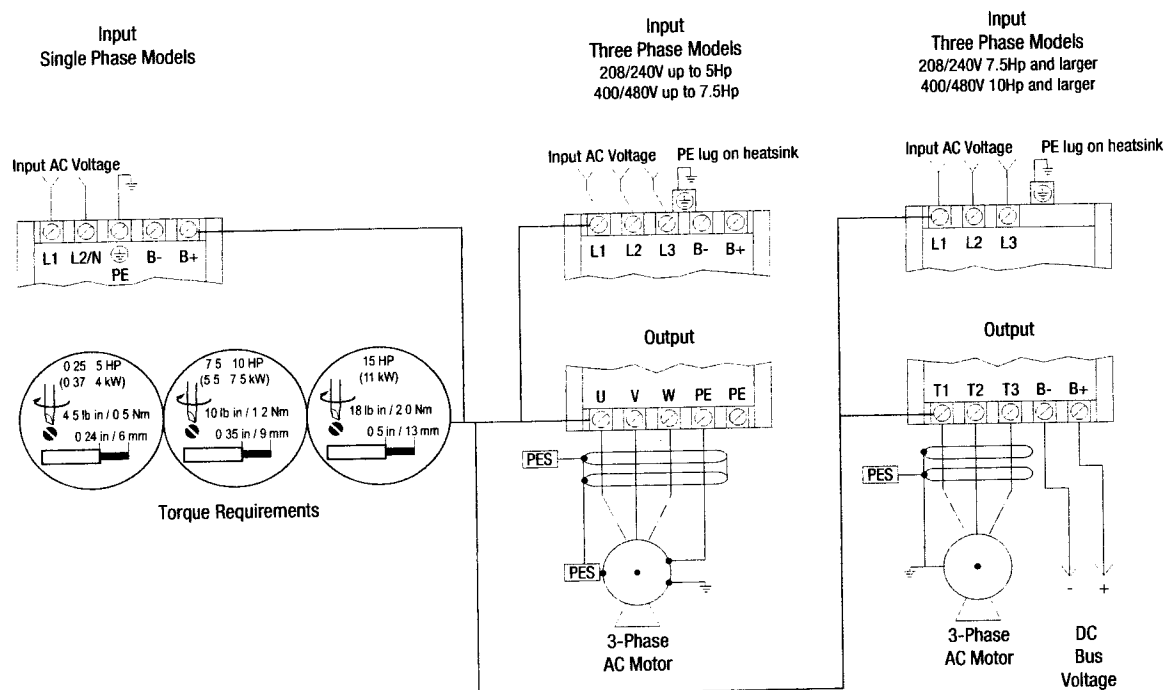
### 8.1 Input and Output Wiring

On single phase input models, wire the input power to terminals L1 and L2/N. On three phase input models, wire the input power to terminals L1, L2, and L3. Refer to Section 9, *SCL/SCM POWER WIRING DIAGRAM*.

Keep all three power output wires, from terminals U, V, and W to the motor, tightly bundled and run them in a separate conduit away from all other power and control wiring.

It is not recommended to install contactors or disconnect switches between the drive and motor. Operating such devices while the drive is running can potentially cause damage to the drive's power components. If such a device is required, it should only be operated when the drive is in a STOP state. If there is potential for the device to be opened while the drive is running, the drive must be programmed for COAST to stop (refer to Parameter 4 - STOP METHOD), and an auxiliary contact on the device must be interlocked with the drive's run circuit. This will give the drive a stop command at the same time the device opens, and will not allow the drive to start again until the device is closed.

## 9 SCL/SCM POWER WIRING DIAGRAM



### WARNING!

- DO NOT connect incoming AC power to output terminals U, V, W, or terminals B+, B-. Severe damage to the drive will result.
- Leakage current may exceed 3.5 mA AC. Minimum size of the protective earth (PE) conductor shall comply with local safety regulations for high leakage current equipment.



### NOTE

- WIRE AND GROUND IN ACCORDANCE WITH NEC OR CEC, AND ALL APPLICABLE LOCAL CODES.
- Motor wires MUST be run in a separate steel conduit away from control wiring and incoming AC power wiring.
- Do not install contactors between the drive and the motor without consulting AC Technology for more information. Failure to do so may result in drive damage.
- Use only UL and CSA listed and approved wire.
- Minimum wire voltage rating is 300 V for 120, 208, and 240 Vac systems, and 600 V for 400 and 480 Vac systems.
- Wire gauge must be based on a minimum of 125% of the rated input/output current of the drive, and a minimum 75°C insulation rating. Use copper wire only.

## 10 CONTROL WIRING

### 10.1 Control Wiring vs. Power Wiring

External control wiring **MUST** be run in a separate conduit away from all other input and output power wiring. If control wiring is not kept separate from power wiring, electrical noise may be generated on the control wiring that will cause erratic drive behavior. Use twisted wires or shielded cable grounded at the drive chassis **ONLY**. Recommended control wire is Belden 8760 (2-wire), 8770 (3-wire), or equivalent.



#### NOTE

Control terminals provide basic isolation (insulation per EN 61800-5-1). Protection against contact can only be assured by additional measures e.g. supplemental insulation.

Strip off 0.20 to 0.25 inches (5 to 6 mm) of insulation for control wiring, and torque the control terminals to 2 lb-in (0.2 Nm). Be careful not to overtorque the control terminals, as this will cause damage to the terminal strip. This is not covered under warranty and can only be repaired by replacing the control board.

### 10.2 TB-2: Circuit Common

The TB-2 terminal is used as circuit common for the analog speed reference inputs. If necessary TB-2 may be connected to chassis ground.

### 10.3 Surge Suppression on Relays

Current and voltage surges and spikes in the coils of contactors, relays, solenoids, etc, near or connected to the drive, can cause erratic drive operation. Therefore, a snubber circuit should be used on coils associated with the drive. For AC coils, snubbers should consist of a resistor and a capacitor in series across the coil. For DC coils, a free-wheeling or flyback diode should be placed across the coil. Snubbers are typically available from the manufacturer of the device.

### 10.4 Start/Stop Control

There are various control schemes that allow for 2-wire and 3-wire Start/Stop circuits. Refer to the wiring diagrams in Section 11, *SCL/SCM CONTROL WIRING DIAGRAMS*.

### 10.5 Speed Reference Signals

The drive allows for three analog speed reference inputs:

- |           |   |
|-----------|---|
| SPEED POT | Connect the wiper of a speed pot to terminal TB-5, and connect the high and low end leads to terminals TB-6 and TB-2, respectively. The speed pot can be 2.5k $\Omega$ up to 10k $\Omega$ . |
| 0-10 VDC  | Wire the positive to terminal TB-5 and the negative to terminal TB-2. TB-5 input impedance is 120k $\Omega$ .   |
| 4-20 mA   | Wire the positive to terminal TB-25 and the negative to terminal TB-2. TB-25 input impedance is 250 $\Omega$ .  |



## 10.6 Speed Reference Selection

If an analog speed reference input is used to control the drive speed, terminal TB-13A, 13B, or 13E (Parameter 10, 11, or 12) may be programmed as the input select for the desired analog input signal. When that TB-13 terminal is then closed to TB-11, the drive will follow the selected analog speed reference input.

If an analog speed reference input is not selected on the terminal strip using TB-13A, 13B, or 13E, speed control will default to STANDARD mode, which is governed by the setting of STANDARD SPEED SOURCE (Parameter 05). The STANDARD SPEED SOURCE can be the ▲ and ▼ buttons on the front of the drive, PRESET SPEED #1 (Parameter 31), a 0-10 VDC signal, or a 4-20 mA signal.

### 0 - 10 VDC and 4 - 20 mA INPUT SIGNALS

TB-13A, TB-13B, and TB-13E can all be programmed to select a 0-10 VDC or 4-20 mA analog speed reference input.

### PRESET SPEEDS

TB-13A can be programmed to select PRESET SPEED #1 (04), TB-13B to select PRESET SPEED #2 (04), and TB-13E to select PRESET SPEED #3 (04). There are a total of seven preset speeds, which are activated by different combinations of contact closures between TB-13A, 13B, 13E and TB-11. Refer to Parameters 31-37 in Section 15, *DESCRIPTION OF PARAMETERS*.

### JOG

TB-13B can be programmed to select either JOG FORWARD (07) or JOG REVERSE (08). The Jog speed is set by PRESET SPEED #2 (Parameter 32). Close TB-13B to TB-11 to JOG, and open the contact to STOP.



#### **WARNING!**

When operating in JOG mode, the STOP signal and the AUXILIARY STOP function (see Parameters 10-12) **WILL NOT** stop the drive. To stop the drive, remove the JOG command.

JOG REVERSE will operate the drive in reverse rotation even if ROTATION DIRECTION (Parameter 17) is set to FORWARD ONLY.



#### **NOTE**

If the drive is commanded to JOG while running, the drive will enter JOG mode and run at PRESET SPEED #2. When the JOG command is removed, the drive will STOP.

### MOTOR OPERATED POT (MOP) / FLOATING POINT CONTROL

TB-13B and TB-13E are used for this function, which controls the drive speed using contacts wired to the terminal strip. Program TB-13B for DECREASE FREQ (05), and program TB-13E for INCREASE FREQ (05). Closing TB-13B to TB-11 will cause the speed setpoint to decrease until the contact is opened. Closing TB-13E to TB-11 will cause the speed setpoint to increase until the contact is opened. The INCREASE FREQ function will only operate while the drive is running.



#### NOTE

If TB-13A, TB-13B, and TB-13E are all programmed to select speed references, and two or three of the terminals are closed to TB-11, the higher terminal has priority and will override the others. For example, if TB-13A is programmed to select 0-10VDC, and TB-13E is programmed to select PRESET SPEED #3, closing both terminals to TB-11 will cause the drive to respond to PRESET SPEED #3, because TB-13E overrides TB-13A.

The exception to this is the MOP function, which requires the use of TB-13B and TB-13E. This leaves TB-13A to be used for some other function. If TB-13A is programmed for a speed reference, and TB-13A is closed to TB-11, TB-13A will override the MOP function.

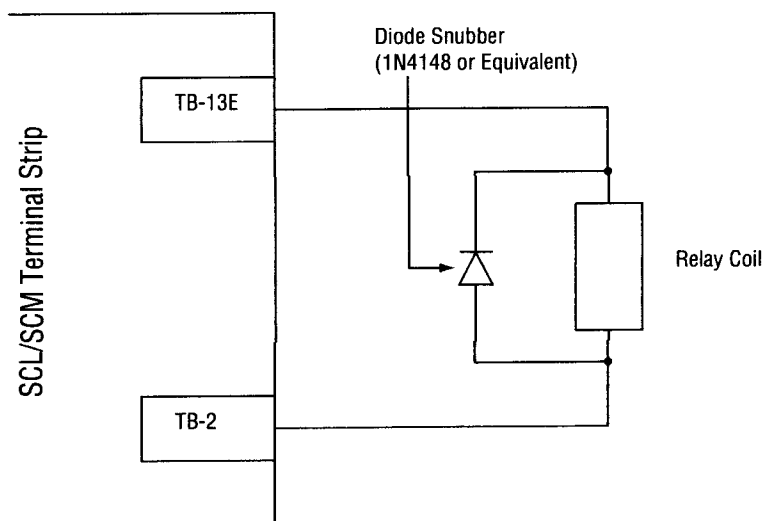
## 10.7 Drive Status Digital Outputs

There is one Form A relay at terminals TB-16 and TB-17. The relay contacts are rated 3 amps at 250 Vac.

Terminal TB-13E can also be configured as a digital output. This output circuit is a current-sourcing type rated at 12 VDC and 50 mA maximum.

The Form A relay and digital output can be programmed to indicate any of the following: RUN, FAULT, INVERSE FAULT, FAULT LOCKOUT, AT SPEED, ABOVE PRESET SPEED #3, CURRENT LIMIT, AUTO SPEED MODE, and REVERSE. Refer to Parameters 06 and 12 in Section 15, *DESCRIPTION OF PARAMETERS*.

The diagram below illustrates how TB-13E, when configured as a digital output, can be used to drive an external relay:

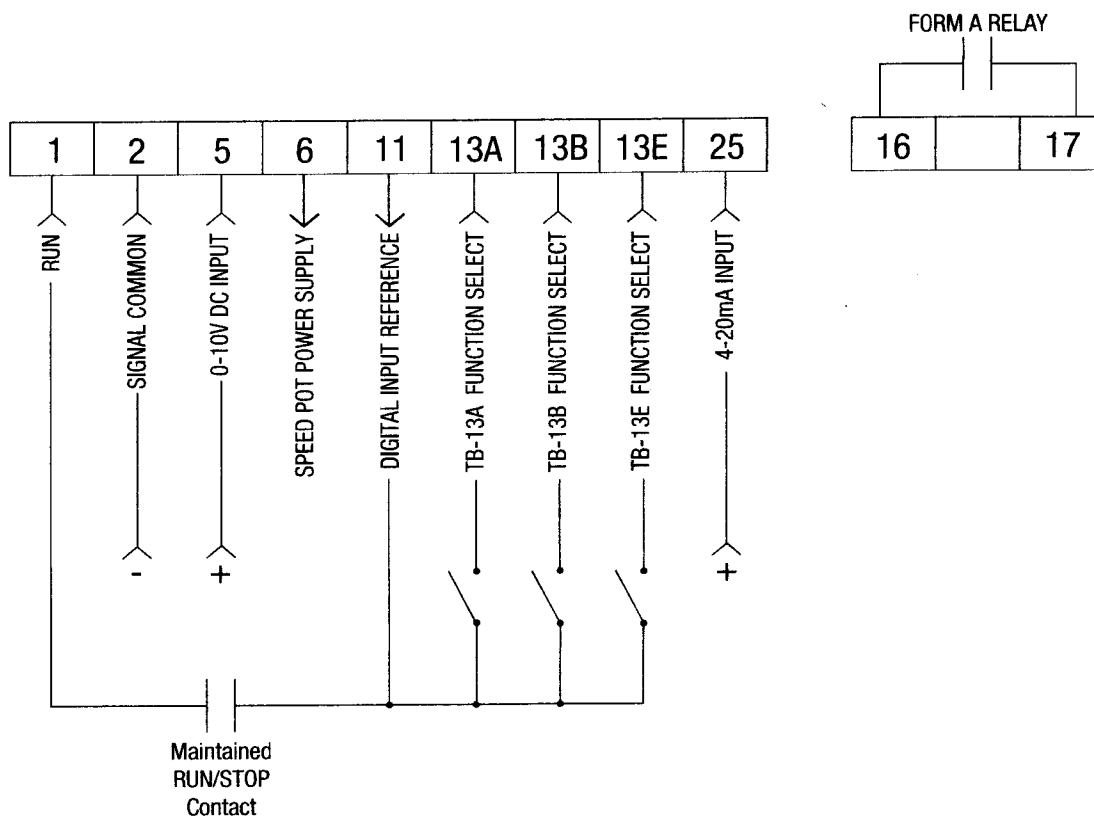


TB-13E used to Drive an External Relay

## 11 SCL/SCM CONTROL WIRING DIAGRAMS

### 11.1 SCL/SCM Terminal Strip

Shown below is the control terminal strip, along with a brief description of the function of each terminal. The following wiring diagram examples provide a quick reference to wire the drive for the most common configurations.



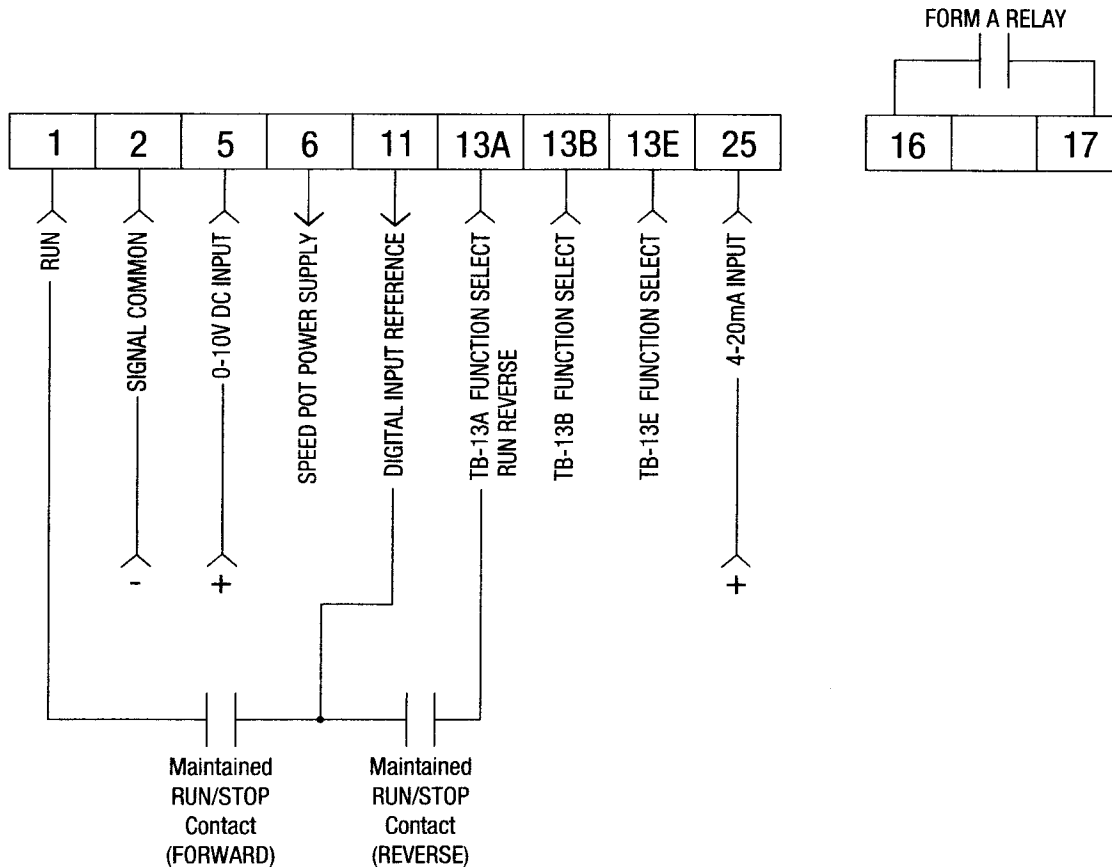
SCL/SCM Terminal Strip



#### NOTE

- The function of terminals TB-13A, 13B, 13E and the Form A relay at terminals 16 and 17 are dependent on the programming of certain parameters. Refer to Section 15, *DESCRIPTION OF PARAMETERS*.
- The digital inputs (terminals 1, 13A, 13B, and 13E) are active-high. They can be activated using terminal 11 (which is +12 VDC) as shown in the following diagrams, or by using an external voltage source with a range of +12 VDC to +28 VDC ( $\pm 10\%$ ).

## 11.2 Two-Wire Start/Stop Control



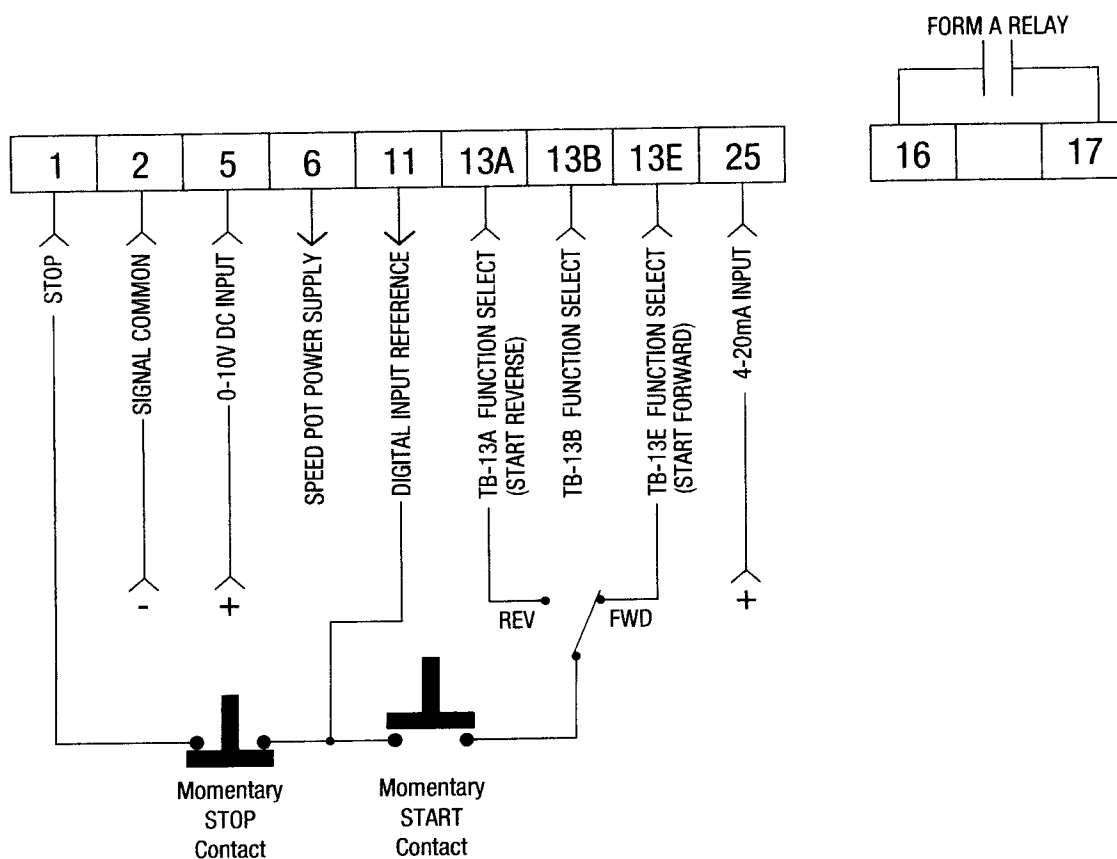
2-Wire Start/Stop Control



### NOTE

- Close TB-1 to TB-11 to RUN, and open to STOP. TB-1 functions as a RUN input for two-wire start/stop circuits, and a STOP input for three-wire start/stop circuits. Refer to Section 11.3
- If reverse direction is required, set ROTATION (Parameter 17) to FORWARD AND REVERSE (02), and program TB-13A (Parameter 10) to RUN REVERSE (06). Close TB-13A to TB-11 to RUN in the reverse direction, and open to STOP.
- For 0-10 VDC or 4-20 mA speed control, set STANDARD SPEED SOURCE (Parameter 05) to 0-10 VDC (03) or 4-20 mA (04).

### 11.3 Three-Wire Start/Stop Control



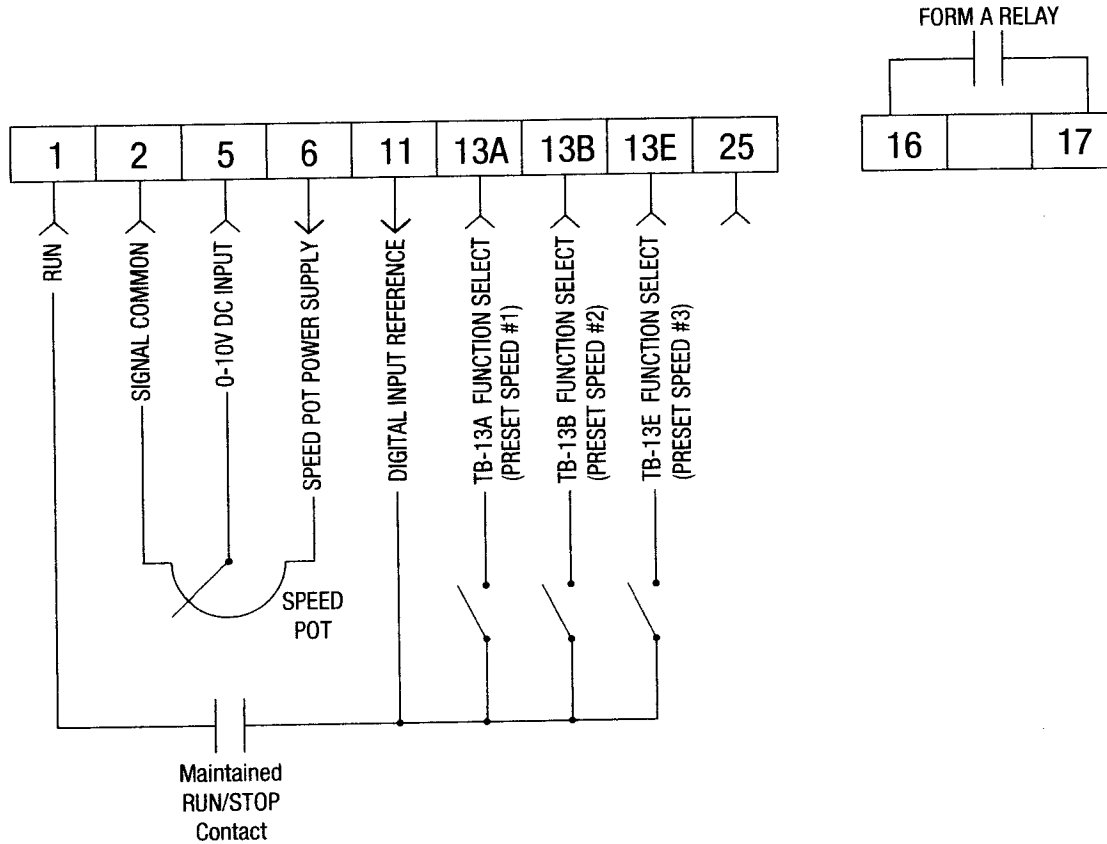
3-Wire Start/Stop Control



#### NOTE

- Program TB-13E (Parameter 12) for START FORWARD (06).
- If reverse direction is required, set ROTATION (Parameter 17) to FORWARD AND REVERSE (02), and program TB-13A (Parameter 10) for START REVERSE (07).
- Momentarily close TB-13E to TB-11 to START in the forward direction, or close TB-13A to TB-11 to START in the reverse direction. Momentarily open TB-1 to TB-11 to STOP the drive.
- For 0-10 VDC or 4-20 mA speed control, set STANDARD SPEED SOURCE (Parameter 05) to 0-10 VDC (03) or 4-20 mA (04).

## 11.4 Preset Speeds & Speed Pot (2-Wire Start/Stop Control)



Speed Potentiometer



### NOTE:

- For preset speed control, all or some of the TB-13 terminals must be programmed as preset speed selects. If only two or three preset speeds are required, only two of the TB-13 terminals must be used. Refer to the table in the description of Parameters 31-37 in Section 15.
- Program the PRESET SPEEDS (Parameters 31-37) to the desired values.
- If speed pot control is desired when none of the preset speeds are selected (all preset speed selects are open to TB-11), set STANDARD SPEED SOURCE (Parameter 05) to 0-10 VDC (03).

## 12 INITIAL POWER UP AND MOTOR ROTATION

	<b>DANGER!</b> Hazard of electrical shock! Wait three minutes after disconnecting incoming power before servicing drive. Capacitors retain charge after power is removed.
	<b>STOP!</b> <ul style="list-style-type: none"> <li>DO NOT connect incoming AC power to output terminals U, V, and W or terminals B+, B-! Severe damage to the drive will result. Do not continuously cycle input power to the drive more than once every two minutes. Damage to the drive will result.</li> <li>Severe damage to the drive can result if it is operated after a long period of storage or inactivity without reforming the DC bus capacitors! Refer to Section 6.1, <i>Installation After a Long Period of Storage</i></li> </ul>

Before attempting to operate the drive, motor, and driven equipment, be sure all procedures pertaining to installation and wiring have been properly followed.

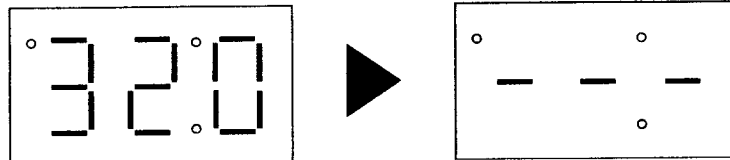
Disconnect the driven load from the motor. Verify that the drive input terminals (L1 and L2/N, or L1, L2, and L3) are wired to the proper input voltage per the nameplate rating of the drive.

Energize the incoming power line. The LED display will flash a three digit number (320 in the example below) that identifies the parameter version contained in the drive. The display should then read “- - -”, which indicates that the drive is in a STOP condition. This is shown below:

Apply input power

Display flashes parameter version (300-399)

Display then reads “- - -”



Follow this 4-step procedure to check the motor rotation. This procedure assumes that the drive has been powered up for the first time, and that none of the parameters have been changed.

1. Use the ▼ button to decrease the speed setpoint to 00.0 Hz. The left decimal point will illuminate as the speed setpoint is decreased. If the ▼ button is held down, the speed setpoint will decrease by tenths of Hz until the next whole Hz is reached, and then it will decrease by one Hz increments. Otherwise, each push of the ▼ button will decrease the speed setpoint by a tenth of a Hz.

Once 00.0 Hz is reached, the display will toggle between “00.0” and “- - -”, which indicates that the drive is in a STOP condition with a speed setpoint of 00.0 Hz.

2. Give the drive a START command. This can be done using one of several wiring methods described in Section 11, *SCL/SCM CONTROL WIRING DIAGRAMS*. Once the START command is issued, the display will read “00.0”, indicating that the drive is in a RUN condition with a speed setpoint of 00.0 Hz.

3. Use the ▲ button to increase the speed setpoint until the motor starts to rotate. The left decimal point will light as the speed setpoint is increased. If the ▲ button is held down, the speed setpoint will increase by tenths of Hz until the next whole Hz is reached, and then it will increase by one Hz increments. Otherwise, each push of the button will increase the speed setpoint by a tenth of a Hz.
4. If the motor is rotating in the wrong direction, give the drive a STOP command and remove power from the drive. Wait three minutes for the bus capacitors to discharge, and swap any two of the motor wires connected to U, V, W.

**NOTE**

The drive is phase insensitive with respect to incoming line voltage. This means that the drive will operate with any phase sequence of the incoming three phase voltage. Therefore, to change the motor rotation, the phases must be swapped at the drive output terminals or at the motor.



## 13 PROGRAMMING THE SCL/SCM DRIVE

The drive may be programmed by one of two methods: using the three buttons and 3-digit LED display on the front of the drive, or by programming the Electronic Programming Module (EPM) using the optional EPM Programmer. This section describes programming the drive using the buttons and display, which are shown below:

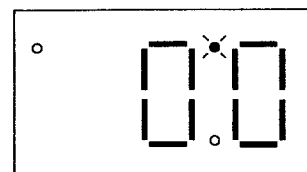


To enter the PROGRAM mode to access the parameters, press the **Mode** button. This will activate the PASSWORD prompt (if the password has not been disabled). The display will read "00" and the upper right-hand decimal point will be blinking, as shown below:

Press **Mode**

Display reads "00"

Upper right decimal point blinks

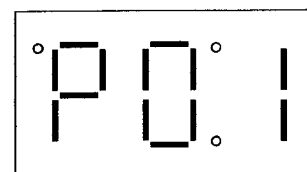
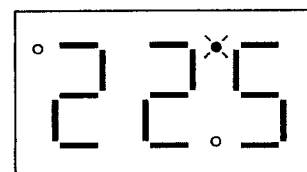


Use the ▲ and ▼ buttons to scroll to the password value (the factory default password is "225") and press the Mode button. Once the correct password value is entered, the display will read "P01", which indicates that the PROGRAM mode has been accessed at the beginning of the parameter menu (P01 is the first parameter). This is shown below:

Use ▲ and ▼ to scroll to the password value

Press **Mode** to enter password

Parameter menu is accessed at the first parameter

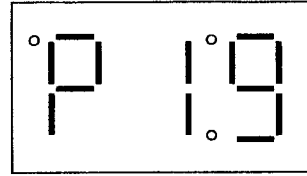


### NOTE

If the display flashes "Er", the password was incorrect, and the process to enter the password must be repeated.

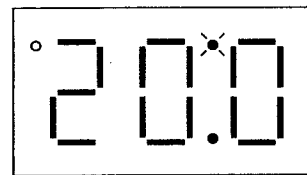
Use the ▲ and ▼ buttons to scroll to the desired parameter number. In the example below, Parameter 19 is being displayed, which is the ACCELERATION TIME of the drive:

Use ▲ and ▼ to scroll to the desired parameter number (the example is Parameter 19 - ACCELERATION TIME)



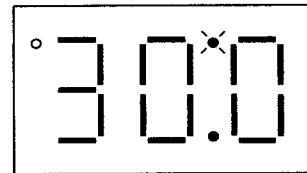
Once the desired parameter number is found, press the **Mode** button to display the present parameter setting. The upper right-hand decimal point will begin blinking, indicating that the present parameter setting is being displayed, and that it can be changed by using the ▲ and ▼ buttons.

Press **Mode** to display present parameter setting (example setting is 20.0)



Upper right decimal point blinks

Use ▲ and ▼ to change setting (example setting changed to 30.0)



Press **Mode** to store new setting

Pressing **Mode** will store the new setting and also exit the PROGRAM mode. To change another parameter, press the **Mode** key again to re-enter the PROGRAM mode (the parameter menu will be accessed at the parameter that was last viewed or changed before exiting). If the **Mode** key is pressed within two minutes of exiting the PROGRAM mode, the password is not required access the parameters. After two minutes, the password must be entered in order to access the parameters again.

### 13.1 Setting Values in Tenths of Units Above 100

Parameter settings and the keypad speed command can always be adjusted in tenths of unit increments from 0.0 to 99.9. Above 100 however, values can be set in whole units or tenths of units, depending on the setting of Parameter 16 - UNITS EDITING.

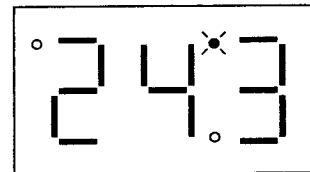
If Parameter 16 - UNITS EDITING is set to WHOLE UNITS (02), parameter values and the keypad speed command can only be adjusted by whole unit increments above 100. For example, Parameter 19 - ACCELERATION TIME could not be set to 243.7 seconds. It could only be set to 243 or 244 seconds. Likewise, the keypad speed command (set using the ▲ and ▼ buttons) could not be set to 113.4 Hz. It could only be set to 113 or 114 Hz.

If, however, Parameter 16 - UNITS EDITING is set to TENTHS OF UNITS (01), parameter values and the keypad speed command can be adjusted in tenths of unit increments up to a value of 1000 (above 1000, whole unit increments only). Each push of the ▲ or ▼ button will adjust the value by one tenth of a unit. If the ▲ or ▼ button is pressed and held, the value will increment by tenths of units until the next whole unit is reached, and then the value will increment by whole units.

When a value above 100 is being adjusted by tenths of units, the value is shifted to the left by one digit so that the tenths portion of the value can be displayed. This results in the first digit (reading from left to right) of the value disappearing from the display. Also, the lower decimal point will blink to indicate that the actual value is above 100. Once the value is no longer being adjusted, the value will shift back to the right and the tenths portion of the value will disappear.

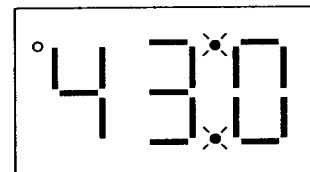
In the example below, Parameter 19 - ACCELERATION TIME is presently set to 243.0 seconds, and is being increased to 243.7 seconds.

Go to Parameter 19 and press  
**Mode** to see present setting ("243"  
seconds)

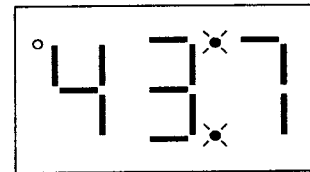


Upper right decimal point blinks

Press ▲ button to see tenths portion  
Value shifts to the left ("2" disappears)  
Upper right decimal point and lower  
decimal point blink



Press ▲ button to scroll up to "43.7"



Press **Mode** to store new value

### 13.2 Electronic Programming Module (EPM)

Every SCL/SCM Series drive has an Electronic Programming Module (EPM) installed on the main control board. The EPM stores the user's parameter settings and special OEM default settings (if programmed). The EPM is removable, allowing it to be installed in another drive for quick set-up. For example, if a drive is being replaced with a new one, the EPM can be taken out of the first drive and installed in the new drive. Downtime is minimized because the new drive does not require programming - it is ready to run when the EPM is installed.

The SCL/SCM Series drive contains two or three sets of parameter values, depending on whether the drive has been programmed with optional OEM default settings. The first set of values is the factory default settings, which are permanently stored on the main control board and cannot be changed. The second set of values is the user settings, which are stored in the EPM. When the drive leaves the factory, the user settings are the same as the factory default settings, but the user settings can be changed to configure the drive for a particular application. The optional third set of values is the OEM default settings, which are also stored in the EPM. OEM default settings are typically used in cases where many drives are used for the same application, which requires that all of the drives have the same parameter settings. The OEM default settings cannot be changed without the optional EPM Programmer. The drive can be programmed to operate according to the user settings or the OEM default settings (Refer to Parameter 48 in Section 15).

**NOTE**

The drive will not operate without the EPM installed. The drive will display "F1" if the EPM is missing or damaged.

**STOP!**

Do not remove the EPM while power is applied to the drive. Damage to the EPM and/or drive may result.

The optional EPM Programmer has the ability to quickly and easily program many SC Series drives for the same configuration. Once a "master" EPM is programmed with the desired parameter settings, the EPM Programmer can then copy those settings to other EPMs, allowing many drives to be configured very quickly. Consult the EPM Programmer Instruction Manual or contact the factory for more information.

If the OEM settings in the EPM become corrupted, the drive will operate normally, until an attempt is made to perform a RESET OEM using Parameter 48, PROGRAM SELECTION. The drive will then flash "GF" to indicate that the OEM settings are no longer valid. The EPM must then be re-programmed using the optional EPM Programmer.

If the OEM settings and the user settings are both corrupted, the drive will display "GF" immediately and the drive will require a RESET 60 or RESET 50 using Parameter 48, PROGRAM SELECTION. Once the RESET is performed, the parameters can then be programmed individually to match the OEM default settings. This will allow the drive to operate as if it were in OEM mode, even though it is actually operating in USER mode. Refer to Parameter 48 in Section 15, *DESCRIPTION OF PARAMETERS*.

**NOTE**

The drive will also display "GF" if a RESET OEM or OPERATE WITH OEM SETTINGS is attempted when the EPM does not contain OEM defaults.

## 14 PARAMETER MENU

NO.	PARAMETER NAME	RANGE OF ADJUSTMENT	FACTORY DEFAULT
01	LINE VOLTAGE	HIGH (01), LOW (02)	HIGH (01)
02	CARRIER FREQUENCY	4kHz (01), 6 kHz (02), 8 kHz (03), 10 kHz (04)	6 kHz (02)
03	START METHOD	NORMAL (01), START ON POWER UP (02), START WITH DC BRAKE (03), AUTO RESTART WITH DC BRAKE (04), FLYING RESTART 1 (05), FLYING RESTART 2 (06), FLYING RESTART 3 (07)	NORMAL (01)
04	STOP METHOD	COAST (01), COAST WITH DC BRAKE (02), RAMP (03), RAMP WITH DC BRAKE (04)	COAST (01)
05	STANDARD SPEED SOURCE	KEYPAD (01), PRESET #1 (02), 0-10 VDC (03), 4-20 mA (04)	KEYPAD (01)
06	RELAY OUTPUT	NONE (01), RUN (02), FAULT (03), INVERSE FAULT (04), FAULT LOCKOUT (05), AT SET SPEED (06), ABOVE PRESET #3 (07), CURRENT LIMIT (08), AUTO SPEED (09), REVERSE (10)	NONE (01)
10	TB-13A FUNCTION SELECT	NONE (01), 0-10 VDC (02), 4-20 mA (03), PRESET SPEED #1 (04), START FORWARD (05), RUN REVERSE (06), START REVERSE (07), EXTERNAL FAULT (08), INVERSE EXT FAULT (09), AUXILIARY STOP (10), ACCEL/DECEL #2 (11)	NONE (01)
11	TB-13B FUNCTION SELECT	NONE (01), 0-10 VDC (02), 4-20 mA (03), PRESET SPEED #2 (04), DECREASE FREQ (05), START FORWARD (06), JOG FORWARD (07), JOG REVERSE (08), EXTERNAL FAULT (09), INVERSE EXT FAULT (10), AUX. STOP (11), ACCEL/DECEL #2 (12), REMOTE KEYPAD (13)	NONE (01)

NO.	PARAMETER NAME	RANGE OF ADJUSTMENT	FACTORY DEFAULT
12	TB-13E INPUT FUNCTIONS	NONE (01), 0-10 VDC (02), 4-20 mA (03), PRESET SPEED #3 (04), INCREASE FREQ (05), START FORWARD (06), EXTERNAL FAULT (07), INVERSE EXT FAULT (08), AUX. STOP (09), ACCEL/DECEL #2 (10),	NONE (01)
	TB-13E OUTPUT FUNCTIONS	RUN (11), FAULT (12), INVERSE FAULT (13), FAULT LOCKOUT (14), AT SET SPEED (15), ABOVE PRESET #3 (16), CURRENT LIMIT (17), AUTO SPEED (18), REVERSE (19), DYNAMIC BRAKING (20),	
	OTHER FUNCTIONS	REMOTE KEYPAD (21)	
14	CONTROL	TERMINAL STRIP ONLY (01) REMOTE KEYPAD ONLY (02)	TERMINAL STRIP ONLY (01)
16	UNITS EDITING	TENTHS OF UNITS (01), WHOLE UNITS (02)	WHOLE UNITS (02)
17	ROTATION	FORWARD ONLY (01), FORWARD AND REVERSE (02)	FORWARD ONLY (01)
19	ACCELERATION TIME	0.1 - 3600.0 SEC	20.0 SEC
20	DECELERATION TIME	0.1 - 3600.0 SEC	20.0 SEC
21	DC BRAKE TIME	0.0 - 3600.0 SEC	0.0 SEC
22	DC BRAKE VOLTAGE	0.0 - 30.0 %	0.0 %
23	MINIMUM FREQUENCY	0.0 - MAXIMUM FREQUENCY	0.0 Hz
24	MAXIMUM FREQUENCY	MINIMUM FREQUENCY - 240 Hz	SCL = 50.0 Hz SCM = 60.0 Hz
25	CURRENT LIMIT	30 - 180 %	180 %
26	MOTOR OVERLOAD	30 - 100 %	100 %
27	BASE FREQUENCY	25.0 - 500.0 Hz	SCL = 50.0 Hz SCM = 60.0 Hz
28	FIXED BOOST	0.0 - 30.0 %	1.0 %
29	ACCEL BOOST	0.0 - 20.0 %	0.0 %

<b>NO.</b>	<b>PARAMETER NAME</b>	<b>RANGE OF ADJUSTMENT</b>	<b>FACTORY DEFAULT</b>
30	SLIP COMPENSATION	0.0 - 5.0 %	0.00 %
31-37	PRESET SPEEDS	0.0 - MAXIMUM FREQUENCY	0.0 Hz
38	SKIP BANDWIDTH	0.0 - 10.0 Hz	0.0 Hz
39	SPEED SCALING	0.0 - 6500.0	0.0
42	ACCEL/DECEL #2	0.1 - 3600.0 SEC	20.0 SEC
44	PASSWORD	000 - 999	225
45	SPEED AT MIN SIGNAL	MINIMUM FREQUENCY - 999Hz	0.0Hz
46	SPEED AT MAX SIGNAL	MINIMUM FREQUENCY - 999Hz	SCL = 50 Hz SCM = 60 Hz
47	CLEAR HISTORY	MAINTAIN (01), CLEAR (02)	MAINTAIN (01)
48	PROGRAM SELECTION	USER SETTINGS (01) OEM SETTINGS (02) RESET OEM (03), RESET 60 (04) RESET 50 (05), TRANSLATE (06)	SCL = RESET 50 (05) SCM = RESET 60 (04)
50	FAULT HISTORY	(VIEW-ONLY)	(N/A)
51	SOFTWARE CODE	(VIEW-ONLY)	(N/A)
52	DC BUS VOLTAGE	(VIEW-ONLY)	(N/A)
53	MOTOR VOLTAGE	(VIEW-ONLY)	(N/A)
54	LOAD	(VIEW-ONLY)	(N/A)
55	0-10 VDC INPUT	(VIEW-ONLY)	(N/A)
56	4-20 mA INPUT	(VIEW-ONLY)	(N/A)
57	TB STRIP STATUS	(VIEW-ONLY)	(N/A)
58	KEYPAD STATUS	(VIEW-ONLY)	(N/A)

## 15 DESCRIPTION OF PARAMETERS

### P01 LINE VOLTAGE SELECTION

Parameter P01 calibrates the drive for the actual applied input voltage. Set this parameter to HIGH (01) for 120, 220-240, and 460-480 Vac input, or LOW (02) for 200-208 and 380-415 Vac input.



#### NOTE

If this parameter is changed while the drive is running, the new value will not take effect until the drive is stopped.

### P02 CARRIER FREQUENCY

Parameter P02 sets the switching rate of the output IGBT's. Increasing the carrier frequency will result in less audible motor noise. Available settings are: 4 kHz, 6 kHz, 8 kHz, and 10 kHz.

PARAMETER SETTING	CARRIER FREQUENCY	AMBIENT OR OUTPUT DERATE
01	4 kHz	40°C or 100%
02	6 kHz	40°C or 100%
03	8 kHz	40°C or 100%
04	10 kHz	35°C or 92%



#### NOTE

- The SCL/SCM drive is fully rated up to 8 kHz carrier frequency. If the 10 kHz carrier frequency is selected, the drive's ambient temperature rating OR output current rating must be de-rated to the value shown in the table above.
- If this parameter is changed while the drive is running, the change will not take effect until the drive is stopped.

### P03 START METHOD



#### WARNING!

Automatic starting of equipment may cause damage to equipment and/or injury to personnel! Automatic start should only be used on equipment that is inaccessible to personnel.

- 01 **NORMAL:** The drive will start when the appropriate contact is closed on the terminal strip. See Section 11 for possible control configurations.
- 02 **START ON POWER UP:** The drive will automatically start upon application of input power.



- 03 **START WITH DC BRAKE:** When a START command is given, the drive will apply DC BRAKE VOLTAGE (Parameter 22) for the duration of DC BRAKE TIME (Parameter 21) prior to starting the motor to ensure that the motor is not turning.
- 04 **AUTO RESTART WITH DC BRAKING:** Upon a START command, after a fault, or upon application of power, the drive will apply DC BRAKE VOLTAGE (Parameter 22) for the duration of DC BRAKE TIME (Parameter 21) prior to starting (or restarting) the motor.
- 05 **FLYING RESTART 1: LOW** performance. Slowest synchronization and lowest current level. This setting results in the smoothest synchronization.
- 06 **FLYING RESTART 2: MEDIUM** performance. Faster synchronization and higher current level. This setting allows faster synchronization while retaining smoothness.
- 07 **FLYING RESTART 3: HIGH** performance. Fastest synchronization and highest current level. This setting allows the fastest synchronization, but sacrifices smoothness.

When programmed for auto-restart (settings 04 - 07), the drive will attempt three restarts after a fault. The interval between restart attempts is 15 seconds for setting 04, and 2 seconds for settings 05, 06 and 07. During the interval between restart attempts, the display will read "SP" to indicate Start Pending. If all three restart attempts fail, the drive will trip into FAULT LOCKOUT (displayed "LC") and require a manual reset. Refer to Section 16, *TROUBLESHOOTING*.

The FLYING RESTART 1 - 3 settings allow the drive to start into a spinning load after a fault or upon application of input power. They differ in the time required to find the motor speed and the amount of current required to synchronize with it. The faster the drive attempts to find the motor speed, the more current is required. The first two restart attempts will try to start into the spinning load, but the third restart attempt will act like AUTO RESTART WITH DC BRAKING.



**NOTE**

Settings 02 and 04 - 07 require a two-wire start/stop circuit to operate. The RUN contact must remain closed for the power-up start and auto-restart functions to operate.

**P04 STOP METHOD**

- 01 **COAST TO STOP:** When a STOP command is given, the drive shuts off the output to the motor, allowing it to coast freely to a stop.
- 02 **COAST WITH DC BRAKE:** When a stop command is given, the drive will activate DC braking (after a delay of up to 2 seconds, depending on frequency) to help decelerate the load. Refer to Parameters: 21 - DC BRAKE TIME, and 22 - DC BRAKE VOLTAGE.
- 03 **RAMP TO STOP:** When a stop command is given, the drive will decelerate the motor to a stop at the rate determined by Parameter 20 - DECELERATION TIME.

- 04 RAMP WITH DC BRAKE: When a stop command is given, the drive will decelerate the motor down to 0.2 Hz (at the rate set by Parameter 20 - DECELERATION TIME) and then activate DC braking according to the settings of Parameters 21 - DC BRAKE TIME and 22 - DC BRAKE VOLTAGE. This is used to bring the load to a final stop, as the motor may still be turning slightly after the drive stops.

## **P05 STANDARD SPEED SOURCE**

P05 selects the speed reference source when the drive is in STANDARD speed mode. The following speed references can be selected:

- 01 KEYPAD: Use the ▲ and ▼ buttons to scroll to the desired speed.
- 02 PRESET SPEED #1: Drive will operate at the frequency set in Parameter 31.
- 03 0-10 VDC: Drive will respond to a 0-10 VDC signal wired to TB-5 (+) and TB-2 (-).
- 04 4-20 mA: Drive will respond to a 4-20 mA signal wired to TB-25 (+) and TB-2 (-).

## **P06 RELAY OUTPUT**

P06 selects the status indication for the normally open relay output at TB-16 and TB-17:

- 01 NONE: Disables the relay output.
- 02 RUN: Closes upon a START command. Opens if the drive is in a STOP state, the drive faults, or input power is removed. DC braking is considered a STOP state.
- 03 FAULT: Closes if there is no fault condition. Opens if the drive faults, or input power is removed.
- 04 INVERSE FAULT: Closes if the drive faults. Opens if there is no fault condition.
- 05 FAULT LOCKOUT: Closes when input power is applied. Opens if three restart attempts are unsuccessful, or if input power is removed.
- 06 AT SET SPEED: Closes if the drive is within + 0.5 Hz of the speed setpoint.
- 07 ABOVE PRESET SPEED #3: Closes if the output frequency exceeds PRESET SPEED #3 (Parameter 33). Opens if the output frequency is equal to or less than PRESET SPEED #3.
- 08 CURRENT LIMIT: Closes if the output current exceeds the CURRENT LIMIT setting. Opens if the output current is equal to or less than CURRENT LIMIT (see Parameter 25).
- 09 AUTOMATIC SPEED MODE: Closes if an AUTOMATIC (terminal strip) speed reference is active. Opens if a STANDARD (Parameter 5) speed reference is active.
- 10 REVERSE: Closes when reverse rotation is active. Opens when forward rotation is active (see Parameter 17 - ROTATION DIRECTION).

## **P10 TB-13A FUNCTION SELECT**

P10 selects the function of terminal TB-13A. Closing TB-13A to TB-11 (or opening in the case of settings 08 and 10) activates the selected function. The following functions can be selected:

- 01 NONE: Disables the TB-13A function.
- 02 0-10 VDC: Selects a 0-10 VDC signal (at TB-5) as the AUTO speed reference input.
- 03 4-20 mA: Selects a 4-20 mA signal (at TB-25) as the AUTO speed reference input.
- 04 PRESET SPEED #1: Selects PRESET SPEED #1 as the speed reference. The drive will operate at the frequency programmed into Parameter 31.
- 05 START FORWARD: Sets up the drive for a 3-wire start/stop circuit. Momentarily close TB-13A to TB-11 to start the drive, and momentarily open TB-1 to TB-11 to stop.
- 06 RUN REVERSE: Close TB-13A to TB-11 to run in the reverse direction, and open to stop. Close TB-1 to TB-11 to run in the forward direction and open to stop.
- 07 START REVERSE: Momentarily close TB-13A to TB-11 to start the drive in the reverse direction, and momentarily open TB-1 to TB-11 to stop. Parameter 17 - ROTATION must be set to FORWARD AND REVERSE (02), and TB-13E must be used for START FORWARD.
- 08 EXTERNAL FAULT: Sets TB-13A as a normally closed external fault input. Open TB-13A to TB-11 to trip the drive.
- 09 INVERSE EXTERNAL FAULT: Sets TB-13A as a normally open external fault input. Close TB-13A to TB-11 to trip the drive.
- 10 AUXILIARY STOP: When TB-13A is opened with respect to TB-11, the drive will decelerate to a STOP (even if STOP METHOD is set to COAST) at the rate set into ACCEL/DECEL #2 (Parameter 42).
- 11 ACCEL/DECEL #2: Selects the acceleration and deceleration time programmed into ACCEL/DECEL #2 (Parameter 42).

## **P11 TB-13B FUNCTION SELECT**

P11 selects the function of terminal TB-13B. Closing TB-13B to TB-11 (or opening in the case of settings 09 and 11) activates the selected function. The following functions can be selected:

- 01 NONE: Disables the TB-13B function.
- 02 0-10 VDC: Selects a 0-10 VDC signal (at TB-5) as the AUTO speed reference input.
- 03 4-20 mA: Selects a 4-20 mA signal (at TB-25) as the AUTO speed reference input.
- 04 PRESET SPEED #2: Selects PRESET SPEED #2 as the speed reference. The drive will operate at the frequency programmed into Parameter 32.

- 05 DECREASE FREQ: Closing TB-13B to TB-11 will decrease the speed setpoint until the contact is opened. TB-13E must be programmed for INCREASE FREQ.
- 06 START FORWARD: Sets up the drive for a 3-wire start/stop circuit. Momentarily close TB-13B to TB-11 to start the drive, and momentarily open TB-1 to TB-11 to stop.
- 07 JOG FORWARD: Close TB-13B to TB-11 to JOG in the forward direction. The drive will run at PRESET SPEED #2 (Parameter 32) when in JOG mode.
- 08 JOG REVERSE: Close TB-13B to TB-11 to JOG in the reverse direction. The drive will run at PRESET SPEED #2 (Parameter 32) when in JOG mode.



**WARNING!**

- When operating in JOG mode, the STOP signal and the AUXILIARY STOP function (see Parameters 10-12) **WILL NOT** stop the drive. To stop the drive, remove the JOG command.
- JOG REVERSE will operate the drive in reverse rotation even if ROTATION DIRECTION (Parameter 17) is set to FORWARD ONLY.

- 09 EXTERNAL FAULT: Sets TB-13B as a normally closed external fault input. Open TB-13B to TB-11 to trip the drive.
- 10 INVERSE EXTERNAL FAULT: Sets TB-13B as a normally open external fault input. Close TB-13B to TB-11 to trip the drive.
- 11 AUXILIARY STOP: When TB-13B is opened with respect to TB-11, the drive will decelerate to a STOP (even if STOP METHOD is set to COAST) at the rate set into ACCEL/DECEL #2 (Parameter 42).
- 12 ACCEL/DECEL #2: Selects the acceleration and deceleration time programmed into Parameter 42 - ACCEL/DECEL #2.
- 13 REMOTE KEYPAD: When the Remote Keypad option is being used, TB-13B must be set to this function. Also, TB-13E (Parameter 12) must be set for REMOTE KEYPAD (21), and CONTROL (Parameter 14) must be set to REMOTE KEYPAD ONLY (02).



**NOTE**

If the drive is commanded to JOG while running, the drive will enter JOG mode and run at PRESET SPEED #2 (Parameter 32). When the JOG command is removed, the drive will STOP.

## **P12 TB-13E FUNCTION SELECT**

Parameter P12 selects the function of terminal TB-13E. This terminal can be configured as a digital input (settings 01 to 10) or a digital status output (settings 11 to 20). When used as an input, closing TB-13E to TB-11 (or opening in the case of settings 07 and 09) activates the selected function.

When used as an output, P12 can provide the drive's status for monitoring. If the Remote Keypad option is being used, this parameter must be set to REMOTE KEYPAD (21).

The following input functions can be selected for P12:

- 01 NONE: Disables the TB-13E function.
- 02 0-10 VDC: Selects a 0-10 VDC signal (at TB-5) as the AUTO speed reference input.
- 03 4-20 mA: Selects a 4-20 mA signal (at TB-25) as the AUTO speed reference input.
- 04 PRESET SPEED #3: Selects PRESET SPEED #3 as the speed reference. The drive will operate at the frequency programmed into Parameter 33.
- 05 INCREASE FREQ: Closing TB-13E to TB-11 will increase the speed setpoint until the contact is opened. INCREASE FREQ will only work when the drive is running. TB-13B must be programmed for DECREASE FREQ.
- 06 START FORWARD: Sets up the drive for a 3-wire start/stop circuit. Momentarily close TB-13E to TB-11 to start the drive, and momentarily open TB-1 to TB-11 to stop.
- 07 EXTERNAL FAULT: Sets TB-13E as a normally closed external fault input. Open TB-13E to TB-11 to trip the drive.
- 08 INVERSE EXTERNAL FAULT: Sets TB-13E as a normally open external fault input. Close TB-13E to TB-11 to trip the drive.
- 09 AUXILIARY STOP: When TB-13E is opened with respect to TB-11, the drive will decelerate to a STOP (even if STOP METHOD is set to COAST) at the rate set into ACCEL/DECEL #2 (Parameter 42).
- 10 ACCEL/DECEL #2: Selects the acceleration and deceleration time programmed into ACCEL/DECEL #2 (Parameter 42).

The following output functions can be selected for P12. The terms "open" and "close" refer to the state of the internal transistor that activates the circuit. When the transistor is "closed" the circuit is complete, and TB-13E is pulled up to 15 VDC (when "open", TB-13E is at 0 VDC potential).

- 11 RUN: Closes upon a START command. Opens if the drive is in a STOP state, the drive faults, or input power is removed. DC braking is considered a STOP state.
- 12 FAULT: Closes if there is no fault condition. Opens if the drive faults, or input power is removed.
- 13 INVERSE FAULT: Closes if the drive faults. Opens if there is no fault condition.
- 14 FAULT LOCKOUT: Closes when input power is applied. Opens if three restart attempts are unsuccessful, or if input power is removed.
- 15 AT SET SPEED: Closes if the drive is within  $\pm 0.5$  Hz of the speed setpoint.
- 16 ABOVE PRESET SPEED #3: Closes if the output frequency exceeds PRESET SPEED #3 (Parameter 33). Opens if the output frequency is equal to or less than PRESET SPEED #3.
- 17 CURRENT LIMIT: Closes if the output current exceeds the CURRENT LIMIT setting. Opens if the output current is equal to or less than CURRENT LIMIT (see Parameter 25).

- 18 **AUTOMATIC SPEED MODE:** Closes if an AUTOMATIC (terminal strip) speed reference is active. Opens if a STANDARD (Parameter 5) speed reference is active.
- 19 **REVERSE:** Closes when reverse rotation is active. Opens when forward rotation is active (refer to Parameter 17 - ROTATION DIRECTION).
- 20 **DYNAMIC BRAKING:** TB-13E becomes the "trigger" that activates the optional external Dynamic Braking module. Refer to the instructions included with the Dynamic Braking option.
- 21 **REMOTE KEYPAD:** When the Remote Keypad option is being used, TB-13E must be set for this function. Also, TB-13B (Parameter 11) must be set for Remote Keypad (13) and CONTROL (Parameter 14) must be set for REMOTE KEYPAD ONLY (02).

#### **P14 CONTROL**

Parameter P14 selects the source of START/STOP and direction commands.

- 01 **TERMINAL STRIP ONLY:** The drive will only respond to START/STOP and direction commands from the terminal strip.
- 02 **REMOTE KEYPAD ONLY:** The drive will only respond to START/STOP and direction commands from the optional remote keypad. Terminals 13B and 13E must also be set for the REMOTE KEYPAD option (refer to Parameters 12 and 13).

#### **P16 UNITS EDITING**

P16 allows parameter and keypad speed editing in whole units or tenths of units above 100. Below 100, the value can always be changed by tenths of units.

- 01 **TENTHS OF UNITS:** The value can always be changed by tenths of units (up to a value of 1000). If the ▲ or ▼ button is pressed and held, the value will change by tenths of units until the next whole unit is reached, and then the value will change by whole units. Refer to Section 13.1, *Setting Values in Tenths of Units Above 100*.
- 02 **WHOLE UNITS:** The value can be changed by tenths of units until 99.9 is reached. Above 99.9, the value will change in whole unit increments only. Below a value of 100, if the ▲ or ▼ button is pressed and held, the value will change by tenths of units until the next whole unit is reached, and then the value will change by whole units.

#### **P17 ROTATION DIRECTION**

- 01 **FORWARD ONLY:** The drive will only allow rotation in the forward direction. However, JOG REVERSE (see Parameter 11) will still operate even if FORWARD ONLY is selected.
- 02 **FORWARD AND REVERSE:** The drive will allow rotation in both directions.

#### **P19 ACCELERATION TIME**

P19 sets the acceleration rate for all of the speed reference sources (keypad, speed pot, jog, MOP, and preset speeds). This setting is the time to accelerate from 0 Hz to the BASE FREQUENCY (Parameter 27).

## **P20      DECELERATION TIME**

P20 sets the deceleration rate for all of the speed reference sources (keypad, speed pot, jog, MOP, and preset speeds). This setting is the time to decelerate from BASE FREQUENCY to 0 Hz. If the drive is set for COAST TO STOP (setting 01 or 02 in Parameter 04), this parameter will have no effect when a STOP command is given.

## **P21      DC BRAKE TIME**

P21 sets the length of time that the DC braking voltage is applied to the motor. The DC BRAKE TIME should be set to the lowest value that provides satisfactory operation in order to minimize motor heating.

## **P22      DC BRAKE VOLTAGE**

P22 sets the magnitude of the DC braking voltage, in percentage of the line voltage. The point at which the DC braking is activated depends on the selected STOP METHOD (Parameter 04):

If COAST WITH DC BRAKE is selected, braking is activated after a time delay of up to 2 seconds, depending on the output frequency at the time of the STOP command. In this case, the DC braking is the only force acting to decelerate the load.

If RAMP WITH DC BRAKE is selected, braking is activated when the output frequency reaches 0.2 Hz. In this case, the drive decelerates the load to a near stop and then DC braking is used to bring the load to a final stop.

## **P23      MINIMUM FREQUENCY**

P23 sets the minimum output frequency of the drive for all speed reference sources except the PRESET SPEEDS (Parameters 31-37), and is used with MAXIMUM FREQUENCY (Parameter 24) to define the operating range of the drive.

When using an analog input speed reference (0-10 VDC or 4-20 mA), Parameters 45 and 46 (SPEED AT MIN SIGNAL and SPEED AT MAX SIGNAL) also affect the drive's speed range.



### **NOTE**

If this parameter is changed while the drive is running, the new value will not take effect until the drive is stopped.

## **P24      MAXIMUM FREQUENCY**

P24 sets the maximum output frequency of the drive for all speed reference sources, and is used with MINIMUM FREQUENCY (Parameter 23) to define the operating range of the drive.

When using an analog input speed reference (0-10 VDC or 4-20 mA), Parameters 45 and 46 (SPEED AT MIN SIGNAL and SPEED AT MAX SIGNAL) also affect the drive's speed range.

**NOTE**

If this parameter is changed while the drive is running, the new value will not take effect until the drive is stopped.

**P25 CURRENT LIMIT**

P25 sets the maximum allowable output current of the drive. The maximum setting is either 180% or 150%, depending on whether LINE VOLTAGE SELECTION (Parameter 01) is set to HIGH or LOW.

If the load demands more current than the CURRENT LIMIT setting, the drive will reduce the output frequency in an attempt to reduce the output current. When the overcurrent condition passes, the drive will accelerate the motor back up to the speed setpoint.

**P26 MOTOR OVERLOAD**

The SCL/SCM Series is UL approved for solid state motor overload protection, and therefore does not require a separate thermal overload relay for single motor applications. This circuit allows the drive to deliver up to 150% current for one minute. If the overload circuit "times out", the drive will trip into an OVERLOAD fault (displayed as "PF"). MOTOR OVERLOAD should be set to the ratio (in percent) of the motor current rating to the drive's output current rating to properly protect the motor.

**Example:** A 3 HP, 480 Vac drive with a 4.8 Amp rating is operating a 2 HP motor with a current rating of 3.4 Amps. Dividing the motor current rating by the drive's output current rating yields 71% ( $3.4 / 4.8 = 0.71 = 71\%$ ), so this parameter should be set to 71%.

**P27 BASE FREQUENCY**

The BASE FREQUENCY determines the V/Hz ratio by setting the output frequency at which the drive will output full voltage to the motor. In most cases, the BASE FREQUENCY should be set to match the motor's rated frequency.

**Example:** A 230 Vac, 60 Hz motor requires a V/Hz ratio of 3.83 ( $230 \text{ V} / 60 \text{ Hz} = 3.83 \text{ V/Hz}$ ) to produce full torque. Setting the BASE FREQUENCY to 60 Hz causes the drive to output full voltage (230 Vac) at 60 Hz, which yields the required 3.83 V/Hz. Output voltage is proportional to output frequency, so the 3.83 V/Hz ratio is maintained from 0 - 60 Hz, allowing the motor to produce full torque from about 2 Hz (below 2 Hz there is less torque due to slip) up to 60 Hz.

**NOTE**

If this parameter is changed while the drive is running, the new value will not take effect until the drive is stopped.



## P28 FIXED BOOST

FIXED BOOST increases starting torque by increasing the output voltage when operating below half of the base frequency. For better out-of-the-box performance, SCL/SCM Series drives are shipped with a setting that is different from the factory default of 1%. Units rated 0.33 to 1 HP (0.25 to 0.75 kW) = 5.3%, 1.5 to 2 HP (1.1 to 1.5 kW) = 4.4%, 3 HP (2.2 kW) = 3.6%, 5 HP (4 kW) = 3.0%, 7.5 HP (5.5 kW) = 2.7%, 10 HP (7.5 kW) = 2.4%, and 15 HP (11 kW) = 2.2%.

## P29 ACCELERATION BOOST

ACCELERATION BOOST helps accelerate high-inertia loads. During acceleration, the output voltage is increased to increase motor torque. Once the motor reaches the new speed setpoint, the boost is turned off and the output voltage returns to the normal value.

## P30 SLIP COMPENSATION

SLIP COMPENSATION is used to counteract changes in motor speed (slip) caused by changes in load. In a standard AC induction motor, the shaft speed decreases as load increases, and increases as load decreases. By increasing or decreasing the output frequency in response to an increasing or decreasing load, the slip is counteracted and speed is maintained. Most standard NEMA B motors have a 3% slip rating.

## P31 - P37 PRESET SPEED #1 - #7

Preset speeds are activated by contact closures between TB-11 and TB-13A, 13B, and 13E. The TB-13 terminals must be programmed as preset speed selects using Parameters 10-12.



### NOTE

Preset speeds can operate below the frequency defined by the Minimum Frequency parameter (Parameter 23).

Refer to the table below for activation of the preset speeds using the TB-13 terminals:

SPEED #	TB - 13A	TB - 13B	TB - 13E
1	CLOSED	OPEN	OPEN
2	OPEN	CLOSED	OPEN
3	OPEN	OPEN	CLOSED
4	CLOSED	CLOSED	OPEN
5	CLOSED	OPEN	CLOSED
6	OPEN	CLOSED	CLOSED
7	CLOSED	CLOSED	CLOSED



### NOTE

When a TB-13 terminal is programmed for a function other than a preset speed select, it is considered OPEN for the table above.

Preset Speed #6 and #7 can also be used as skip frequencies to restrict the drive from operating at frequencies that cause vibration in the system. Refer to Parameter 38.

### **P38 SKIP BANDWIDTH**

The SCL/SCM drive has two skip frequencies that can be used to lock out critical frequencies that cause mechanical resonance in the system. Once SKIP BANDWIDTH is set to a value other than 0 Hz, the skip frequencies are enabled. When the skip frequency function is enabled, PRESET SPEED #6 and #7 are used as the skip frequencies. SKIP BANDWIDTH sets the range above the skip frequencies that the drive will not operate within.

**Example:** The critical frequency is 23 Hz, and it is desired to skip a frequency range of 3 Hz above and below the critical frequency (therefore the skip range is 20 to 26 Hz). PRESET SPEED #6 or #7 would be set to 20 Hz, and the SKIP BANDWIDTH would be set to 6 Hz.

If the drive is running at a speed below the skip range, and it is given a speed command that is within the skip range, the drive will accelerate to the start of the skip range (20 Hz in the example) and run at that speed until the speed command is greater than or equal to the "top" of the skip range. The drive will then accelerate through the skip range to the new speed. Likewise, if the drive is running at a speed above the skip range, and it is given a speed command that is within the skip range, the drive will decelerate to the "top" of the skip range (26 Hz in the example) and run at that speed until the speed command is less than or equal to the "bottom" of the skip range. The drive will then decelerate through the skip range to the new speed.



#### **NOTE**

PRESET SPEEDS #6 and #7 can still be used as preset speeds even if they are also being used as skip frequencies.

### **P39 SPEED SCALING**

Parameter P39 scales the display to indicate speed in units other than frequency. This parameter should be set to the desired display value when the drive output is 60 Hz. The highest setting is 6500, and the highest value that can be displayed is 6553.6. If SPEED SCALING is set to 0.0, the speed scaling function is disabled and the display will indicate frequency.

**Example:** A machine produces 175 parts per hour when the motor is running at 60 Hz. Setting SPEED SCALING to 175 will calibrate the drive's display to read 175 when the motor is running at 60 Hz. This is a linear function, so at 30 Hz the display would read 87.5 Hz, and at 120 Hz the display would read 350.

**NOTE**

- If the displayed value will exceed 999, the value is shown in two parts. For example, if the displayed value is 1800, the display will indicate this by toggling between "1--" and "800".
- If SPEED SCALING is set such that the maximum displayable value (6553.6) is exceeded, the display will flash "9999" to indicate that the value is out of range. For example, if SPEED SCALING is set to 6000, the drive will display 6000 when it is running at 60 Hz. If the speed is increased past 65.5 Hz (at 65.5 Hz, the scaled value would be 6550), the display will flash "9999" because a scaled value above 6553.6 cannot be displayed.

**P42 ACCEL / DECEL #2**

Parameter P42 sets the second acceleration and deceleration rate of the drive, which can be activated using terminals TB-13A, 13B, or 13E (Parameter 10, 11, or 12).

**P44 PASSWORD**

P44 allows the PASSWORD to be changed to any number between 000 and 999. Setting PASSWORD to 000 disables the password function. The factory default password is 225.

**P45 SPEED AT MIN SIGNAL**

P45 sets the speed at which the drive will run when it receives the minimum speed reference signal (0 VDC or 4 mA). This is used in conjunction with SPEED AT MAX SIGNAL (Parameter 46) to define the speed range of the drive when following an analog speed reference signal.

**P46 SPEED AT MAX SIGNAL**

P46 sets the speed at which the drive will run when it receives the maximum speed reference signal (10 VDC or 20 mA). This is used in conjunction with SPEED AT MIN SIGNAL (Parameter 45) to define the speed range of the drive when following an analog speed reference signal.

**NOTE**

If SPEED AT MIN SIGNAL is set higher than SPEED AT MAX SIGNAL, the drive will react inversely to the speed reference signal. Therefore, as the speed reference signal increases, the drive speed will decrease, and vice-versa.

**P47 CLEAR FAULT HISTORY**

- 01 MAINTAIN: Maintains the FAULT HISTORY (Parameter 50) entries for troubleshooting.
- 02 CLEAR: Erases the FAULT HISTORY (Parameter 50) entries.

## P48 PROGRAM SELECTION

P48 is used to select whether the drive will operate according to the user settings or the optional OEM default settings, and to reset the parameters to default settings. Refer to Section 13.2.

- 01 OPERATE WITH USER SETTINGS: The drive will operate according to the user settings. Operation in USER mode allows the parameter values to be changed to suit any application.
- 02 OPERATE WITH OEM DEFAULTS: The drive will operate according to the optional OEM default settings, which configure the drive for a specific application. When operating in OEM mode, the parameter values can be viewed, but not changed. If an attempt is made to change a parameter setting, the display will flash "GE". If the drive is not programmed with OEM default settings, the display will flash "GF" if this option is selected.
- 03 RESET OEM: Resets the user parameters to the OEM default settings. If the drive is not programmed with OEM default settings, the display will flash "GF" if this option is selected.
- 04 RESET 60: Resets the user parameters to the factory defaults for a 60 Hz base frequency. Parameters 24, 27, and 46 will reset to 60.0 Hz.
- 05 RESET 50: Resets the user parameters to the factory defaults for a 50 Hz base frequency. Parameters 24, 27, and 46 will reset to 50.0 Hz.
- 06 TRANSLATE: If an EPM from a drive with a previous (but compatible) parameter version is installed in a new drive, the new drive will function like the previous version drive, but none of the parameter settings can be changed ("cE" will be displayed if this is attempted). The TRANSLATE function converts the EPM to the new parameter version so that the parameters can be changed, but it also retains the old parameter settings so the new drive will operate like the old drive without having to re-program all of the parameters. Once the EPM is "translated", it will no longer work in the old drive.



### NOTE

- If the user parameters are reset to the OEM defaults (using the RESET OEM option), and then OPERATE WITH USER SETTINGS is selected, the USER settings will be the same as the OEM default settings. This allows the drive to operate as if it was in OEM mode, but the parameter values can be changed. This is useful if some of the OEM default settings need to be fine-tuned for proper operation. The new parameter values are not actually stored as new OEM default settings however; they are simply stored as new USER settings. Therefore, if the parameters are reset to the OEM defaults again, the parameters that were changed will be reset to their "old" value. The optional EPM Programmer is required to change OEM default settings. Refer to Section 13.2.
- Only the TRANSLATE (06) function can be performed while the drive is running. The display will flash "Er" if an attempt is made to select any other function while the drive is running.

## **P50      FAULT HISTORY**

The FAULT HISTORY stores the last eight faults that tripped the drive. Refer to Section 16, *TROUBLESHOOTING* for a list of the faults and possible causes.

Use the ▲ and ▼ buttons to scroll through the fault entries. The faults are stored from newest to oldest, with the first fault shown being the most recent.

The display will read “\_ \_” if the FAULT HISTORY does not contain any fault messages.

## **P51      SOFTWARE VERSION**

Parameter P51 displays the software version number for the control board software. This information is useful when contacting the factory for programming or troubleshooting assistance.

The software version is displayed in two parts which alternate. The first part is the software version, and the second part is the revision number. For example, if the display flashes "94" and "02", this indicates that the drive contains the second revision of version 94 software.

## **P52      DC BUS VOLTAGE**

P52 displays the DC bus voltage in percent of nominal. Nominal DC bus voltage is determined by multiplying the drive's nameplate input voltage rating by 1.4.

## **P53      MOTOR VOLTAGE**

P53 displays the output voltage in percent of the drive's nameplate output voltage rating.

## **P54      MOTOR LOAD**

P54 displays the motor load in percent of the drive's output current rating.

## **P55      0-10 VDC INPUT**

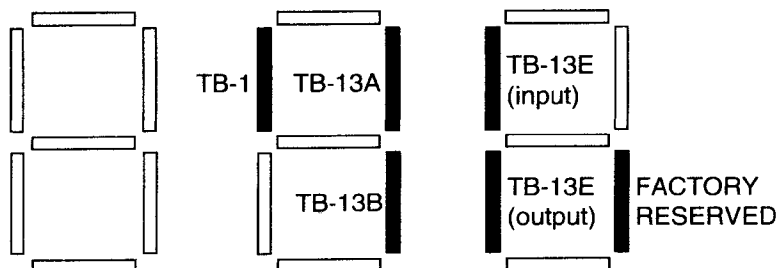
Parameter P55 displays the level of the 0-10 VDC input signal at TB-5. A reading of 100% indicates a 10 VDC input at TB-5.

## **P56      4-20 mA INPUT**

Parameter P56 displays the level of the 4-20 mA input signal at TB-25. A reading of 20% indicates a 4 mA input at TB-25, and a reading of 100% indicates a 20 mA input at TB-25.

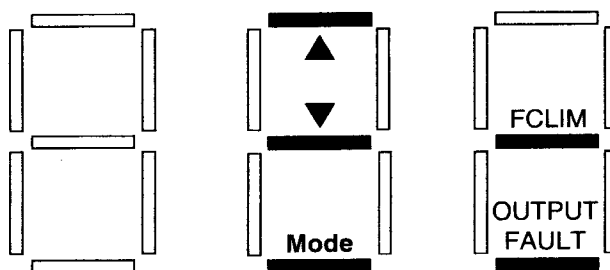
## P57 TERMINAL STRIP STATUS

P57 indicates the status of several terminals using the vertical segments of the LED display. An illuminated segment indicates that the particular terminal is closed to TB-11.



## P58 KEYPAD AND PROTECTION STATUS

P58 indicates the status of the buttons on the keypad, and the status of the protective circuitry in the drive, using the horizontal segments of the LED. An illuminated segment indicates that the corresponding button is pressed, or the protective circuit is active.



FCLIM is an abbreviation for Fast Current Limit.

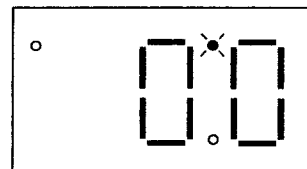
## 16 TROUBLESHOOTING

To aid in troubleshooting, Parameters 50 through 60 can be accessed without entering the PASSWORD. Simply press the **Mode** button twice to “skip” over the PASSWORD prompt, and “P50” will be displayed to indicate that the parameter menu has been entered and Parameter 50 (FAULT HISTORY) can be viewed. The ▲ and ▼ buttons can then be used to scroll from Parameter 50 to Parameter 60. Once the desired parameter is found, press the **Mode** button to view its “contents”. When finished, press **Mode** to exit the parameter menu. An example is shown herein:

Press **Mode** once

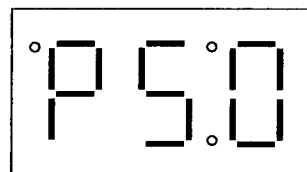
Display reads "00"

Upper right decimal point blinks



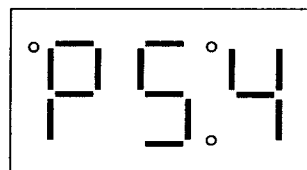
Press **Mode** again

Display reads "P50" (FAULT HISTORY)



Use ▲ and ▼ to scroll to the desired parameter number

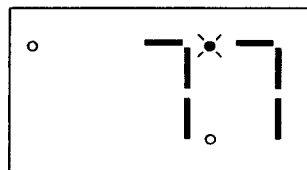
(In this example Parameter 54 has been selected, which is MOTOR LOAD)



Press **Mode** to view parameter contents (77 = 77% LOAD)

Upper right decimal point blinks

Press **Mode** again to exit



In the example above, Parameter 54 - MOTOR LOAD is being viewed. The “77” in the example indicates that the load on the motor is 77% of the output current rating of the drive.

The table herein lists the fault conditions that will cause the drive to shut down, as well as some possible causes. Contact the factory for more information on troubleshooting faults.

<b>FAULT MESSAGES</b>	
<b>FAULT</b>	<b>DESCRIPTION &amp; POSSIBLE CAUSES</b>
AF	High Temp. Fault: Ambient temperature is too high; Cooling fan has failed (if equipped).
CF	Control Fault: A blank EPM, or an EPM with corrupted data has been installed. Perform a factory reset using Parameter 48 - PROGRAM SELECTION.
cF	Incompatibility Fault: An EPM with an incompatible parameter version has been installed. Either remove the EPM or perform a factory reset (Parameter 48) to change the parameter version of the EPM to match the parameter version of the drive.
dF	Dynamic Braking Fault: The drive has sensed that the dynamic braking resistors are overheating and shuts down to protect the resistors.
EF	External Fault: One of the TB-13 terminals is set as an External Fault input and that terminal is open with respect to TB-11. Refer to Parameters 10, 11 and 12.
GF	Data Fault: User data and OEM defaults in the EPM are corrupted.
HF	High DC Bus Voltage Fault: Line voltage is too high; Deceleration rate is too fast; Over-hauling load. For fast deceleration or overhauling loads, dynamic braking may be required
JF	Remote Keypad Fault: The communication link between the drive and the optional Remote Keypad has been lost. Check for proper wiring and/or noise.
LF	Low DC Bus Voltage Fault: Line voltage is too low.
OF	Output Transistor Fault: Phase to phase or phase to ground short circuit on the output; Boost settings are too high; Acceleration rate is too fast; Failed output transistor.
PF	Current Overload Fault: VFD is undersized for the application; Mechanical problem with the driven equipment.
UF	Start Fault: Start command was present when the drive was powered up. Must wait 2 seconds after power-up to apply Start command if START METHOD is set to NORMAL.
F1	EPM Fault: The EPM is missing or damaged.
FC, F2 - F9, Fo	Internal Faults: The control board has sensed a problem - consult factory.

To clear a fault, issue a STOP command on the terminal strip. The fault will only clear if the condition that caused the fault has passed. For example, if the drive trips on a LOW DC BUS VOLTAGE FAULT (LF) due to low input voltage, the fault cannot be cleared until the input voltage returns to a normal level.

If the drive is programmed to automatically restart after a fault (see Parameter 03), the drive will attempt to restart three times after a fault (the drive will not restart after CF, cF, GF, FC, F1, F2-F9, or Fo faults). If all three restart attempts are unsuccessful, the drive will trip into FAULT LOCKOUT (LC), which requires a manual reset as described above.



## 17 SCL/SCM DISPLAY MESSAGES

The following paragraphs describe the various displays and messages that can appear on the SCL/SCM drive.

### 17.1 Speed Display

If the drive is in a STOP state (indicated by "- - -" on the display), and the commanded speed is changed, the display will show the commanded speed, and the upper left decimal point will turn on solid. About five seconds after a change is made, the display will begin to alternate between the commanded speed value and the "- - -" display. If the **Mode** button is pressed, the display will stop alternating and show the "- - -" display only.

When the drive is given a START command, the displayed speed will start increasing as the drive accelerates up to the commanded speed. If the commanded speed is changed while the drive is running, the display will show the commanded speed rather than the actual speed, until the actual speed reaches the commanded speed.

If the commanded speed is changed faster than the drive can accelerate or decelerate, the upper left decimal point will blink to indicate that the drive is accelerating or decelerating to the new speed. Once the actual speed reaches the commanded speed, the upper left decimal point will turn on solid for 5 seconds and then turn off to indicate that the commanded speed has been reached, and that the display is now showing the actual speed.

### 17.2 Changing the Speed Reference Source

When the speed source is changed while the drive is running, the display will flash the message for the new speed source to indicate that the new speed source is active. Also, if the drive is being controlled from a speed source other than the ▲ and ▼ buttons (0-10 VDC, 4-20 mA, etc), and one of the ▲ or ▼ buttons is pressed, the display will flash the present speed source message to indicate that the ▲ and ▼ buttons are invalid.

**Example 1:** The drive is running and the present speed source is the keypad. TB-13A is programmed to select a 4-20 mA signal as the speed source. When TB-13A is closed to TB-11, the display will flash "EI" to indicate that the speed source has changed to the 4-20 mA signal. If the contact between TB-13A and TB-11 is opened, the display will flash "CP" to indicate that the speed source has changed back to the ▲ and ▼ buttons.

**Example 2:** The speed source is a 0-10 VDC signal. If the ▲ or ▼ button is pushed, the display will flash "EU" to indicate that the present speed source is the 0-10 VDC signal and that the ▲ and ▼ buttons are invalid.

Refer to the following table for the possible speed reference source displays:

<b>SPEED SOURCE DISPLAYS</b>	
<b>DISPLAY</b>	<b>DESCRIPTION</b>
CP	CONTROL PAD: Speed is set using the ▲ and ▼ buttons on the front of the drive.
EI	EXTERNAL CURRENT: Speed is controlled by a 4-20 mA signal wired to TB-25 and TB-2.
EU	EXTERNAL VOLTAGE: Speed is controlled by a 0-10 VDC signal wired to TB-5 and TB-2.
JG	JOG: The drive is in Jog mode, and the speed is set by Preset Speed #2 (Parameter 32).
OP	MOP (Motor Operated Pot): Contacts wired to TB-13B and TB-13E are used to increase and decrease the drive speed.
Pr1 - Pr7	PRESET SPEEDS #1-7: Speed is set by the indicated Preset Speed (Parameters 31-37).



**NOTE**

The speed source displays will flash when the speed reference source is changed while the drive is running to indicate that the new speed reference source is active

### 17.3 Status and Warning Messages

<b>STATUS AND WARNING MESSAGES</b>	
<b>DISPLAY</b>	<b>DESCRIPTION</b>
br	DC BRAKING: The DC braking circuit is activated.
cE	“cE” will be displayed if an EPM with a different parameter version is installed and then an attempt is made to change parameter settings without performing the TRANSLATE function. Refer to PROGRAM SELECTION (Parameter 48).
CL	CURRENT LIMIT: The output current has exceeded the CURRENT LIMIT setting (Parameter 25) and the drive is reducing the output frequency to reduce the output current. If the drive remains in CURRENT LIMIT for too long, it can trip into a CURRENT OVERLOAD fault (PF).
Er	ERROR: Invalid data has been entered or an invalid command was attempted.
GE	“GE” will be displayed if an attempt is made to change the OEM default settings when the drive is operating in the OEM mode (refer to Parameter 48).
GF	If “GF” is displayed when a RESET OEM is attempted, it indicates that the OEM defaults in the EPM are corrupted. If “GF” is displayed upon power-up, it indicates that the OEM defaults and the user settings in the EPM are corrupted. Refer to Section 13.2.
LC	FAULT LOCKOUT: The drive has failed three restart attempts and now requires a manual reset.
SE	SERIAL: The optional remote keypad is active as the user interface instead of the buttons on front of the drive. Refer to Parameter 14 (CONTROL).
SP	START PENDING: “SP” blinks during the interval between restart attempts.
✕ ✕	DECEL OVERRIDE (both upper decimal points blinking): The drive has stopped decelerating to avoid tripping into an HF fault due to regenerative energy from the motor.

**AC Technology Corporation**  
630 Douglas Street • Uxbridge, MA 01569 • USA  
Sales: 800 217-9100 • Service: 508 278-9100  
[www.lenze-actech.com](http://www.lenze-actech.com)

**SM01M**

# **SERVICE AND PARTS MANUAL FOR BLOWER MODEL**

## **DR404 – DR656**

**AMETEK****Technical and Industrial Products**

627 Lake Street, Kent, Ohio 44240 U.S.A.

Telephone: 330-673-3452 Fax: 330-677-3306

e-mail: [rotroindustrial@ametek.com](mailto:rotroindustrial@ametek.com)internet: [www.ametektip.com](http://www.ametektip.com)

**Your Choice. Our Commitment.™**

# WARRANTY, INSTALLATION, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

**AMETEK**

## TECHNICAL AND INDUSTRIAL PRODUCTS

627 Lake Street, Kent, Ohio 44240 USA

Telephone: 330-673-3452 Fax: 330-677-3306

e-mail: [rottronindustrial@ametek.com](mailto:rottronindustrial@ametek.com) web site: [www.ametektip.com](http://www.ametektip.com)

1. AMETEK Rotron DR, EN and HiE regenerative direct drive blowers are guaranteed for one full year from the date of installation (limited to 18 months from the date of shipment) to the original purchaser only. Should the blower fail we will evaluate the failure. If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.
2. AMETEK Rotron Minispiral, Revaflo, Multiflow, Nautilair, remote drive blowers, moisture separators, packaged units, CP blowers, Nasty Gas™ models and special built (EO) products are guaranteed for one full year from date of shipment for workmanship and material defect to the original purchaser only. Should the blower fail, If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.
3. **Parts Policy** - AMETEK Rotron spare parts and accessories are guaranteed for three months from date of shipment for workmanship and material defect to the original purchaser only. If failure is determined to be workmanship or material defect related we will at our option repair or replace the part.

**Corrective Action** - A written report will be provided indicating reason(s) for failure, with suggestions for corrective action. Subsequent customer failures due to abuse, misuse, misapplication or repeat offense will not be covered. AMETEK Rotron will then notify you of your options. Any failed unit that is tampered with by attempting repair or diagnosis will void the warranty, unless authorized by the factory.

**Terms and Conditions** - Our warranty covers repairs or replacement of regenerative blowers only, and will not cover labor for installation, outbound and inbound shipping costs, accessories or other items not considered integral blower parts. Charges may be incurred on products returned for reasons other than failures covered by their appropriate warranty. Out-of-warranty product and in warranty product returned for failures determined to be caused by abuse, misuse, or repeat offense will be subject to an evaluation charge. Maximum liability will in no case exceed the value of the product purchased. Damage resulting from mishandling during shipment is not covered by this warranty. It is the responsibility of the purchaser to file claims with the carrier. Other terms and conditions of sale are stated on the back of the order acknowledgement.

### Installation Instructions for SL, DR, EN, CP, and HiE Series Blowers

1. **Bolt It Down** - Any blower must be secured against movement prior to starting or testing to prevent injury or damage. The blower does not vibrate much more than a standard electric motor.
2. **Filtration** - All blowers should be filtered prior to starting. Care must be taken so that no foreign material enters the blower. If foreign material does enter the blower, it could cause internal damage or may exit at extremely high velocity.

Should excessive amounts of material pass through the blower, it is suggested that the cover(s) and impeller(s) be removed periodically and cleaned to avoid impeller imbalance. Impeller

imbalance greatly speeds bearing wear, thus reducing blower life. Disassembling the blower will void warranty, so contact the factory for cleaning authorization.

3. **Support the Piping** - The blower flanges and nozzles are designed as connection points only and are not designed to be support members.

Caution: Plastic piping should not be used on blowers larger than 1 HP that are operating near their maximum pressure or suction point. Blower housing and nearby piping temperatures can exceed 200°F. Access by personnel to the blower or nearby piping should be limited, guarded, or marked, to prevent danger of burns.

4. **Wiring** - Blowers must be wired and protected/fused in accordance with local and national electrical codes. All blowers must be grounded to prevent electrical shock. Slo-Blo or time delay fuses should be used to bypass the first second of start-up amperage.
5. **Pressure/Suction Maximums** - The maximum pressure and/or suction listed on the model label should not be exceeded. This can be monitored by means of a pressure or suction gage (available from Rotron), installed in the piping at the blower outlet or inlet. Also, if problems do arise, the Rotron Field representative will need to know the operating pressure/suction to properly diagnose the problem.
6. **Excess Air** - Bleed excess air off. DO NOT throttle to reduce flow. When bleeding off excess air, the blower draws less power and runs cooler.

**Note:** Remote Drive (Motorless) Blowers - Properly designed and installed guards should be used on all belts, pulleys, couplings, etc. Observe maximum remote drive speed allowable. Due to the range of uses, drive guards are the responsibility of the customer or user. Belts should be tensioned using belt gauge.

#### Maintenance Procedure

When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.

Bearing Part Number	Size	Seal Material	Grease	Heat Stabilized
510217 510218 510219	205 206 207	Polyacrylic	Nye Rheotemp 500 30% +/- 5% Fill	Yes - 325 F
510449 516440 516648	203 202 307	Buna N	Exxon Polyrex Grease	NO
516840 516841 516842 516843 516844 516845 516846 516847	206 207 208 210 309 310 311 313	Buna N	Exxon Polyrex Grease	NO

## Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected 2. * One phase of stator winding open 3. Bearings defective 4. Impeller jammed by foreign material 5. Impeller jammed against housing or cover 6. ** Capacitor open	1. Connect 2. Rewind or buy new motor 3. Change bearings 4. Clean and add filter 5. Adjust 6. Change capacitor
	No Sound	1. * Two phases of power line not connected 2. * Two phases of stator winding open	1. Connect 2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity 2. Short circuit	1. Use time delay fuse of proper rating 2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage 2. * Operating in single phase condition 3. Bearings defective 4. Impeller rubbing against housing or cover 5. Impeller or air passage clogged by foreign material 6. Unit operating beyond performance range 7. Capacitor shorted 8. * One phase of stator winding short circuited	1. Check input voltage 2. Check connections 3. Check bearings 4. Adjust 5. Clean and add filter 6. Reduce system pressure/vacuum 7. Change capacitor 8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover 2. Impeller or air passages clogged by foreign material 3. Bearings defective	1. Adjust 2. Clean and add filter 3. Change bearings
	Performance Below Standard	1. Leak in piping 2. Piping and air passages clogged 3. Impeller rotation reversed 4. Leak in blower 5. Low voltage	1. Tighten 2. Clean 3. Check wiring 4. Tighten cover, flange 5. Check input voltage
* 3 phase units ** 1 phase units *** Disassembly and repair of new blowers or motors will void the Rotron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.			

### **Blower Disassembly:**

**WARNING:** Attempting to repair or diagnose a blower may void Rotron's warranty. It may also be difficult to successfully disassemble and reassemble the unit.

- 1) Disconnect the power leads. **CAUTION:** Be sure the power is disconnected before doing any work whatsoever on the unit.
- 2) Remove or separate piping and/or mufflers and filters from the unit.
- 3) Remove the cover bolts and then the cover. **NOTE:** Some units are equipped with seals. It is mandatory that these seals be replaced once the unit has been opened.
- 4) Remove the impeller bolt and washers and then remove the impeller. **NOTE:** Never pry on the edges of the impeller. Use a puller as necessary.
- 5) Carefully note the number and location of the shims. Remove and set them aside. **NOTE:** If the disassembly was for inspection and cleaning the unit may now be reassembled by reversing the above steps. If motor servicing or replacement and/or impeller replacement is required the same shims may not be used. It will be necessary to re-shim the impeller according to the procedure explained under assembly.

- 6) Remove the housing bolts and remove the motor assembly (arbor/housing on remote drive models).
- 7) Arbor disassembly (Applicable on remote drive models only):
  - a) Slide the bearing retraining sleeve off the shaft at the blower end.
  - b) Remove the four (4) screws and the bearing retaining plate from the blower end.
  - c) Lift the shaft assembly far enough out of the arbor to allow removal of the blower end snap ring.
  - d) Remove the shaft assembly from the arbor.
  - e) If necessary, remove the shaft dust seal from the pulley end of the arbor.

***Muffler Material Replacement:***

- 1) Remove the manifold cover bolts and then manifold cover.
- 2) The muffler material can now be removed and replaced if necessary. On blowers with fiberglass acoustical wrap the tubular retaining screens with the fiberglass matting before sliding the muffler pads over the screens.
- 3) Reassemble by reversing the procedure.

**NOTE: On DR068 models with tubular mufflers it is necessary to remove the cover and impeller accessing the muffler material from the housing cavity.**

***Blower Reassembly:***

- 1) Place the assembled motor (assembled arbor assembly for remote drive models) against the rear of the housing and fasten with the bolts and washer.
- 2) To ensure the impeller is centered within the housing cavity re-shim the impeller according to the procedure outlined below.
- 3) If blower had a seal replace the seal with a new one.
- 4) Place the impeller onto the shaft making sure the shaft key is in place and fasten with the bolt, washer and spacer as applicable. Torque the impeller bolt per the table below. Once fastened carefully rotate the impeller to be sure it turns freely.
- 5) Replace the cover and fasten with bolts.
- 6) Reconnect the power leads to the motor per the motor nameplate.

Bolt Size	Torque Pound-Force-Foot
1/4-20	6.25 +/- 0.25
5/16-18	11.5 +/- 0.25
3/8-16	20.0 +/- 0.5
1/2-13	49.0 +/- 1
5/8 -11	90.0 +/- 2



*Impeller Shimming Procedure:*

**WARNING:** This unit may be difficult to shim. Extreme care may be exercised.

**Tools Needed:** Machinist's Parallel Bar

Vernier Caliper with depth measuring capability

Feeler gauges or depth gauge

**Measure the Following:**

Distance from the flange face to the housing (A)

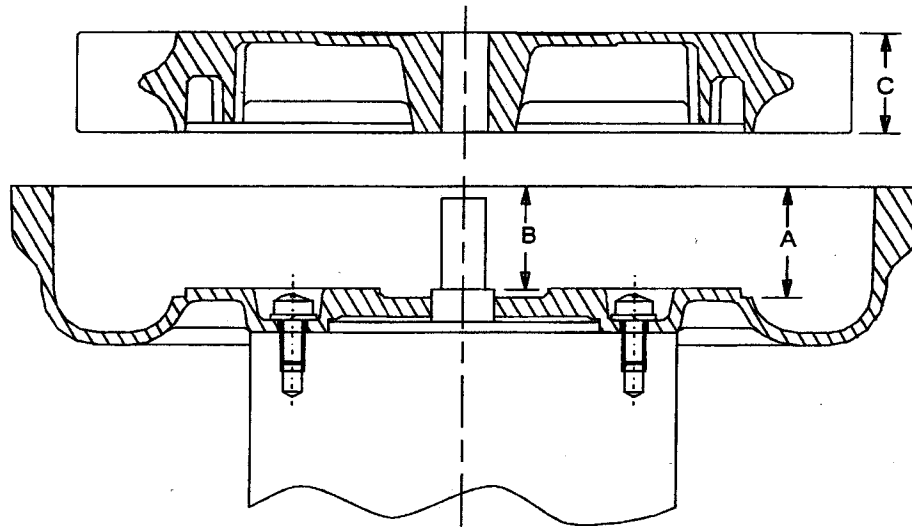
Distance from the flange face to the motor shaft shoulder (B)

Impeller Thickness (C)

Measurements (A) and (B) are made by laying the parallel bar across the housing flange face and measuring to the proper points. Each measurement should be made at three points, and the average of the readings should be used.

$$\text{Shim Thickness} = B - (A+C)/2$$

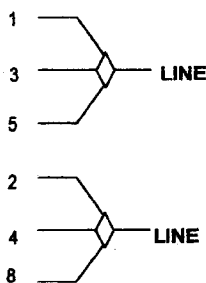
After the impeller installation (step #4 above) the impeller/cover clearance can be checked with feeler gauges, laying the parallel bar across the housing flange face. This clearance should nominally be  $(A-C)/2$ .



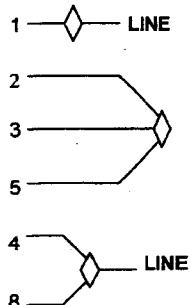
# WIRING DIAGRAMS, TEFC and ODP MOTORS

## A. 1Ø, 6 WIRE

**115 VAC**



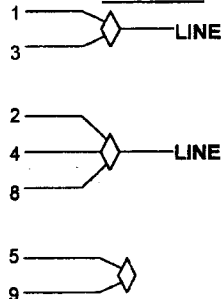
**230 VAC**



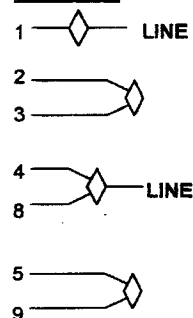
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

## B. 1Ø, 7 WIRE

**115 VAC**



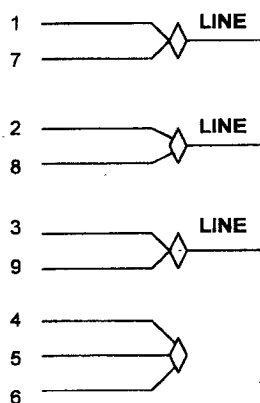
**230 VAC**



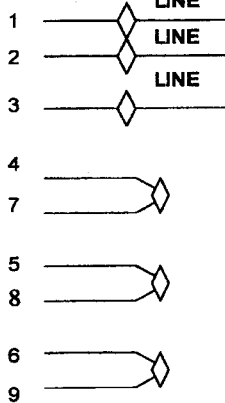
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

## C. 3Ø, 9 WIRE

**230 VAC**



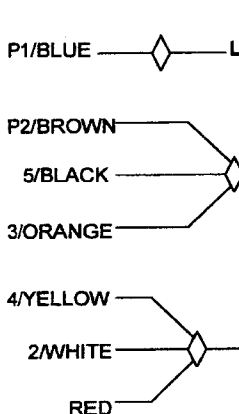
**460 VAC**



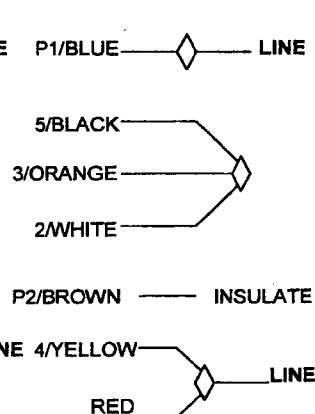
INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

## D. 1Ø, EMERSON 1/8 HP MOTOR

**115 VAC**



**230 VAC**

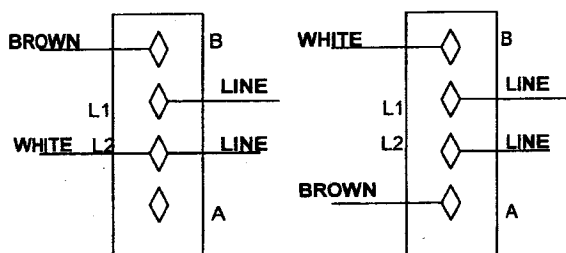


INTERCHANGE RED AND BLACK TO REVERSE ROTATION

## E. 1Ø, SPA DUTY WITH TERMINAL STRIPS

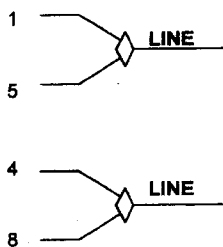
**LOW 115 VAC**

**HIGH 230 VAC**



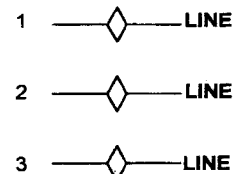
## F. 1Ø, 230 VAC

**SINGLE VOLTAGE**



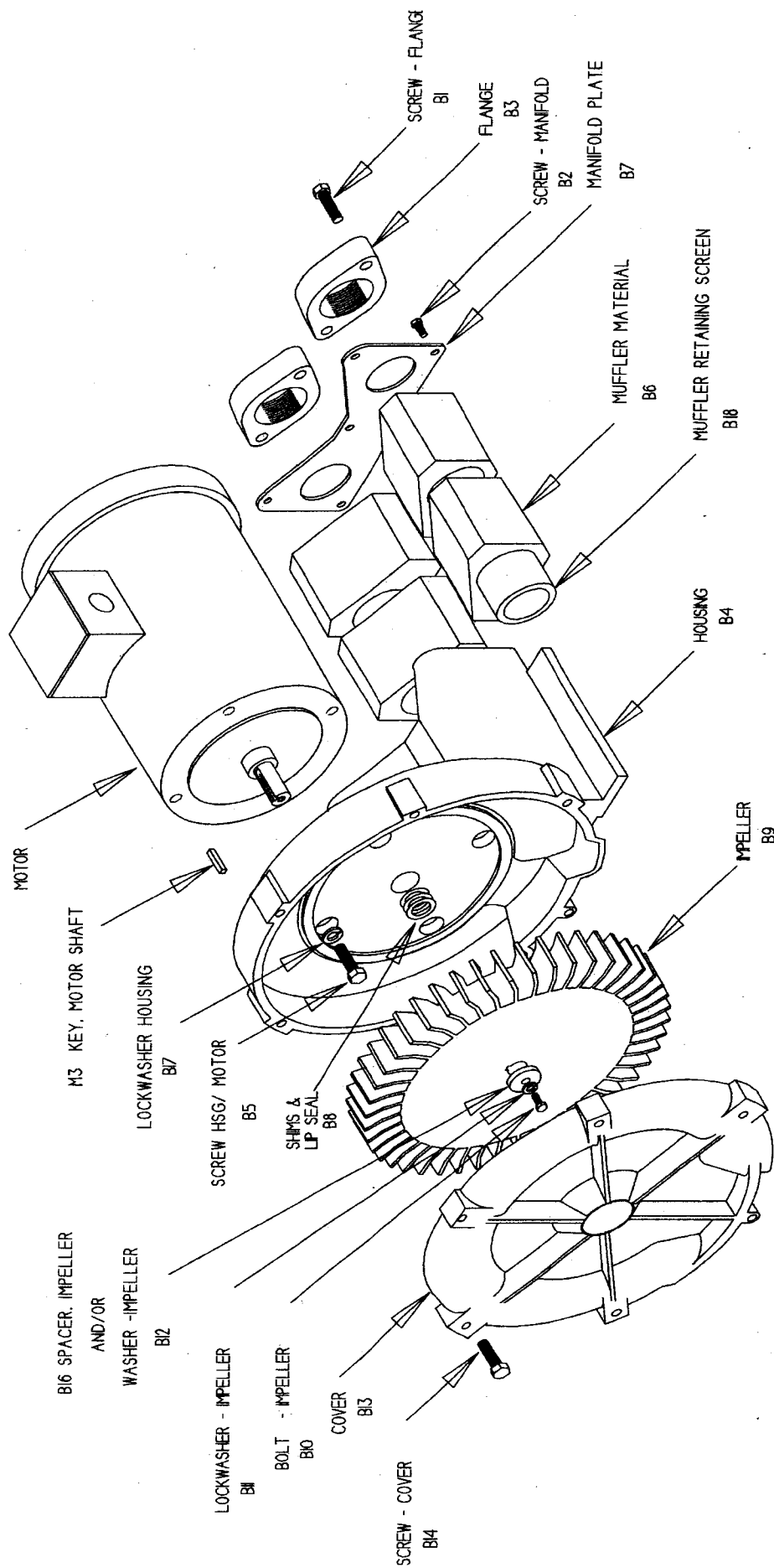
INTERCHANGE LEAD WIRES 5 & 8 TO REVERSE ROTATION

## G. 3Ø, 575 VAC



INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

# ASSEMBLY DIAGRAM DR/EN/CP/HIE XOX



## Parts Breakdown

DR555	DR606
037308	038526

037309 038529  
037310 080077

Item No.	Qty.	Description	NEW										OBSOLETE			
	Req'd															
M3	1	Key Motor Shaft	510629	510629	510629	510629	155099	510629	510629			510629	510629			
B1	4	Screw, Flange	120162	120162	120162	120162	120162	120162	120162			120162	120162	120255	120162	
B2	6	Screw, Manifold	155130	155130	155477 (10 pcs)	120214 (10 pcs)	120214	155130	155170			155477	155477	155477		
B3	2	Flange	510962	510354	510354	510354	510354	510354	510354			510354	510354	510354	510354	
B4	1	Housing	517002	515737	551001	516552	516551	517419	550195			516721	525790	517419	517419	
B5	4	Screw, Hsg /Motor	155128	251791	155128	251791	251791	155128	251791			251791	251791	251791	251791	
B6	4	Muffler Material	(6 pcs) 517015	515743	515743	516560	516560 (6 pcs)	515743 (8 pcs)	551555			515743	529781			
B7	2	Muffler Material	Not Used	Not Used	551006	Not Used	Not Used	Not Used	Not Used			Not Used	Not Used	Not Used	Not Used	
B8	1	Manifold Plate	517008	515744	515744	529868	529868	517458	551563			517458	511284			
	*	Shim .002"	510356	510356	510356	510356	500664	510356	510356			510356	510356	510356	510356	
	*	Shim .005"	510357	510357	510357	510357	500665	510357	510357			510357	510357	510357	510357	
	*	Shim .010"	510358	510358	510358	510358	500666	510358	510358			510358	510358	510358	510358	
	*	Shim .020"	510359	510359	510359	510359	500667	510359	510359			510359	510359	510359	510359	
	*	Shim .030"	Not Used	Not Used	Not Used	Not Used	510292	Not Used	Not Used			Not Used	Not Used	Not Used	Not Used	
B9	1	Impeller	516987	515675	551067	516557 (2 pcs)	516562	517433	550305			516678	511272	516678	511272	
B10	1	Bolt, Impeller	120214	120214	120214	120325	120214	120214	120325			120262	120325	120262	120325	
B11	1	Lockwasher, Impeller	120203	120203	120203	120203	120203	120203	120203			120203	120203	120203	120203	
B12	1	Washer, Impeller	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used			Not Used	Not Used	Not Used	Not Used	
B13	1	Cover	516990	515702	551085	516559	516559	517431	550249			516675	511274	516675	511274	
B14	6	Screw, Cover	155129	155236	155129 (8 pcs)	120255 (8 pcs)	155098	155236 (8 PCS)	155236 (7 pcs)			155236	155236	155236	155236	
B16	1	Spacer, Impeller Bolt	510355	510355	510355	510355	510355	510355	510355			510355	510355	510355	510355	
B17	4	Lockwasher, Housing	251787	251787	251787	251787	251787	251787	251787			251787	251787	251787	251787	
B18	2	Screen, Muffler Retaining	517016	551087	551087	511718	511718	See Next Page	551423			510362	529782	510362	529782	
B19		Bolt, Muffler Hsg/Hsg	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used			Not Used	Not Used	Not Used	Not Used	
B20		Muffler Housing	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used			Not Used	Not Used	Not Used	Not Used	
		Lip Seal	Not Used	Not Used	Not Used	Not Used	516587	Not Used	Not Used			Not Used	Not Used	Not Used	Not Used	

11/8/04 REV. G

Model	Part #	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)	Bearing, Impeller End (M2)
DR404AL72M	037406	510438	C			
DR404AL86M	037408	510700	G			
DR404AL58M	037407	510439	A			
DR454R72	036855	510317	C			
DR454R86	036856	510319	A			
DR454R86	036949	516034	G			
DR454C072	038808	510763	C			
DR454R72M	080480	510317	C			
DR454R86M	080481	510319	A			
DR454R86M	080482	516034	G			
DR513R72	037217	510317	C			
DR513R58	037209	510319	A			
DR513R86	037773	516034	G			
DR523K72	037210	516571	C			
DR523K58	037211	516572	A			
DR523K86	037772	551131	G			
DR505C86M	037546	511307	A			
DR505C072M	037545	511306	C			
DR505AS86M	037544	510701	G			
DR505AS72M	037543	510318	C			
DR505AS58M	037542	510320	A			
DR555C72 - Obsolete	037308	510895	C			
DR555K72 - Obsolete	037306	511306	C			
DR555K58 - Obsolete	037305	511307	A			
DR555K86 - Obsolete	037310	511305	G			
DR555K86 - Obsolete	037309	516686	G			
DR555C72	081100	510895	C			
DR555K72	081099	511306	C			
DR555K58	081098	511307	A			
DR555C86	081102	511305	G			
DR555K86	081101	516686	G			
DR606C72M - Obsolete	038526	510895	C			
DR606K72M - Obsolete	038527	511306	C			
DR606K58M - Obsolete	038529	511307	A			
DR606K86M - Obsolete	038530	511305	G			
DR606C58M - Obsolete	038532	516848	F			
DR606D72M - Obsolete	080077	550689	C			
DR656C72X	080582	510895	C			
DR656C5X	080584	516848	F			
DR656C86X	080583	511305	G			
DR656K72X	080602	511306	C			
DR656K58X	080603	511307	A			
DR656D72X	080585	550689	C			
DR656D86X	080604	550694	G			

B2A Washer Manifold  
(6 pcs) 120222

510449

510217

B7\* Muffler Extension 550253

Muffler - Liner  
(2 pcs) 551006

B13A Center  
Annulus  
(1 pc) 516555  
B18 R517436  
R517436

B18 R517435  
R517435

\*As needed \*\*Viewed looking at inlet/outlet ports

# Parts Breakdown

DR656  
080582  
080583  
080604  
080584  
080585  
080602  
080603

Item No.	Qty.	Description	
M3	1	Key Motor Shaft	510629
B1	4	Screw, Flange	120255
B2	6	Screw, Manifold	155170
B3	2	Flange	511480
B4	1	Housing	550195
B5	4	Screw, Hsg./Motor	251791
B6	4	Muffler Material	(10 pcs) 551585
			Not Used
B7	0	Manifold Plate	Not Used
B8	*	Shim .002"	510356
	*	Shim .005"	510357
	*	Shim .010"	510358
	*	Shim .020"	510359
	*	Shim .030"	Not Used
B9	1	Impeller	550305
B10	1	Bolt, Impeller	120325
B11	1	Lockwasher, Impeller	120203
B12	1	Washer, Impeller	Not Used
B13	1	Cover	550249
B14	6	Screw, Cover	(8 PCS) 155236
B16	1	Spacer, Impeller Bolt	510355
B17	4	Lockwasher, Housing	251787
B18	2	Screen, Muffler Retaining Right (**)	517436
B19		Bolt, Muffler Hsg/Hsg	Not Used
B20		Muffler Housing	Not Used
		Lip Seal	Not Used

\*As needed \*\*Viewed looking at inlet/outlet ports

## ROTRON Regenerative Blowers

# DR 454M & CP 454M Regenerative Blower

### FEATURES

- Manufactured in the USA – ISO 9001 compliant
- CE compliant – Declaration of Conformity on file
- Maximum flow: 127 SCFM
- Maximum pressure: 65 IWG
- Maximum vacuum: 4.3" Hg (58.5 IWG)
- Standard motor: 1.5 HP, TEFC
- Cast aluminum blower housing, impeller & cover; cast iron flanges (threaded)
- UL & CSA approved motor with permanently sealed ball bearings
- Inlet & outlet internal muffling
- Quiet operation within OSHA standards

### MOTOR OPTIONS

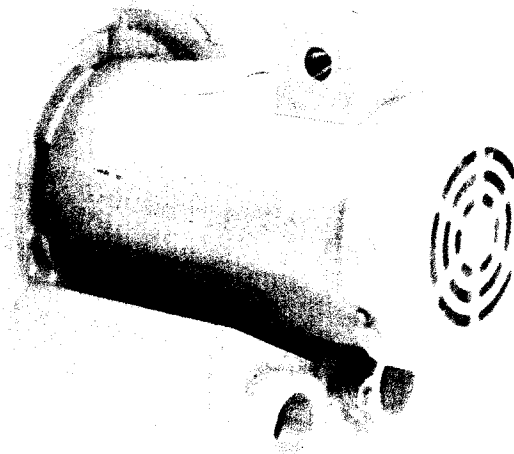
- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepower for application-specific needs

### BLOWER OPTIONS

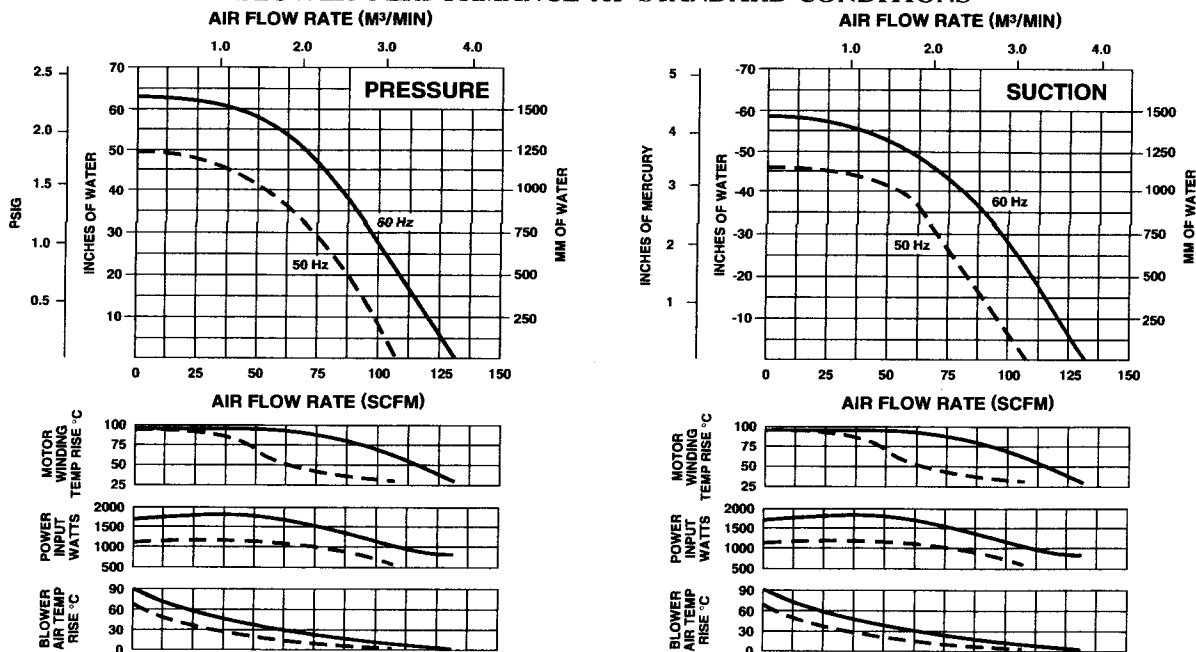
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

### ACCESSORIES (See Catalog Accessory Section)

- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges & relief valves
- Switches – air flow, pressure, vacuum or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package



### BLOWER PERFORMANCE AT STANDARD CONDITIONS



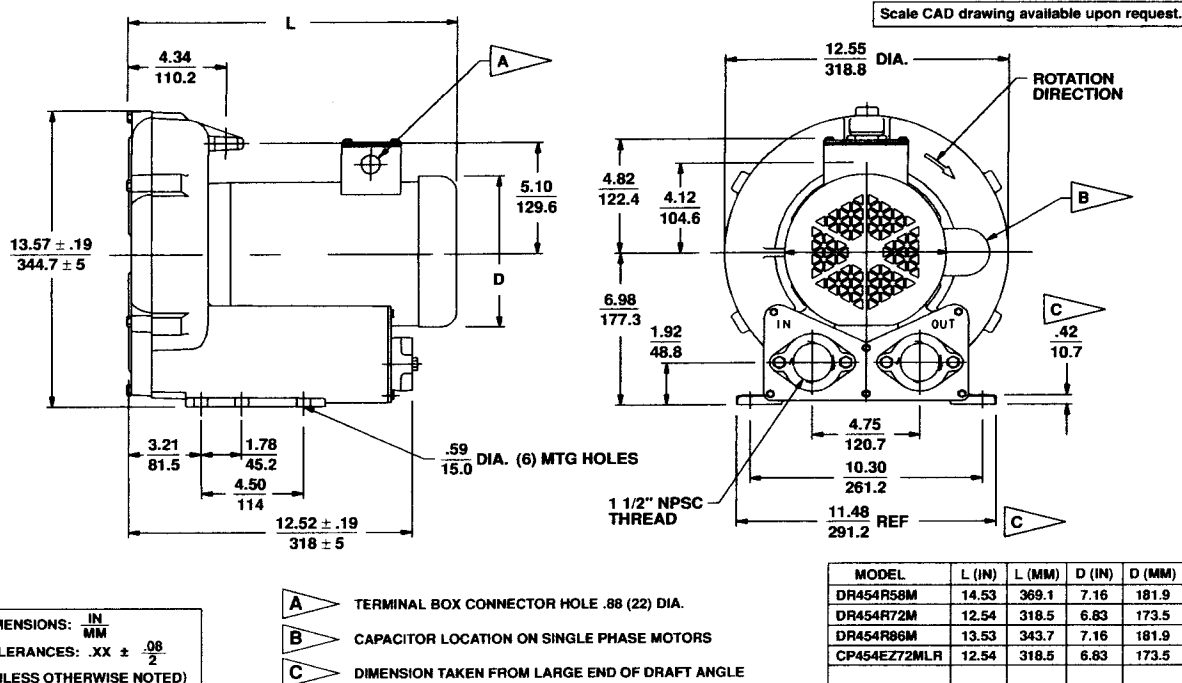
Rev. 2/04

B-15

AMETEK Technical and Industrial Products, Kent, OH 44240 • e mail: [rotronindustrial@ametek.com](mailto:rotronindustrial@ametek.com) • internet: [www.ametektmd.com](http://www.ametektmd.com)

# ROTRON Regenerative Blowers

## DR 454M & CP 454M Regenerative Blower



### SPECIFICATIONS

MODEL	DR454R58M	DR454R72M	DR454R86M	CP454EZ72MLR
Part No.	080481	080480	080482	080491
Motor Enclosure - Shaft Material	TEFC - CS	TEFC - CS	TEFC - CS	Chem TEFC - SS
Horsepower	1.5	1.5	1.5	Same as DR454R72M 080480 except add Chemical Processing (CP) features from catalog inside front cover
Voltage <sup>1</sup>	115/230	230/460	575	
Phase - Frequency <sup>1</sup>	Single - 50/60 Hz	Three - 50/60 Hz	Three - 60 Hz	
Insulation Class <sup>2</sup>	F	F	F	
NEMA Rated Motor Amps	15.6/7.8	4.6/2.3	1.8	
Service Factor	1.15	1.15	1.15	
Inrush Amps	84/42	32/16	12.8	
Max. Blower Amps <sup>3</sup>	19/9.5	6.2/3.1	2.1	
Recommended NEMA Starter Size	1/0	0/00	00	
Shipping Weight	76 lb (35 kg)	71 lb (32 kg)	66 lb (30 kg)	

<sup>1</sup> Rotron motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a  $\pm 10\%$  voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

<sup>2</sup> Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

<sup>3</sup> Maximum blower amps corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

Specifications subject to change without notice. Please consult your Local Field Sales Engineer for specification updates.

Rev. 2/04

AMETEK Technical and Industrial Products, Kent, OH 44240 • e mail: rotronindustrial@ametek.com • internet: www.ametektrnd.com

B-16



# Atlas XT-100 Welding Positioner

(Manual not provided by manufacturer)

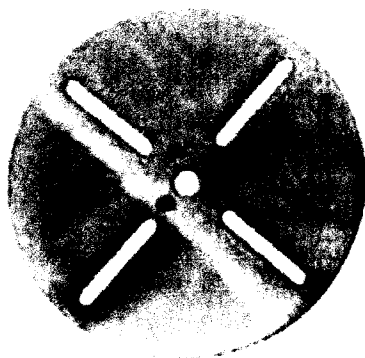


Controls shown, relocated to test chamber control panel.

# Model XT-100

ATLAS WELDING ACCESSORIES, INC.

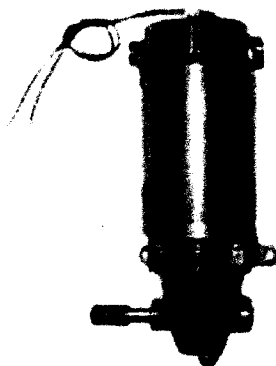
501 Stephenson Hwy., Troy, MI 48063  
800-962-9353 / Fax: 248-588-2706



1-20



2-36



0-17



0-02



0-14

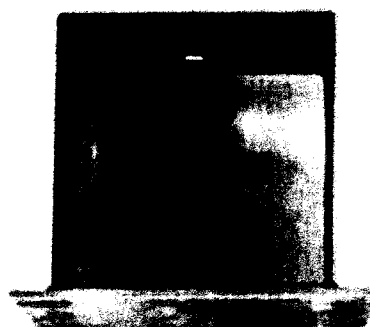


0-13

0-12



0-11



1-28



0-03

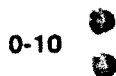


0-04

0-05



1-23

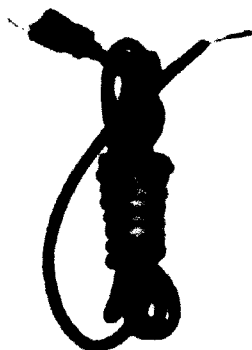


0-10



0-08

0-07



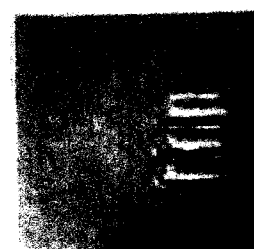
0-09



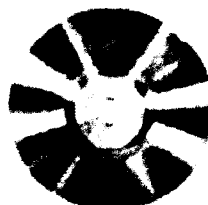
1-30



1-25



1-29



1-31



1-26



0-16



1-27



0-06

# Model XT-100

ATLAS WELDING ACCESSORIES, INC.

501 Stephenson Hwy., Troy, MI 48063  
800-962-9353 / Fax: 248-588-2708



<b>Part Number</b>	<b>Description</b>
0-02	Speed Control
0-03	Reversing Switch
0-04	Fuse Holder
0-05	Slow Blow Fuse
0-06	Foot Rheostat
0-07	Foot Rheostat Grommet
0-08	Foot Rheostat Cord
0-09	Power Cord
0-10	Cord Grommet
0-11	Welding Ground Stud
0-12	Welding Ground Flat Washer
0-13	Welding Ground Lock Washer
0-14	Welding Ground Hex Nut
0-16	Spindle Thrust Bearing
0-17	XT Standard Gearmotor
1-20	Face Plate, 9" Diameter
1-23	Welding Ground Brush Assembly
1-25	Top Spindle Bushing
1-26	Spindle Set Collar
1-27	Bottom Spindle Bushing
1-28	XT Main Frame
1-29	XT End Covers
1-30	XT Spindle
1-31	Spindle Gear, 80 Tooth
2-36	Drive Gear, 28 Tooth

## **Optional Accessories Not Pictured**

2-20	Face Plate, 10" Diameter
3-08	Face Plate, 12" Diameter
3-09	High Frequency Filter
3-12	Dynamic Brake Relay
3-13	Dynamic Brake On/Off Switch
3-70	Spindle Gear, 70 Tooth
4-01	Drive Gear, 40 Tooth
5-01	Slow Gearmotor

## Appendix C

### Data Log Sheets Manually Recorded

K. Carr Fume Hood Test Sample Data

			Weld Preparation			Filter Weight			Weld Duration				Fume Chamber Set Up				Conditions			
Filter No.	Process	Shield Flow Rate	Alloy	Filler Wire	Weld Preparation	Initial gms <sup>7</sup>	Final gms	Delta	Planned	Start	Stop	Actual	Flow	Inch H2O	Blower Speed	Table Speed	Area Temp F	Area Humidity	Date Completed	Comments
1	VPPA	He - 80cfh, Ar - 2 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	15.0974	15.1247	0.0273	15	12:36	12:43	:1309	30	st: 16 adj: 17 adj: 18 adj: 19 adj: 20 adj: 24	st: 39.4 adj: 40.4 adj: 40.9 adj: 41.7 adj: 42.5 adj: 45.1	3	68.8	29.0%	1/12/10	12, 13, 14
2	VPPA	He - 80cfh, Ar - 2 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	15.0635	15.0884	0.0249	15	11:05	11:20	:1606	30	st: 29 adj: 28 adj: 29 adj: 30 adj: 32 adj: 35	st: 46.4 adj: 47.2 adj: 48 adj: 49 adj: 50.5 adj: 52.6	3	69	60.0%	1/19/10	19, 20
3	GTAW	He - 100 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	15.0858	15.1425	0.0567	15	12:09	12:20	:1118	30	st: 27 adj: 34 adj: 38 adj: 45 adj: 50 adj: 51 adj: 54 adj: 56	st: 46.6 adj: 50.6 adj: 52.1 adj: 54.2 adj: 56.3 adj: 57.9 adj: 60 adj: 60	3	70	46.0%	1/28/10	25, 26
4	GTAW	He - 100 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	14.9803	15.0323	0.0520	15	13:20	13:35	:1521	30	st: 26 adj: 27 adj: 31 adj: 36 adj: 40 adj: 48 adj: 51 adj: 51	st: 46.1 adj: 46.9 adj: 48.5 adj: 50.6 adj: 52.4 adj: 56.8 adj: 58.6 adj: 59.4	3	68	44.0%	2/1/10	
5						15.0682		-15.0682												
6	VPPA	He - 80cfh, Ar - 2 cfh	2219	4043	Alcohol wipe/wire brush/alcohol wipe	15.0399	15.0523	0.0124	15	10:04	10:20	:1621	30	st: 19 adj: 20 adj: 21 adj: 22 adj: 24 adj: 25 adj: 27	st: 40.9 adj: 42 adj: 42.5 adj: 43.2 adj: 44.8 adj: 45.6 adj: 46.7	3	68	24.0%	1/13/10	15, 16
7						15.1016		-15.1016												

Do not write on the bags, record data here - we need to put the samples back in the bags to be weighed - keep them as clean as possible!

K. Carr Fume Hood Test Sample Data

			Weld Preparation			Filter Weight			Weld Duration				Fume Chamber Set Up				Conditions			
Filter No.	Process	Shield Flow Rate	Alloy	Filler Wire	Weld Preparation	Initial gms <sup>7</sup>	Final gms	Delta	Planned	Start	Stop	Actual	Flow	Inch H2O	Blower Speed	Table Speed	Area Temp F	Area Humidity	Date Completed	Comments
8	GTAW	He - 100 cfh	2219	4043	Alcohol wipe/wire brush/alcohol wipe	15.0205	15.0347	0.0142	15	9:55	10:08	:1500	30	st: 27 adj: 28 adj: 30 adj: 31 adj:34 adj: 38 adj: 43 adj: 50 adj: 46 adj: 48	st: 46.1 adj: 47.2 adj: 49 adj: 49 adj: 50.6 adj: 53.2 adj: 55.5 adj: 60 adj: 60 adj: 60	3	70	40.0%	1/26/10	22, 23
9	GTAW	He - 100 cfh	2219	4043	Alcohol wipe/wire brush/alcohol wipe	15.0350	15.0352	0.0002	15	13:37	13:52	:1618	30	st: 28 adj: 29 adj: 30 adj: 31 adj: 32 adj: 33	st: 47.4 adj: 48.2 adj: 49.3 adj: 50 adj: 50.6 adj: 50.6	3	68	42.0%	1/26/10	24
10						15.0858		-15.0858												
11	VPPA	He - 80cfh, Ar - 2 cfh	2219	2319	Alcohol wipe/wire brush/alcohol wipe	15.0333	15.0450	0.0117	15	13:24	13:39	:1545	30	st: 23 adj: 23 adj: 24 adj: 25 adj: 26 adj: 28 adj: 30	st: 43.3 adj: 43.8 adj: 44.6 adj: 45.6 adj: 46.4 adj: 47.7 adj: 49.0	3	70	32.0%	1/14/10	16, 17, 18
12						15.0005		-15.0005												
13						15.0148		-15.0148												
14	GTAW	He - 100 cfh	2219	2319	Alcohol wipe/wire brush/alcohol wipe	15.0250	15.0366	0.0116	15	13:33	13:48	:1506	30	st: 27 adj: 28 adj: 30 adj: 32 adj: 33 adj: 34	st: 47.4 adj: 48.5 adj: 49.5 adj: 51.1 adj: 51.1 adj: 52.4	3	71	70.0%	1/21/10	18
15	GTAW	He - 100 cfh	2219	2319	Alcohol wipe/wire brush/alcohol wipe	15.1544	15.1576	0.0032	15	9:47* 10:08	10:24	:1733	30	st: 27 adj: 27 adj: 27 adj: 28	st: 46.4* adj: 47.2 adj: 48.2 adj: 48.5	3	71	70.0%	1/21/10	19, 21
Initial runs to ensure set up is correct																				
16	GTAW	He - 80 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	14.8700	15.1398	0.2698	15	12:58	13:14	:1644	30	st: 26 adj: 30	st: 46 adj: 48.0	3.5	69.4	60.6%	11/10/09	1, 2
17	GTAW	He - 100 cfh	2219	4043	Alcohol wipe/wire brush/alcohol wipe	14.8000	15.0228	0.2228	15+	10:49	11:05	0:1415	30	st: 23 adj: 27 adj: 34 adj: 31	st: 44.8 adj: 48 adj: 52.9 adj: 51.3	3	68.8	58.5%	11/11/09	3, 4, 5

Do not write on the bags, record data here - we need to put the samples back in the bags to be weighed - keep them as clean as possible!

K. Carr Fume Hood Test Sample Data

			Weld Preparation			Filter Weight			Weld Duration				Fume Chamber Set Up				Conditions			
Filter No.	Process	Shield Flow Rate	Alloy	Filler Wire	Weld Preparation	Initial gms <sup>7</sup>	Final gms	Delta	Planned	Start	Stop	Actual	Flow	Inch H2O	Blower Speed	Table Speed	Area Temp F	Area Humidity	Date Completed	Comments
18	GTAW	He - 100 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	15.0000	15.2108	0.2108	15	14:275	14:43	:1509	30	st: 24 adj: 28 adj: 34 adj: 40 adj: 45 adj: 48	st: 45.3 adj: 46.9 adj: 49.3 adj: 51.3 adj: 53.7 adj: 58.1	3.1	68.4	52.8%	11/12/09	3, 6, 8
19	GTAW	He - 100 cfh	2195	4043	Alcohol wipe/wire brush/alcohol wipe	15.1253	15.2496	0.1243	15			:1902	<b>15</b>	*	*	3	68	51.0%	11/13/09	* 9, 10
20	none	none	2195	none	Alcohol wipe/wire brush/alcohol wipe	15.0273	15.0169	-0.0104	15	9:10	9:25	:1500	30	st: 16	st: 38.8	0	68.8	29.0%	1/12/10	11

Do not write on the bags, record data here - we need to put the samples back in the bags to be weighed - keep them as clean as possible!

K. Carr Fume Hood Test Sample Data

			Weld Preparation			Filter Weight			Weld Duration				Fume Chamber Set Up				Conditions			
Filter No.	Process	Shield Flow Rate	Alloy	Filler Wire	Weld Preparation	Initial gms <sup>7</sup>	Final gms	Delta	Planned	Start	Stop	Actual	Flow	Inch H2O	Blower Speed	Table Speed	Area Temp F	Area Humidity	Date Completed	Comments
Gen 1			All welding setups have utilized a diffuser shield cup on the torch. Use 0.320"t plate welded together w/FSW. When started welding, shielding pattern (80 cfh) insufficient based on smut pattern (set up issue). Resolution: increase shield flow rate & re-run. Torch set up is on slight angle rather than straight down (equipment interference even after made opening longer). Cannot reconfigure torch or alter chamber in any other manner to accommodate torch configuration bulk.																	
2			When run over wire start location, smokes excessively. Need to cross slide weld over 1-1.5" before start to preclude overlapping weld.																	
3			Welded with higher shield flow rate (100 cfh).																	
4			Filter receptical did not fit snugly on 1st plate (#16) & so taped edges. Top casing trimmed SQUARE & cap now sits level/seals.																	
5			Plate (0.320" t) started to buckle due to heat & voltage adjustment made, but system did not react quickly enough. Torch gagged out & E stop hit.																	
6			Less dense smutting occurred with shield increase, but still occurring & in greater quantity than Al 2219. Note that no pure TIG welds besides manual repairs performed on Al 2195. Repairs had evidence of dark smut on Al 2195. Does not occur on VPPA. Consider running VPPA seal pass demo to compare. Re-weighed prepared filters/bags to 4th decimal point. Chamber temperature at end of weld & 1 minute evacuation in excess 115+ deg F																	
7			Run using reduced flow rate of 15.																	
8			Adjustment data for blower/ water column was very erratic. Filter developed a hole on installation.																	
9			Run without any welding in-process to show environment contributions																	
10			VPPA heated the chamber up - too hot for anything but momentary contact																	
11			2195 base plate (0.320t) warped during VPPA weld which caused torch to gage out on subsequent pass, blowing hole																	
12			AVC not working correctly to handle surface gradations due to warping. Torch is installed at an angle (not straight up/down) to get it and the gas delivery system																	
13			in the chamber. This impacts the stroke such that torch could not be adequately raised to avoid the gag out.																	
14			New bolts used to hold plate in place. Some off-gasing occurred as plate heated up (failed to solvent wipe bolts down prior to installation).																	
15			Minimal warpage using 0.650" thick plate, less issues with welding. Note that equipment needs to be checked out as table rotation after 15 min duration slows/stops on its own if not watched carefully.																	
16			Bolts cleaned. No obvious off gassing.																	
17			Reuse plate from 0.650" thick 2219 plate from #6 - sand top & flip over to use bottom for weld, very little warpage allows this to occur.																	
18			Use 0.500" thick 2195 plate (width provided by FSW plates together), minimized heat																	
19			Even with thicker plate (0.320 vs 0.500) welding on 2195 warped the base plate																	
20			Travel erratic/wire feed issue caused immediate tailout (not even 60 sec), changed out tungsten & restart																	
21			No thick plate available. Use 0.320t Al 2219 siting on top of 0.320t Al 2195 (as heat sink).																	
22			Al 2219 plate started to warp early & is worst warped plate we've had. Plate was from salvage pile & temper not checked - probably T3/T4 without																	
23			stress relief which would make it unstable.																	
24			With #8 panel warping so badly, discarded the remainder of that material. Took plate from #11 & faced it to remove the weld. Plate remained > 0.650t,																	
25			Use of heavier plate makes system much more stable & without the warpage, much easier to weld.																	
26			System is starting high on water col & blower speed, indicating that something maybe clogging. - Nothing found on take apart of system. Terminate panel #3 early as blower speed maxed out at 60. We also had trouble maintaining the flow at 30 - that is why listed as 30/20.																	

Do not write on the bags, record data here - we need to put the samples back in the bags to be weighed - keep them as clean as possible!



## Appendix D

### Data Log Sheets Electronically Recorded

Date: 12-Jan-10 Time: 12:36  
Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0  
Weld ID: MTL-0039-09 TD F6457 WELD FUME CHARACTERIZATION TL-7191-1 Configuration: 4.1

Startup.....ROBOTSEAL/ VPPA WELD FUME TEST FLAT 2195 BASE 4043 FILLER  
Main.....ROBOTSEAL/  
Termination.....ROBOTSEAL/  
E-Stop.....STANDARD/ Standard ESTOP for all welds.

1-Dec-09 13:18:58  
1-Dec-09 13:18:58  
1-Dec-09 13:18:58  
27-Sep-95 14:38:48

{Scheduled / % Trim / Actual}

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
0:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:03	0.00	100	0.0	87	26.0	0.0	21.8	0.0	0.0	0.0
0:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:06	0.00	155	0.0	156	26.0	0.0	25.6	0.0	0.0	0.0
0:09	0.00	155	0.0	156	26.0	0.0	26.1	0.0	0.0	0.0
0:12	0.00	155	0.0	156	26.0	0.0	26.1	0.0	0.0	0.0
0:15	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
0:18	0.00	155	0.0	155	26.0	0.0	26.1	0.0	0.0	0.0
0:21	0.00	155	0.0	154	26.0	0.0	25.8	0.0	0.0	0.0
0:24	0.00	155	0.0	154	26.0	0.0	26.0	0.0	0.0	0.0
0:27	0.00	155	0.0	156	26.0	0.0	26.0	0.0	0.0	0.0
0:30	0.00	155	0.0	155	26.0	0.0	26.1	0.0	0.0	0.0
0:33	0.00	155	0.0	155	26.0	0.0	26.1	0.0	0.0	0.0
0:36	0.00	155	0.0	155	26.0	0.0	26.5	0.0	0.0	0.0
0:39	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
0:42	0.00	155	0.0	154	26.0	0.0	26.1	0.0	0.0	0.0
0:45	0.00	155	0.0	155	26.0	0.0	26.1	0.0	0.0	0.0
0:48	0.00	155	0.0	155	26.0	0.0	26.0	0.0	0.0	0.0
0:51	0.00	155	0.0	156	26.0	0.0	26.0	0.0	0.0	0.0
0:54	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
0:57	0.00	155	0.0	155	26.0	0.0	26.0	0.0	0.0	0.0
1:00	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
1:03	0.00	155	0.0	154	26.0	0.0	26.0	0.0	0.0	0.0
1:06	0.00	155	0.0	156	26.0	0.0	26.1	0.0	0.0	0.0
1:09	0.00	155	0.0	156	26.0	0.0	25.9	0.0	0.0	0.0
1:12	0.00	155	0.0	155	26.0	0.0	26.0	0.0	0.0	0.0
1:15	0.00	155	0.0	154	26.0	0.0	26.1	0.0	0.0	0.0
1:18	0.00	155	0.0	153	26.0	0.0	25.8	0.0	0.0	0.0
1:21	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
1:24	0.00	155	0.0	154	26.0	0.0	26.0	0.0	0.0	0.0
1:27	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
1:30	0.00	155	0.0	155	26.0	0.0	25.8	0.0	0.0	0.0
1:33	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
1:36	0.00	155	0.0	156	26.0	0.0	26.0	0.0	0.0	0.0
1:39	0.00	155	0.0	155	26.0	0.0	26.2	0.0	0.0	0.0
1:42	0.00	155	0.0	155	26.0	0.0	25.8	0.0	0.0	0.0
1:45	0.00	155	0.0	154	26.0	0.0	26.0	0.0	0.0	0.0
1:48	0.00	155	0.0	155	26.0	0.0	26.1	0.0	0.0	0.0
1:51	0.00	155	0.0	155	26.0	0.0	26.2	0.0	0.0	0.0
1:54	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
1:57	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
2:00	0.00	155	0.0	155	26.0	0.0	26.4	0.0	0.0	0.0
2:03	0.00	155	0.0	154	26.0	0.0	26.3	0.0	0.0	0.0
2:06	0.00	155	0.0	155	26.0	0.0	26.0	0.0	0.0	0.0
2:09	0.00	155	0.0	158	26.0	0.0	25.9	0.0	0.0	0.0
2:12	0.00	155	0.0	155	26.0	0.0	25.9	0.0	0.0	0.0
2:15	0.00	155	0.0	156	26.0	0.0	26.3	0.0	0.0	0.0

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev	Stand off							
2:10	0.00	155	0.0	155	26.0	0.0	25.9	4.1	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
2:21	0.00	155	0.0	156	26.0	0.0	25.9	4.1	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
2:24	0.00	155	0.0	155	26.0	0.0	25.9	4.1	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
2:27	0.00	155	0.0	155	26.0	0.0	25.8	4.1	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
2:30	0.00	155	0.0	156	26.0	0.0	26.0	4.1	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
2:33	0.00	155	0.0	155	26.0	0.0	25.8	4.2	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
2:36	0.00	155	0.0	155	26.0	0.0	25.8	4.1	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
2:39	0.00	155	0.0	155	26.0	0.0	25.9	4.1	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
2:42	0.00	155	0.0	155	26.0	0.0	26.3	4.1	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
2:45	0.00	155	0.0	155	26.0	0.0	26.1	4.2	2.00	1.93	80	30	0.0	0.0	0.0	44	0.590
2:48	0.00	155	0.0	155	26.0	0.0	26.0	4.1	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
2:51	0.00	155	0.0	155	26.0	0.0	25.8	4.1	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
2:54	0.00	155	0.0	155	26.0	0.0	26.8	4.2	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
2:57	0.00	155	0.0	154	26.0	0.0	25.8	4.1	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
3:00	0.00	155	0.0	154	26.0	0.0	25.6	4.2	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
3:03	0.00	155	0.0	155	26.0	0.0	25.5	4.2	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
3:06	0.00	155	0.0	155	26.0	0.0	26.2	4.2	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
3:09	0.00	155	0.0	154	26.0	0.0	26.2	4.2	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
3:12	0.00	155	0.0	156	26.0	0.0	25.6	4.1	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
3:15	0.00	155	0.0	154	26.0	0.0	26.1	4.2	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
3:18	0.00	155	0.0	154	26.0	0.0	26.0	4.0	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
3:21	0.00	155	0.0	155	26.0	0.0	25.7	4.1	2.00	1.92	80	30	0.0	0.0	0.0	44	0.590
3:24	0.00	155	0.0	155	26.0	0.0	26.2	4.1	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
3:27	0.00	155	0.0	153	26.0	0.0	25.9	4.1	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
3:30	0.00	155	0.0	155	26.0	0.0	26.2	4.2	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
3:33	0.00	155	0.0	156	26.0	0.0	25.9	4.1	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
3:36	0.00	155	0.0	155	26.0	0.0	25.9	4.1	2.00	1.93	79	30	0.0	0.0	0.0	43	0.590
3:39	0.00	155	0.0	155	26.0	0.0	26.0	4.2	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
3:42	0.00	155	0.0	155	26.0	0.0	26.0	4.2	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
3:45	0.00	155	0.0	155	26.0	0.0	26.2	4.2	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
3:48	0.00	155	0.0	155	26.0	0.0	26.1	4.1	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
3:51	0.00	155	0.0	155	26.0	0.0	25.9	4.1	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
3:54	0.00	155	0.0	155	26.0	0.0	25.9	4.2	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
3:57	0.00	155	0.0	155	26.0	0.0	26.1	4.1	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
4:00	0.00	155	0.0	156	26.0	0.0	25.7	4.1	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
4:03	0.00	155	0.0	154	26.0	0.0	26.2	4.1	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
4:06	0.00	155	0.0	154	26.0	0.0	26.1	4.2	2.00	1.95	80	30	0.0	0.0	0.0	44	0.590
4:09	0.00	155	0.0	155	26.0	0.0	25.9	4.1	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
4:12	0.00	155	0.0	154	26.0	0.0	25.7	4.1	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
4:15	0.00	155	0.0	155	26.0	0.0	25.7	4.1	2.00	1.99	79	30	0.0	0.0	0.0	44	0.590
4:18	0.00	155	0.0	155	26.0	0.0	25.7	4.1	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
4:21	0.00	155	0.0	155	26.0	0.0	25.7	4.1	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
4:24	0.00	155	4.0	160	26.0	0.0	25.8	4.1	2.00	2.03	80	30	0.0	0.0	0.0	44	0.590
4:27	0.00	155	4.0	163	26.0	0.0	25.9	4.2	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
4:30	0.00	155	4.0	160	26.0	0.0	25.9	4.1	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
4:33	0.00	155	4.0	163	26.0	0.0	26.1	4.2	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
4:36	0.00	155	4.0	161	26.0	0.0	26.1	4.2	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
4:39	0.00	155	4.0	162	26.0	0.0	26.1	4.2	2.00	2.00	80	30	0.0	0.0	0.0	42	0.590
4:42	0.00	155	4.0	161	26.0	0.0	26.3	4.2	2.00	1.94	79	30	0.0	0.0	0.0	43	0.590
4:45	0.00	155	4.0	161	26.0	0.0	26.1	4.2	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
4:48	0.00	155	4.0	161	26.0	0.0	26.1	4.2	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
4:51	0.00	155	4.0	161	26.0	0.0	25.9	4.1	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
4:54	0.00	155	4.0	161	26.0	0.0	25.9	4.2	2.00	2.03	80	30	0.0	0.0	0.0	44	0.590
4:57	0.00	155	4.0	161	26.0	0.0	26.0	4.2	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
5:00	0.00	155	4.0	161	26.0	0.0	26.0	4.3	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
5:03	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:06	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
5:09	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:12	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:15	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:18	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
5:21	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:24	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
5:27	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:30	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
5:33	0.00	155	26.0	4.2	2.00	79	30	0.0	43	0.590
5:36	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
5:39	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
5:42	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
5:45	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
5:48	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
5:51	0.00	155	26.0	4.2	2.00	79	30	0.0	43	0.590
5:54	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
5:57	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
6:00	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
6:03	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:06	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
6:09	0.00	155	26.0	4.2	2.00	79	30	0.0	44	0.590
6:12	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:15	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
6:18	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
6:21	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:24	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
6:27	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:30	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
6:33	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
6:36	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
6:39	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:42	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:45	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
6:48	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
6:51	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
6:54	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
6:57	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
7:00	2.00	155	26.0	4.3	2.00	79	30	0.0	44	0.590
7:03	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
7:06	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
7:09	0.00	155	26.0	4.3	2.00	79	30	0.0	44	0.590
7:12	0.00	155	26.0	4.3	2.00	79	30	0.0	44	0.590
7:15	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
7:18	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590
7:21	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
7:24	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
7:27	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
7:30	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
7:33	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
7:36	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
7:39	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
7:42	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
7:45	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590

Production Weld Fixture

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off				
7:48	0.00	155	8.0	166	26.0	-13 22.4	4.3	2.00	2.00	30	0.0	0.0	44	0.590
7:51	0.00	155	8.0	167	26.0	-13 22.4	4.3	2.00	2.02	30	0.0	0.0	44	0.590
7:54	0.00	155	8.0	168	26.0	-13 22.3	4.2	2.00	2.04	30	0.0	0.0	44	0.590
7:57	0.00	155	8.0	167	26.0	-13 22.5	4.3	2.00	2.00	30	0.0	0.0	43	0.590
8:00	0.00	155	8.0	168	26.0	-13 22.3	4.3	2.00	1.99	30	0.0	0.0	43	0.590
8:03	0.00	155	8.0	168	26.0	-13 22.3	4.3	2.00	2.00	30	0.0	0.0	44	0.590
8:06	0.00	155	8.0	168	26.0	-13 22.4	4.3	2.00	1.96	30	0.0	0.0	44	0.590
8:09	0.00	155	8.0	167	26.0	-13 22.3	4.3	2.00	2.03	30	0.0	0.0	43	0.590
8:12	0.00	155	8.0	169	26.0	-13 22.8	4.3	2.00	2.03	30	0.0	0.0	44	0.590
8:15	0.00	155	8.0	168	26.0	-13 22.8	4.3	2.00	1.96	30	0.0	0.0	44	0.590
8:18	0.00	155	8.0	168	26.0	-13 22.9	4.3	2.00	1.99	79	30	0.0	43	0.590
8:21	0.00	155	8.0	167	26.0	-13 22.9	4.3	2.00	2.04	30	0.0	0.0	44	0.590
8:24	0.00	155	8.0	167	26.0	-13 23.0	4.2	2.00	1.98	79	30	0.0	43	0.590
8:27	0.00	155	8.0	166	26.0	-13 22.9	4.4	2.00	2.00	30	0.0	0.0	43	0.590
8:30	0.00	155	8.0	167	26.0	-13 22.8	4.3	2.00	1.98	30	0.0	0.0	44	0.590
8:33	0.00	155	8.0	167	26.0	-13 22.8	4.3	2.00	1.93	30	0.0	0.0	44	0.590
8:36	0.00	155	8.0	168	26.0	-13 22.4	4.3	2.00	1.97	30	0.0	0.0	43	0.590
8:39	0.00	155	8.0	168	26.0	-13 22.4	4.4	2.00	2.02	30	0.0	0.0	43	0.590
8:42	0.00	155	8.0	167	26.0	-13 22.0	4.3	2.00	1.97	30	0.0	0.0	44	0.590
8:45	0.00	155	8.0	167	26.0	-13 22.1	4.3	2.00	1.99	30	0.0	0.0	44	0.590
8:48	0.00	155	8.0	167	26.0	-13 22.1	4.3	2.00	2.00	30	0.0	0.0	43	0.590
8:51	0.00	155	8.0	168	26.0	-12 22.0	4.3	2.00	1.98	30	0.0	0.0	43	0.590
8:54	0.00	155	8.0	167	26.0	-10 22.0	4.3	2.00	1.99	30	0.0	0.0	44	0.590
8:57	0.00	155	8.0	167	26.0	-9.0 23.3	4.2	2.00	2.02	30	0.0	0.0	44	0.590
9:00	0.00	155	8.0	167	26.0	-9.0 23.4	4.3	2.00	1.99	30	0.0	0.0	43	0.590
9:03	0.00	155	8.0	168	26.0	-9.0 23.7	4.2	2.00	2.00	30	0.0	0.0	43	0.590
9:06	0.00	155	8.0	167	26.0	-9.0 23.8	4.3	2.00	1.97	30	0.0	0.0	44	0.590
9:09	0.00	155	8.0	168	26.0	-9.0 24.1	4.3	2.00	2.01	30	0.0	0.0	43	0.590
9:12	0.00	155	8.0	164	26.0	-9.0 24.1	4.4	2.00	1.97	30	0.0	0.0	43	0.590
9:15	0.00	155	8.0	169	26.0	-9.0 24.2	4.3	2.00	1.98	30	0.0	0.0	44	0.590
9:18	0.00	155	8.0	167	26.0	-9.0 24.2	4.2	2.00	2.00	30	0.0	0.0	43	0.590
9:21	0.00	155	8.0	168	26.0	-9.0 24.1	4.3	2.00	1.99	30	0.0	0.0	43	0.590
9:24	0.00	155	8.0	168	26.0	-9.0 24.0	4.3	2.00	2.00	30	0.0	0.0	44	0.590
9:27	0.00	155	8.0	168	26.0	-9.0 23.8	4.3	2.00	2.00	30	0.0	0.0	43	0.590
9:30	0.00	155	8.0	168	26.0	-9.0 23.8	4.3	2.00	2.00	30	0.0	0.0	43	0.590
9:33	0.00	155	8.0	168	26.0	-9.0 23.5	4.4	2.00	1.97	30	0.0	0.0	43	0.590
9:36	0.00	155	8.0	167	26.0	-9.0 23.4	4.3	2.00	2.04	79	30	0.0	44	0.590
9:39	0.00	155	8.0	167	26.0	-9.0 23.2	4.3	2.00	1.98	30	0.0	0.0	43	0.590
9:42	0.00	155	8.0	167	26.0	-9.0 23.4	4.3	2.00	2.01	30	0.0	0.0	43	0.590
9:45	0.00	155	8.0	167	26.0	-9.0 23.3	4.3	2.00	1.97	30	0.0	0.0	44	0.590
9:48	0.00	155	8.0	167	26.0	-9.0 23.4	4.3	2.00	2.01	30	0.0	0.0	43	0.590
9:51	0.00	155	8.0	167	26.0	-9.0 23.3	4.4	2.00	2.01	30	0.0	0.0	44	0.590
9:54	0.00	155	8.0	167	26.0	-9.0 23.5	4.3	2.00	1.97	30	0.0	0.0	44	0.590
9:57	0.00	155	8.0	168	26.0	-9.0 23.4	4.3	2.00	2.00	30	0.0	0.0	43	0.590
10:00	0.00	155	8.0	168	26.0	-9.0 23.6	4.3	2.00	2.04	30	0.0	0.0	43	0.590
10:03	0.00	155	8.0	168	26.0	-9.0 23.6	4.3	2.00	1.98	30	0.0	0.0	44	0.590
10:06	0.00	155	8.0	167	26.0	-9.0 23.9	4.3	2.00	2.02	30	0.0	0.0	44	0.590
10:09	0.00	155	8.0	169	26.0	-9.0 23.9	4.4	2.00	2.00	30	0.0	0.0	43	0.590
10:12	0.00	155	8.0	167	26.0	-9.0 23.9	4.3	2.00	1.97	30	0.0	0.0	43	0.590
10:15	0.00	155	8.0	167	26.0	-9.0 23.9	4.3	2.00	1.99	30	0.0	0.0	43	0.590
10:18	0.00	155	8.0	167	26.0	-9.0 24.0	4.3	2.00	2.01	30	0.0	0.0	44	0.590
10:21	0.00	155	8.0	168	26.0	-9.0 23.8	4.3	2.00	1.97	30	0.0	0.0	43	0.590
10:24	0.00	155	8.0	168	26.0	-9.0 23.9	4.3	2.00	1.98	30	0.0	0.0	43	0.590
10:27	0.00	155	8.0	168	26.0	-9.0 23.9	4.3	2.00	1.98	30	0.0	0.0	44	0.590
10:30	0.00	155	8.0	167	26.0	-9.0 23.8	4.3	2.00	2.01	30	0.0	0.0	43	0.590



(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	IPress	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off			
40	10:33	0.00	155	26.0	9.0	23.7	4.3	2.00	2.03	30	0.0	0.0	43	0.590
41	10:36	0.00	155	26.0	9.0	23.4	4.3	2.00	2.00	30	0.0	0.0	44	0.590
42	10:39	0.00	155	26.0	9.0	23.5	4.3	2.00	2.00	30	0.0	0.0	44	0.590
43	10:42	0.00	155	26.0	9.0	23.4	4.4	2.00	1.99	30	0.0	0.0	43	0.590
44	10:45	0.00	155	26.0	9.0	23.4	4.3	2.00	2.02	30	0.0	0.0	44	0.590
45	10:48	0.00	155	26.0	9.0	23.4	4.3	2.00	1.97	30	0.0	0.0	44	0.590
46	10:51	0.00	155	26.0	9.0	23.2	4.3	2.00	1.97	30	0.0	0.0	43	0.590
47	10:54	0.00	155	26.0	9.0	23.2	4.3	2.00	1.98	30	0.0	0.0	44	0.590
48	10:57	0.00	155	26.0	9.0	23.4	4.3	2.00	2.02	30	0.0	0.0	43	0.590
49	11:00	0.00	155	26.0	9.0	23.4	4.3	2.00	1.98	30	0.0	0.0	43	0.590
50	11:03	0.00	155	26.0	9.0	23.8	4.4	2.00	1.94	30	0.0	0.0	43	0.590
51	11:06	0.00	155	26.0	9.0	23.9	4.3	2.00	2.00	30	0.0	0.0	44	0.590
52	11:09	0.00	155	26.0	9.0	23.9	4.2	2.00	1.99	30	0.0	0.0	43	0.590
53	11:12	0.00	155	26.0	9.0	23.9	4.3	2.00	1.97	30	0.0	0.0	43	0.590
54	11:15	0.00	155	26.0	9.0	24.0	4.3	2.00	1.98	30	0.0	0.0	44	0.590
55	11:18	0.00	155	26.0	9.0	24.1	4.4	2.00	2.04	30	0.0	0.0	43	0.590
56	11:21	0.00	155	26.0	9.0	23.9	4.3	2.00	2.01	30	0.0	0.0	43	0.590
57	11:24	0.00	155	26.0	9.0	23.9	4.3	2.00	1.98	30	0.0	0.0	44	0.590
58	11:27	0.00	155	26.0	9.0	23.9	4.3	2.00	1.98	30	0.0	0.0	43	0.590
59	11:30	0.00	155	26.0	9.0	23.7	4.3	2.00	1.95	30	0.0	0.0	44	0.590
60	11:33	0.00	155	26.0	9.0	23.9	4.3	2.00	1.99	30	0.0	0.0	43	0.590
61	11:36	0.00	155	26.0	9.0	23.5	4.3	2.00	2.00	30	0.0	0.0	44	0.590
62	11:39	0.00	155	26.0	9.0	23.4	4.4	2.00	1.99	30	0.0	0.0	44	0.590
63	11:42	0.00	155	26.0	9.0	24.1	4.3	2.00	1.98	30	0.0	0.0	43	0.590
64	11:45	0.00	155	26.0	9.0	23.5	4.4	2.00	1.98	30	0.0	0.0	44	0.590
65	11:48	0.00	155	26.0	9.0	23.5	4.3	2.00	2.00	30	0.0	0.0	43	0.590
66	11:51	0.00	155	26.0	9.0	23.3	4.3	2.00	1.96	30	0.0	0.0	44	0.590
67	11:54	0.00	155	26.0	9.0	23.3	4.3	2.00	1.98	30	0.0	0.0	44	0.590
68	11:57	0.00	155	26.0	9.0	23.5	4.3	2.00	1.98	30	0.0	0.0	43	0.590
69	12:00	0.00	155	26.0	9.0	23.4	4.3	2.00	1.99	30	0.0	0.0	44	0.590
70	12:03	0.00	155	26.0	9.0	23.4	4.3	2.00	2.00	30	0.0	0.0	44	0.590
71	12:06	0.00	155	26.0	9.0	23.6	4.3	2.00	2.01	30	0.0	0.0	43	0.590
72	12:09	0.00	155	26.0	9.0	24.0	4.3	2.00	1.99	30	0.0	0.0	43	0.590
73	12:12	0.00	155	26.0	9.0	23.9	4.3	2.00	1.99	30	0.0	0.0	43	0.590
74	12:15	0.00	155	26.0	9.0	24.1	4.3	2.00	2.02	30	0.0	0.0	43	0.590
75	12:18	0.00	155	26.0	9.0	23.9	4.3	2.00	2.00	30	0.0	0.0	43	0.590
76	12:21	0.00	155	26.0	9.0	24.2	4.3	2.00	1.98	30	0.0	0.0	44	0.590
77	12:24	0.00	155	26.0	9.0	24.0	4.3	2.00	1.99	30	0.0	0.0	44	0.590
78	12:27	0.00	155	26.0	9.0	23.8	4.4	2.00	1.98	30	0.0	0.0	43	0.590
79	12:30	0.00	155	26.0	9.0	23.9	4.3	2.00	2.01	30	0.0	0.0	43	0.590
80	12:33	0.00	155	26.0	9.0	23.9	4.3	2.00	2.00	30	0.0	0.0	44	0.590
81	12:36	0.00	155	26.0	9.0	23.5	4.4	2.00	1.97	30	0.0	0.0	44	0.590
82	12:39	0.00	155	26.0	9.0	23.3	4.3	2.00	1.99	30	0.0	0.0	43	0.590
83	12:42	0.00	155	26.0	9.0	23.7	4.3	2.00	2.00	30	0.0	0.0	44	0.590
84	12:45	0.00	155	26.0	9.0	23.5	4.3	2.00	2.00	30	0.0	0.0	44	0.590
85	12:48	0.00	155	26.0	9.0	23.4	4.3	2.00	1.97	30	0.0	0.0	43	0.590
86	12:51	0.00	155	26.0	9.0	23.4	4.2	2.00	2.01	30	0.0	0.0	44	0.590
87	12:54	0.00	155	26.0	9.0	23.4	4.2	2.00	1.97	30	0.0	0.0	43	0.590
88	12:57	0.00	155	26.0	9.0	23.0	4.2	2.00	1.99	30	0.0	0.0	43	0.590
89	12:58	0.00	155	26.0	9.0	22.7	4.3	2.00	1.97	30	0.0	0.0	44	0.590
90	13:00	0.00	155	26.0	9.0	22.7	4.3	2.00	2.00	30	0.0	0.0	44	0.590
91	13:03	0.00	155	26.0	9.0	22.5	4.3	2.00	2.00	30	0.0	0.0	44	0.590
92	13:04	0.00	155	26.0	9.0	22.1	4.2	2.00	1.98	30	0.0	0.0	44	0.590
93	13:06	0.00	155	26.0	9.0	22.1	4.2	2.00	2.01	30	0.0	0.0	43	0.590
94	13:09	0.00	155	26.0	9.0	28.1	4.2	2.00	2.01	30	0.0	0.0	43	0.590

==&gt; AVC Head manually locked by pendant button.

==&gt; AVC Head unlocked by pendant button.

Date: 12-Jan-10 Time: 12:51

Production Weld Fixture

Page 6

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off							
13:12	0.00	155	0.0	154	26.0	-9.0	28.5	4.2	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
13:13	0.00	==> TRANSITION TO EMERGENCY STOP WELD SEQUENCE															
13:13	0.00	==> E-Stop is pressed. Timer: 793.2 Sec, Pos.: 0.00 in. E-STOP is activated,															
13:15	0.00	0	0.0	0	0.0	-9.0	0.0	3.1	2.00	2.02	80	9	0.0	0.0	0.0	21	0.590
13:18	0.00	0	0.0	0	0.0	-9.0	0.0	3.0	2.00	2.01	80	0	0.0	0.0	0.0	0	0.590
13:21	0.00	0	0.0	0	0.0	-9.0	0.0	3.0	2.00	2.02	80	0	0.0	0.0	0.0	0	0.590

Start-up.....ROBOTSEAL/ VPPA WELD FUME TEST FLAT 2195 BASE 4043 FILLER

Main.....ROBOTSEAL/

Termination.....ROBOTSEAL/

E-Stop.....STANDARD/ Standard ESTOP for all welds.

1-Dec-09 13:18:58

1-Dec-09 13:18:58

1-Dec-09 13:18:58

27-Sep-95 14:38:48

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
0:00	0.00	==>> STARTUP SEQUENCE BEGIN								
0:00	0.00	75 0.0	0.0	2.9	2.00	2.01	0.0	0.0	0.0	0.590
0:03	0.00	117 0.0	0.0	2.9	2.00	2.01	1.0	0.0	0.0	0.590
0:05	0.00	==>> NORMAL TRANSITION TO MAIN WELD SCHEDULE								
0:06	0.00	155 0.0	0.0	2.9	2.00	2.02	3.0	0.0	0.0	0.590
0:09	0.00	155 0.0	0.0	2.9	2.00	2.00	3.0	0.0	0.0	0.590
0:12	0.00	155 0.0	0.0	2.9	2.00	1.96	3.0	0.0	0.0	0.590
0:15	0.00	155 0.0	0.0	2.9	2.00	2.03	3.0	0.0	0.0	0.590
0:18	0.00	155 0.0	0.0	2.7	2.00	2.01	3.0	0.0	0.0	0.590
0:21	0.00	155 0.0	0.0	2.9	2.00	2.04	3.0	0.0	0.0	0.590
0:24	0.00	155 0.0	0.0	2.9	2.00	1.97	3.0	0.0	0.0	0.590
0:27	0.00	155 0.0	0.0	2.9	2.00	2.02	3.0	0.0	0.0	0.590
0:30	0.00	155 0.0	0.0	2.9	2.00	2.02	3.0	0.0	0.0	0.590
0:33	0.00	155 0.0	0.0	2.9	2.00	2.06	3.0	0.0	0.0	0.590
0:36	0.00	155 0.0	0.0	3.1	2.00	1.96	3.0	0.0	0.0	0.590
0:39	0.00	155 0.0	0.0	2.9	2.00	2.02	3.0	0.0	0.0	0.590
0:42	0.00	155 0.0	0.0	2.9	2.00	2.01	3.0	0.0	0.0	0.590
0:45	0.00	155 0.0	0.0	2.9	2.00	2.01	3.0	0.0	0.0	0.590
0:48	0.00	155 0.0	0.0	2.9	2.00	1.97	3.0	0.0	0.0	0.590
0:51	0.00	155 0.0	0.0	2.9	2.00	2.01	3.0	0.0	0.0	0.590
0:54	0.00	155 0.0	0.0	2.9	2.00	2.02	3.0	0.0	0.0	0.590
0:57	0.00	155 0.0	0.0	2.9	2.00	2.01	3.0	0.0	0.0	0.590
1:00	0.00	155 0.0	0.0	2.9	2.00	1.99	3.0	0.0	0.0	0.590
1:03	0.00	155 0.0	0.0	2.9	2.00	2.01	3.0	0.0	0.0	0.590
1:06	0.00	155 0.0	0.0	2.9	2.00	2.02	3.0	0.0	0.0	0.590
1:09	0.00	155 0.0	0.0	2.9	2.00	1.98	3.0	0.0	0.0	0.590
1:10	0.00	==>> OPERATOR TRANSITION TO TERMINATE SEQUENCE								
1:12	0.00	119 0.0	0.0	3.0	2.00	2.00	15	0.0	0.0	0.590
1:15	0.00	56 0.0	0.0	2.9	2.00	1.99	0	0.0	0.0	0.590
1:18	0.00	0 0.0	0.0	2.8	2.00	1.99	0	0.0	0.0	0.590
0:00	0.00	==>> TERMINATION SEQUENCE COMPLETED								



Date: 19-Jan-10 Time: 11:02  
Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1  
Weld ID: MTL-0039-09 TO F6457 WELD FUME CHARACTERATION TL-7191-12

Startup.....ROBOTSEAL/ VPPA WELD FUME TEST FLAT 2195 BASE 4043 FILLER

Main.....ROBOTSEAL/

Termination.....ROBOTSEAL/

E-Stop.....STANDARD/ Standard ESTOP for all welds.

1-Dec-09 13:18:58  
1-Dec-09 13:18:58  
1-Dec-09 13:18:58  
27-Sep-95 14:38:48

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	IPress	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev	Stand off
0:00	0.00	75	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:03	0.00	99	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:05	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:06	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:09	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:12	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:15	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:18	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:21	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:24	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:27	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:30	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:33	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:36	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:39	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:42	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:45	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:48	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:51	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:54	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
0:57	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:00	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:03	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:06	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:09	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:12	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:15	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:18	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:21	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:24	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:27	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:30	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:33	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:36	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:39	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:42	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:45	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:48	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:51	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:54	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
1:57	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
2:00	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
2:03	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
2:06	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
2:09	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590
2:12	0.00	155	0.0	0.0	0.0	0.0	0.0	0.0	0	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off								
2:18	0.00	155	6.0	164	26.0	-4.0	24.9	4.3	2.00	2.03	81	30	0.0	0.0	0.0	0.0	44	0.590
2:21	0.00	155	6.0	164	26.0	-4.0	24.9	4.2	2.00	2.01	80	30	0.0	0.0	0.0	0.0	44	0.590
2:24	0.00	155	6.0	165	26.0	-4.0	25.1	4.2	2.00	2.01	81	30	0.0	0.0	0.0	0.0	43	0.590
2:27	0.00	155	6.0	163	26.0	-4.0	24.8	4.2	2.00	2.00	80	30	0.0	0.0	0.0	0.0	43	0.590
2:30	0.00	155	6.0	165	26.0	-4.0	24.9	4.3	2.00	2.02	80	30	0.0	0.0	0.0	0.0	43	0.590
2:33	0.00	155	6.0	166	26.0	-4.0	25.1	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	44	0.590
2:36	0.00	155	6.0	165	26.0	-4.0	24.9	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
2:39	0.00	155	6.0	164	26.0	-4.0	24.7	4.2	2.00	1.97	80	30	0.0	0.0	0.0	0.0	44	0.590
2:42	0.00	155	6.0	164	26.0	-4.0	25.0	4.1	2.00	1.98	80	30	0.0	0.0	0.0	0.0	44	0.590
2:45	0.00	155	6.0	164	26.0	-4.0	25.0	4.3	2.00	1.90	79	30	0.0	0.0	0.0	0.0	43	0.590
2:48	0.00	155	6.0	165	26.0	-4.0	25.0	4.2	2.00	1.93	80	30	0.0	0.0	0.0	0.0	44	0.590
2:51	0.00	155	6.0	164	26.0	-4.0	25.1	4.2	2.00	2.00	80	30	0.0	0.0	0.0	0.0	43	0.590
2:54	0.00	155	6.0	162	26.0	-4.0	25.1	4.3	2.00	2.00	79	30	0.0	0.0	0.0	0.0	43	0.590
2:57	0.00	155	6.0	164	26.0	-2.0	25.5	4.3	2.00	2.02	80	30	0.0	0.0	0.0	0.0	44	0.590
3:00	0.00	155	6.0	164	26.0	0.0	25.0	4.2	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
3:03	0.00	155	6.0	163	26.0	0.0	26.5	4.2	2.00	1.95	80	30	0.0	0.0	0.0	0.0	43	0.590
3:06	0.00	155	6.0	164	26.0	0.0	26.4	4.3	2.00	2.00	79	30	0.0	0.0	0.0	0.0	43	0.590
3:09	0.00	155	6.0	164	26.0	0.0	25.8	4.2	2.00	2.00	90	30	0.0	0.0	0.0	0.0	44	0.590
3:12	0.00	155	6.0	165	26.0	0.0	25.8	4.2	2.00	1.97	79	30	0.0	0.0	0.0	0.0	43	0.590
3:15	0.00	155	6.0	164	26.0	0.0	26.0	4.2	2.00	1.99	90	30	0.0	0.0	0.0	0.0	43	0.590
3:18	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	2.01	79	30	0.0	0.0	0.0	0.0	44	0.590
3:21	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	2.01	79	30	0.0	0.0	0.0	0.0	44	0.590
3:24	0.00	155	8.0	168	26.0	0.0	26.2	4.4	2.00	2.03	80	30	0.0	0.0	0.0	0.0	43	0.590
3:27	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
3:30	0.00	155	8.0	168	26.0	0.0	25.7	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
3:33	0.00	155	8.0	168	26.0	0.0	25.4	4.3	2.00	2.04	80	30	0.0	0.0	0.0	0.0	43	0.590
3:36	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
3:39	0.00	155	8.0	167	26.0	0.0	26.2	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	44	0.590
3:42	0.00	155	8.0	167	26.0	0.0	25.9	4.2	2.00	1.96	80	30	0.0	0.0	0.0	0.0	44	0.590
3:45	0.00	155	8.0	168	26.0	0.0	26.1	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	44	0.590
3:48	0.00	155	8.0	167	26.0	0.0	25.5	4.3	2.00	1.98	79	30	0.0	0.0	0.0	0.0	43	0.590
3:51	0.00	155	8.0	168	26.0	0.0	26.3	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	43	0.590
3:54	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	43	0.590
3:57	0.00	155	8.0	168	26.0	0.0	25.3	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
4:00	0.00	155	8.0	168	26.0	0.0	26.4	4.3	2.00	1.97	80	30	0.0	0.0	0.0	0.0	43	0.590
4:03	0.00	155	8.0	167	26.0	0.0	26.3	4.2	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
4:06	0.00	155	8.0	165	26.0	0.0	26.2	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
4:09	0.00	155	8.0	168	26.0	0.0	25.6	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	43	0.590
4:12	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
4:15	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
4:18	0.00	155	8.0	167	26.0	0.0	26.3	4.4	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
4:21	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	44	0.590
4:24	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.96	80	30	0.0	0.0	0.0	0.0	43	0.590
4:27	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
4:30	0.00	155	8.0	166	26.0	0.0	26.1	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
4:33	0.00	155	8.0	167	26.0	0.0	25.8	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
4:36	0.00	155	8.0	166	26.0	0.0	26.0	4.3	2.00	1.97	80	30	0.0	0.0	0.0	0.0	43	0.590
4:39	0.00	155	8.0	169	26.0	0.0	25.8	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	43	0.590
4:42	0.00	155	8.0	167	26.0	0.0	25.8	4.3	2.00	2.00	79	30	0.0	0.0	0.0	0.0	43	0.590
4:45	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	44	0.590
4:48	0.00	155	8.0	167	26.0	0.0	25.9	4.4	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
4:51	0.00	155	8.0	168	26.0	0.0	26.1	4.3	2.00	1.94	80	30	0.0	0.0	0.0	0.0	43	0.590
4:54	0.00	155	8.0	169	26.0	0.0	26.0	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
4:57	0.00	155	8.0	168	26.0	0.0	26.1	4.3	2.00	1.96	80	30	0.0	0.0	0.0	0.0	44	0.590
5:00	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590

(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off								
0	5:03	0.00	155	8.0	166	26.0	0.0	26.1	4.2	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
1	5:06	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	2.04	80	30	0.0	0.0	0.0	0.0	44	0.590
2	5:09	0.00	155	8.0	167	26.0	0.0	26.2	4.3	2.00	1.94	80	30	0.0	0.0	0.0	0.0	43	0.590
3	5:12	0.00	155	8.0	168	26.0	0.0	25.7	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	43	0.590
4	5:15	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	2.02	80	30	0.0	0.0	0.0	0.0	44	0.590
5	5:18	0.00	155	8.0	168	26.0	0.0	26.1	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
6	5:21	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	2.02	80	30	0.0	0.0	0.0	0.0	43	0.590
7	5:24	0.00	155	8.0	167	26.0	0.0	26.1	4.3	2.00	1.97	80	30	0.0	0.0	0.0	0.0	43	0.590
8	5:27	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.95	80	30	0.0	0.0	0.0	0.0	44	0.590
9	5:30	0.00	155	8.0	166	26.0	0.0	26.1	4.2	2.00	2.01	80	30	0.0	0.0	0.0	0.0	43	0.590
10	5:33	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
11	5:36	0.00	155	8.0	168	26.0	0.0	25.6	4.3	2.00	2.02	80	30	0.0	0.0	0.0	0.0	43	0.590
12	5:39	0.00	155	8.0	167	26.0	0.0	26.2	4.4	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
13	5:42	0.00	155	8.0	168	26.0	0.0	25.8	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	43	0.590
14	5:45	0.00	155	8.0	167	26.0	0.0	26.2	4.2	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
15	5:48	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	1.97	80	30	0.0	0.0	0.0	0.0	44	0.590
16	5:51	0.00	155	8.0	167	26.0	0.0	26.3	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
17	5:54	0.00	155	8.0	167	26.0	0.0	25.7	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
18	5:57	0.00	155	8.0	167	26.0	0.0	25.9	4.4	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
19	6:00	0.00	155	8.0	168	26.0	0.0	25.7	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
20	6:03	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
21	6:06	0.00	155	8.0	166	26.0	0.0	25.8	4.4	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
22	6:09	0.00	155	8.0	170	26.0	0.0	26.2	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
23	6:12	0.00	155	8.0	169	26.0	0.0	25.9	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
24	6:15	0.00	155	8.0	167	26.0	0.0	26.3	4.3	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
25	6:18	0.00	155	8.0	167	26.0	0.0	25.7	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
26	6:21	0.00	155	8.0	167	26.0	0.0	25.9	4.4	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
27	6:24	0.00	155	8.0	167	26.0	0.0	25.7	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
28	6:27	0.00	155	8.0	168	26.0	0.0	26.2	4.3	2.00	2.02	80	30	0.0	0.0	0.0	0.0	43	0.590
29	6:30	0.00	155	8.0	167	26.0	0.0	25.9	4.4	2.00	1.96	80	30	0.0	0.0	0.0	0.0	44	0.590
30	6:33	0.00	155	8.0	167	26.0	0.0	26.1	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	44	0.590
31	6:36	0.00	155	8.0	167	26.0	0.0	26.3	4.3	2.00	1.95	80	30	0.0	0.0	0.0	0.0	44	0.590
32	6:39	0.00	155	8.0	167	26.0	0.0	26.4	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
33	6:42	0.00	155	8.0	166	26.0	0.0	26.2	4.3	2.00	1.97	80	30	0.0	0.0	0.0	0.0	43	0.590
34	6:45	0.00	155	8.0	168	26.0	0.0	26.1	4.3	2.00	1.97	80	30	0.0	0.0	0.0	0.0	43	0.590
35	6:48	0.00	155	8.0	168	26.0	0.0	25.7	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	44	0.590
36	6:51	0.00	155	8.0	168	26.0	0.0	25.8	4.3	2.00	2.05	80	30	0.0	0.0	0.0	0.0	44	0.590
37	6:54	0.00	155	8.0	167	26.0	0.0	26.0	4.2	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
38	6:57	0.00	155	8.0	166	26.0	0.0	26.0	4.4	2.00	1.96	80	30	0.0	0.0	0.0	0.0	43	0.590
39	7:00	0.00	155	8.0	167	26.0	0.0	25.8	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
40	7:03	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.95	80	30	0.0	0.0	0.0	0.0	43	0.590
41	7:06	0.00	155	8.0	168	26.0	0.0	26.2	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
42	7:09	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.96	80	30	0.0	0.0	0.0	0.0	43	0.590
43	7:12	0.00	155	8.0	168	26.0	0.0	25.8	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
44	7:15	0.00	155	8.0	167	26.0	0.0	26.2	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
45	7:18	0.00	155	8.0	167	26.0	0.0	26.1	4.4	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
46	7:21	0.00	155	8.0	166	26.0	0.0	26.3	4.3	2.00	2.00	80	30	0.0	0.0	0.0	0.0	43	0.590
47	7:24	0.00	155	8.0	167	26.0	0.0	26.2	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	44	0.590
48	7:27	0.00	155	8.0	168	26.0	0.0	26.2	4.3	2.00	2.01	80	30	0.0	0.0	0.0	0.0	43	0.590
49	7:30	0.00	155	8.0	168	26.0	0.0	26.0	4.4	2.00	2.00	80	30	0.0	0.0	0.0	0.0	44	0.590
50	7:33	0.00	155	8.0	158	26.0	0.0	26.0	4.2	2.00	1.98	80	30	0.0	0.0	0.0	0.0	43	0.590
51	7:36	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	44	0.590
52	7:39	0.00	155	9.0	167	26.0	0.0	25.9	4.3	2.00	2.06	79	30	0.0	0.0	0.0	0.0	44	0.590
53	7:42	0.00	155	8.0	166	26.0	0.0	25.6	4.3	2.00	1.99	80	30	0.0	0.0	0.0	0.0	43	0.590
54	7:45	0.00	155	8.0	167	26.0	0.0	26.2	4.4	2.00	1.94	80	30	0.0	0.0	0.0	0.0	43	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma IPress	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off							
7:48	0.00	155	8.0	166	26.0	0.0	26.0	4.3	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
7:51	0.00	155	8.0	168	26.0	0.0	26.0	4.4	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
7:54	0.00	155	8.0	167	26.0	0.0	25.9	4.4	2.00	2.04	80	30	0.0	0.0	0.0	44	0.590
7:57	0.00	155	8.0	168	26.0	0.0	25.8	4.4	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
8:00	0.00	155	8.0	167	26.0	0.0	25.8	4.3	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
8:03	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
8:06	0.00	155	8.0	167	26.0	0.0	25.8	4.3	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
8:09	0.00	155	8.0	169	26.0	0.0	25.7	4.3	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
8:12	0.00	155	8.0	167	26.0	0.0	26.2	4.3	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
8:15	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
8:18	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
8:21	0.00	155	8.0	168	26.0	0.0	26.2	4.3	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
8:24	0.00	155	8.0	167	26.0	0.0	26.3	4.3	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
8:27	0.00	155	8.0	167	26.0	0.0	26.2	4.2	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
8:30	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
8:33	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
8:36	0.00	155	8.0	167	26.0	0.0	25.8	4.4	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
8:39	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
8:42	0.00	155	8.0	167	26.0	0.0	26.1	4.3	2.00	1.96	80	30	0.0	0.0	0.0	44	0.590
8:45	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
8:48	0.00	155	8.0	168	26.0	0.0	26.0	4.4	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
8:51	0.00	155	8.0	167	26.0	0.0	26.2	4.4	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
8:54	0.00	155	8.0	168	26.0	0.0	26.0	4.4	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
8:57	0.00	155	8.0	169	26.0	0.0	25.5	4.3	2.00	1.96	80	30	0.0	0.0	0.0	44	0.590
9:00	0.00	155	8.0	167	26.0	0.0	25.9	4.3	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
9:03	0.00	155	8.0	167	26.0	0.0	26.1	4.4	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
9:06	0.00	155	8.0	166	26.0	0.0	26.0	4.3	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
9:09	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	1.94	80	30	0.0	0.0	0.0	43	0.590
9:12	0.00	155	8.0	166	26.0	0.0	25.5	4.4	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
9:15	0.00	155	8.0	168	26.0	0.0	26.2	4.4	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
9:18	0.00	155	8.0	167	26.0	0.0	26.1	4.3	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
9:21	0.00	155	8.0	169	26.0	0.0	26.2	4.4	2.00	1.93	80	30	0.0	0.0	0.0	43	0.590
9:24	0.00	155	8.0	168	26.0	0.0	26.1	4.4	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
9:27	0.00	155	8.0	167	26.0	0.0	26.3	4.4	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
9:30	0.00	155	8.0	167	26.0	0.0	26.3	4.3	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
9:33	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.92	80	30	0.0	0.0	0.0	44	0.590
9:36	0.00	155	8.0	168	26.0	0.0	26.0	4.4	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
9:39	0.00	155	8.0	168	26.0	0.0	26.0	4.3	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
9:42	0.00	155	8.0	168	26.0	0.0	26.1	4.3	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
9:45	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
9:48	0.00	155	8.0	167	26.0	0.0	26.4	4.4	2.00	1.99	79	30	0.0	0.0	0.0	43	0.590
9:51	0.00	155	8.0	168	26.0	0.0	25.8	4.4	2.00	1.93	80	30	0.0	0.0	0.0	44	0.590
9:54	0.00	155	8.0	168	26.0	0.0	25.8	4.3	2.00	1.93	80	30	0.0	0.0	0.0	44	0.590
9:57	0.00	155	8.0	168	26.0	0.0	25.9	4.3	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
10:00	0.00	155	8.0	169	26.0	0.0	25.8	4.3	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
10:03	0.00	155	8.0	166	26.0	0.0	25.8	4.2	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
10:06	0.00	155	8.0	167	26.0	0.0	26.0	4.3	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
10:09	0.00	155	8.0	168	26.0	0.0	25.9	4.4	2.00	2.08	80	30	0.0	0.0	0.0	43	0.590
10:12	0.00	155	8.0	168	26.0	0.0	25.8	4.4	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
10:15	0.00	155	8.0	168	26.0	0.0	26.1	4.2	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
10:18	0.00	155	8.0	168	26.0	0.0	26.3	4.3	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
10:21	0.00	155	8.0	168	26.0	0.0	26.0	4.4	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
10:24	0.00	155	8.0	167	26.0	0.0	25.8	4.2	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
10:27	0.00	155	8.0	168	26.0	0.0	26.2	4.2	2.00	1.99	81	30	0.0	0.0	0.0	44	0.590
10:30	0.00	155	8.0	167	26.0	0.0	26.1	4.3	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590



(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off				
40	10:33	0.00	155	8.0	167	26.0	0.0	26.0	1.99	80	30	0.0	0.0	43	0.590
41	10:36	0.00	155	8.0	168	26.0	0.0	26.2	1.98	80	30	0.0	0.0	43	0.590
42	10:39	0.00	155	8.0	168	26.0	0.0	26.1	1.91	80	30	0.0	0.0	43	0.590
43	10:42	0.00	155	8.0	167	26.0	0.0	25.8	1.96	80	30	0.0	0.0	44	0.590
44	10:45	0.00	155	8.0	167	26.0	0.0	25.9	1.99	80	30	0.0	0.0	43	0.590
45	10:48	0.00	155	8.0	168	26.0	0.0	26.1	2.01	80	30	0.0	0.0	43	0.590
46	10:51	0.00	155	8.0	168	26.0	0.0	25.8	1.98	80	30	0.0	0.0	44	0.590
47	10:54	0.00	155	8.0	167	26.0	0.0	25.9	1.97	80	30	0.0	0.0	43	0.590
48	10:57	0.00	155	8.0	167	26.0	0.0	25.9	1.98	80	30	0.0	0.0	43	0.590
49	11:00	0.00	155	8.0	168	26.0	0.0	25.8	2.01	80	30	0.0	0.0	44	0.590
50	11:03	0.00	155	8.0	167	26.0	0.0	26.1	2.04	80	30	0.0	0.0	43	0.590
51	11:06	0.00	155	8.0	168	26.0	0.0	26.2	1.96	80	30	0.0	0.0	43	0.590
52	11:09	0.00	155	8.0	167	26.0	0.0	25.9	2.03	80	30	0.0	0.0	44	0.590
53	11:12	0.00	155	8.0	167	26.0	0.0	25.8	1.97	80	30	0.0	0.0	44	0.590
54	11:15	0.00	155	8.0	168	26.0	0.0	25.7	1.99	80	30	0.0	0.0	43	0.590
55	11:18	0.00	155	8.0	168	26.0	0.0	25.7	2.00	80	30	0.0	0.0	43	0.590
56	11:21	0.00	155	8.0	167	26.0	0.0	25.9	1.98	80	30	0.0	0.0	44	0.590
57	11:24	0.00	155	8.0	168	26.0	0.0	25.9	1.98	80	30	0.0	0.0	43	0.590
58	11:27	0.00	155	8.0	165	26.0	0.0	26.0	2.01	79	30	0.0	0.0	43	0.590
59	11:30	0.00	155	8.0	169	26.0	0.0	26.3	1.99	80	30	0.0	0.0	44	0.590
60	11:33	0.00	155	8.0	168	26.0	0.0	26.1	1.97	80	30	0.0	0.0	43	0.590
61	11:36	0.00	155	8.0	168	26.0	0.0	26.1	2.01	80	30	0.0	0.0	44	0.590
62	11:39	0.00	155	8.0	168	26.0	0.0	26.1	2.00	80	30	0.0	0.0	43	0.590
63	11:42	0.00	155	8.0	167	26.0	0.0	26.3	1.97	80	30	0.0	0.0	44	0.590
64	11:45	0.00	155	8.0	168	26.0	0.0	26.0	1.98	80	30	0.0	0.0	43	0.590
65	11:48	0.00	155	8.0	168	26.0	0.0	26.1	1.98	80	30	0.0	0.0	43	0.590
66	11:51	0.00	155	8.0	168	26.0	0.0	26.1	1.99	80	30	0.0	0.0	44	0.590
67	11:54	0.00	155	8.0	167	26.0	0.0	26.4	1.99	80	30	0.0	0.0	44	0.590
68	11:57	0.00	155	8.0	167	26.0	0.0	25.8	1.97	80	30	0.0	0.0	44	0.590
69	12:00	0.00	155	8.0	167	26.0	0.0	26.1	1.99	80	30	0.0	0.0	43	0.590
70	12:03	0.00	155	8.0	167	26.0	0.0	26.0	1.96	80	30	0.0	0.0	43	0.590
71	12:06	0.00	155	8.0	167	26.0	0.0	25.9	2.00	79	30	0.0	0.0	43	0.590
72	12:09	0.00	155	8.0	167	26.0	0.0	25.9	1.97	80	30	0.0	0.0	43	0.590
73	12:12	0.00	155	8.0	167	26.0	0.0	26.0	1.98	80	30	0.0	0.0	44	0.590
74	12:15	0.00	155	8.0	167	26.0	0.0	25.8	1.97	80	30	0.0	0.0	44	0.590
75	12:18	0.00	155	8.0	167	26.0	0.0	26.0	1.95	81	30	0.0	0.0	43	0.590
76	12:21	0.00	155	8.0	168	26.0	0.0	25.8	1.97	80	30	0.0	0.0	44	0.590
77	12:24	0.00	155	8.0	167	26.0	0.0	25.8	2.00	80	30	0.0	0.0	44	0.590
78	12:27	0.00	155	8.0	170	26.0	0.0	25.8	1.99	80	30	0.0	0.0	43	0.590
79	12:30	0.00	155	8.0	168	26.0	0.0	25.9	1.94	80	30	0.0	0.0	44	0.590
80	12:33	0.00	155	8.0	168	26.0	0.0	25.8	2.00	80	30	0.0	0.0	44	0.590
81	12:36	0.00	155	8.0	169	26.0	0.0	25.9	1.97	80	30	0.0	0.0	44	0.590
82	12:39	0.00	155	8.0	167	26.0	0.0	25.9	1.95	80	30	0.0	0.0	44	0.590
83	12:42	0.00	155	8.0	168	26.0	0.0	25.9	1.97	80	30	0.0	0.0	43	0.590
84	12:45	0.00	155	8.0	167	26.0	0.0	25.9	1.97	80	30	0.0	0.0	43	0.590
85	12:48	0.00	155	8.0	166	26.0	0.0	26.3	2.04	80	30	0.0	0.0	43	0.590
86	12:51	0.00	155	8.0	168	26.0	0.0	26.1	2.00	80	30	0.0	0.0	44	0.590
87	12:54	0.00	155	8.0	167	26.0	0.0	26.2	2.01	80	30	0.0	0.0	44	0.590
88	12:57	0.00	155	8.0	167	26.0	0.0	26.2	1.98	80	30	0.0	0.0	43	0.590
89	13:00	0.00	155	8.0	166	26.0	0.0	26.2	1.95	80	30	0.0	0.0	44	0.590
90	13:03	0.00	155	8.0	169	26.0	0.0	26.2	1.97	80	30	0.0	0.0	43	0.590
91	13:06	0.00	155	8.0	167	26.0	0.0	26.2	1.99	80	30	0.0	0.0	44	0.590
92	13:09	0.00	155	8.0	167	26.0	0.0	26.4	2.00	80	30	0.0	0.0	43	0.590
93	13:12	0.00	155	8.0	167	26.0	0.0	26.0	1.99	80	30	0.0	0.0	44	0.590
94	13:15	0.00	155	8.0	167	26.0	0.0	26.0	1.97	80	30	0.0	0.0	44	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	IPlasma Press	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
13:18	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
13:21	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
13:24	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
13:27	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
13:30	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
13:33	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
13:36	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
13:39	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
13:42	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
13:45	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
13:48	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
13:51	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
13:54	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
13:57	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:00	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
14:03	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:06	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
14:09	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:12	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
14:15	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:18	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:21	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
14:24	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
14:27	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
14:30	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
14:33	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
14:36	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:39	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
14:42	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
14:45	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
14:48	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
14:51	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:54	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
14:57	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
15:00	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
15:03	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:06	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
15:09	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
15:12	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:15	0.00	155	26.0	4.2	2.00	80	30	0.0	43	0.590
15:18	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
15:21	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:24	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:27	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:30	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:33	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
15:36	0.00	155	26.0	4.3	2.00	80	30	0.0	44	0.590
15:39	0.00	155	26.0	4.3	2.00	80	30	0.0	43	0.590
15:42	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
15:45	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
15:48	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
15:51	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
15:54	0.00	155	26.0	4.4	2.00	80	30	0.0	43	0.590
15:57	0.00	155	26.0	4.4	2.00	80	30	0.0	44	0.590
16:00	0.00	155	26.0	4.2	2.00	80	30	0.0	44	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev	Stand Off
16:03	0.00	155	8.0	167	26.0	0.0	25.8	4.4	2.00	0.0
16:06	0.00	155	8.0	169	26.0	0.0	25.8	4.4	2.00	0.0
16:07	0.00	==>> OPERATOR TRANSITION TO TERMINATE SEQUENCE								
16:09	0.00	115	8.0	128	22.0	0.0	23.3	4.0	2.00	0.0
16:12	0.00	52	8.0	58	22.0	0.0	23.4	3.6	2.00	0.0
16:15	0.00	0	8.0	1	22.0	0.0	0.0	3.0	2.00	0.0
0.00	0.00	==>> TERMINATION SEQUENCE COMPLETED								

Version Information: UFI: 4.1 HAMS: 4.0 Pendant: 1.0 Configuration: 4.1  
Weld ID: MTL-0039-09 TD F6457 WELD FUME CHARACTERATION TL-191-4 2195 BASE 4043 WIRE

Startup.....ROBOTPASS3/ WELD FUME PASS 1 FLAT BASE 2195 WIRE 4043  
Main.....ROBOTPASS3/ WELD FUME PASS 1 FLAT  
Termination.....ROBOTPASS3/ WELD FUME PASS 1 FLAT  
E-Stop.....STANDARD/ Standard ESTOP for all welds.

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev	Stand off
0:00	0.00	75	0.0	0.7	0.1	0.00	0.00	0.0	0	-0.516
0:00	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:03	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:06	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:09	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:12	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:15	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:18	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:21	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:24	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:27	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:30	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:33	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:36	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:39	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:42	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:45	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:48	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:51	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:54	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
0:57	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:00	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:03	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:06	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:09	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:12	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:15	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:18	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:21	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:24	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:27	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:30	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:33	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:36	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:39	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:42	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:45	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:48	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:51	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:54	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
1:57	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
2:00	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
2:03	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
2:06	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
2:09	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
2:12	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516
2:15	0.00	140	0.0	13.5	0.0	0.00	0.00	0.0	0	-0.516



(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
2:13	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0 -0.517
2:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.518
2:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
2:27	0.00	140	13.5	0.2	0.00	100	12	0.0	0.0	0 -0.517
2:30	0.00	140	13.5	0.2	0.00	100	12	0.0	0.0	0 -0.517
2:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.518
2:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
2:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.518
2:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.517
2:45	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.518
2:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
2:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
2:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.518
2:57	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
3:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.518
3:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
3:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
3:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
3:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
3:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
3:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.518
3:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.518
3:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
3:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
3:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
3:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.517
3:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.517
3:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
3:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.521
3:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.514
3:48	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
3:51	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.518
3:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.517
3:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
4:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
4:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.515
4:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.515
4:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
4:12	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
4:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
4:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
4:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.515
4:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.516
4:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
4:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.517
4:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.515
4:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.517
4:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0 -0.516
5:00	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0 -0.517

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
5:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0
5:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:09	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0
5:15	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:18	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:30	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:45	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:48	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:51	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
5:57	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:00	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:09	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:12	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:15	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:18	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:30	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:45	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:48	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:51	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
6:57	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:00	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:09	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:12	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:15	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:18	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:30	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:45	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cum	Stand off
7:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0
7:51	0.00	140	13.4	0.1	0.00	100	12	0.0	0.0	0
7:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
7:57	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:00	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:09	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:12	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:15	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:18	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:30	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:45	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:48	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:51	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
8:57	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:00	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:09	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:12	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:15	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:18	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:30	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:33	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:36	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:39	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:42	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:45	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:48	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:51	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:54	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
9:57	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:00	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:06	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:09	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:12	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:15	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:18	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:21	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:27	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0
10:30	0.00	140	13.5	0.1	0.00	100	12	0.0	0.0	0

(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off				
19	10:33	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
20	10:36	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
21	10:39	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
22	10:42	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
23	10:45	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
24	10:48	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
25	10:51	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
26	10:54	0.00	140	0.0	139	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
27	10:57	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
28	11:00	0.00	140	0.0	138	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
29	11:03	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
30	11:06	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
31	11:09	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
32	11:12	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
33	11:15	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
34	11:18	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
35	11:21	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
36	11:24	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
37	11:27	0.00	140	0.0	140	13.5	0.0	0.00	0.00	101	12	0.0	0.0	0	-0.514
38	11:30	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
39	11:33	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
40	11:36	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
41	11:39	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
42	11:42	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
43	11:45	0.00	140	0.0	139	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
44	11:48	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
45	11:51	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
46	11:54	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
47	11:57	0.00	140	0.0	139	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.518
48	12:00	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
49	12:03	0.00	140	0.0	140	13.5	0.0	0.00	0.00	99	12	0.0	0.0	0	-0.515
50	12:06	0.00	140	0.0	139	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
51	12:09	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
52	12:12	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
53	12:15	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
54	12:18	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
55	12:21	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.518
56	12:24	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.518
57	12:27	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
58	12:30	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
59	12:33	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
60	12:36	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
61	12:39	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
62	12:42	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
63	12:45	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.518
64	12:48	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
65	12:51	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.518
66	12:54	0.00	140	0.0	139	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
67	12:57	0.00	140	0.0	139	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
68	13:00	0.00	140	0.0	140	13.5	0.0	0.00	0.00	101	12	0.0	0.0	0	-0.516
69	13:03	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517
70	13:06	0.00	140	0.0	141	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
71	13:09	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
72	13:12	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.516
73	13:15	0.00	140	0.0	140	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0	-0.517





60# 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Date: 13-Nov-09 Time: 10:40  
Version Information: UFF: 4.1  
Weid ID: MTL-0039-09 TD F6457 WELD FUME CHARACTERATION (FL-7191-19)  
HAWDS: 4.0 Pendant: 1.0  
Configuration: 4.1  
Production Weld Fixture

Start-up: ..... ROBOTPASS3/ WELD FUME PASS 1 FLAT BASE 2195 WIRE 4043  
Main: ..... ROBOTPASS3/ WELD FUME PASS 1 FLAT  
Termination: ..... ROBOTPASS3/ WELD FUME PASS 1 FLAT  
E Stop: ..... STANDARD/ Standard ESTOP for all welds.

2195 BASE 4043

13-Nov-09 10:38:04  
13-Nov-09 10:38:04  
13-Nov-09 10:38:04  
27-Sep-95 14:30:48

(Scheduled / % Trim / Actual)																			
Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off									
0:00	0.00	75	0.0	2	13.5	0.0	0.7	0.0	0.00	0.00	90	0	0.0	0.0	0.0	0	0	0.590	
0:00	0.00	140	0.0	144	13.5	0.0	9.5	0.0	0.00	0.00	101	0	0.0	0.0	0.0	0	0	0.590	
0:03	0.00	140	0.0	141	13.5	0.0	13.3	0.0	0.00	0.00	101	0	0.0	0.0	0.0	0	0	0.590	
0:06	0.00	140	0.0	141	13.5	0.0	13.4	0.0	0.00	0.00	101	0	0.0	0.0	0.0	0	0	0.590	
0:09	0.00	140	0.0	141	13.5	0.0	13.4	0.0	0.00	0.00	101	0	0.0	0.0	0.0	0	0	0.590	
0:12	0.00	140	0.0	141	13.5	0.0	13.4	0.0	0.00	0.00	101	0	0.0	0.0	0.0	0	0	0.590	
0:15	0.00	140	0.0	141	13.5	0.0	13.5	0.0	0.00	0.00	101	0	0.0	0.0	0.0	0	0	0.590	
0:18	0.00	140	0.0	140	13.5	0.0	13.3	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
0:20	0.00	140	0.0	140	13.5	0.0	13.3	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
0:21	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:24	0.00	140	0.0	142	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:27	0.00	140	0.0	140	13.5	0.0	13.3	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
0:30	0.00	140	0.0	141	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:33	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:36	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:39	0.00	140	0.0	141	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:42	0.00	140	0.0	140	13.5	0.0	13.7	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:45	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:48	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:51	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:54	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
0:57	0.00	140	0.0	139	13.5	0.0	13.5	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
1:00	0.00	140	0.0	141	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:03	0.00	140	0.0	141	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:06	0.00	140	0.0	137	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:09	0.00	140	0.0	140	13.5	0.0	13.9	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:12	0.00	140	0.0	140	13.5	0.0	13.7	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
1:15	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:18	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:21	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
1:24	0.00	140	0.0	140	13.5	0.0	13.5	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
1:27	0.00	140	0.0	140	13.5	0.0	13.5	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
1:30	0.00	140	0.0	143	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:33	0.00	140	0.0	140	13.5	0.0	13.7	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:36	0.00	140	0.0	140	13.5	0.0	13.5	0.0	0.00	0.00	101	12	0.0	0.0	0.0	0	0	0.590	
1:39	0.00	140	0.0	140	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:42	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:45	0.00	140	0.0	141	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:48	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:51	0.00	140	0.0	142	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:54	0.00	140	0.0	140	13.5	0.0	13.6	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
1:57	0.00	140	0.0	142	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
2:00	0.00	140	0.0	140	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
2:03	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
2:06	0.00	140	0.0	141	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
2:09	0.00	140	0.0	142	13.5	0.0	13.5	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	
2:12	0.00	140	0.0	140	13.5	0.0	13.7	0.0	0.00	0.00	99	12	0.0	0.0	0.0	0	0	0.590	
2:15	0.00	140	0.0	140	13.5	0.0	13.4	0.0	0.00	0.00	100	12	0.0	0.0	0.0	0	0	0.590	

(Scheduled / % Trim / Actual)

STARTUP SEQUENCE BEGUN

---> NORMAL TRANSITION TO MAIN WELD SCHEDULE

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
2:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:24	0.00	140	13.5	0.1	0.00	100	12	0.0	0	0.590
2:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:30	0.00	140	13.5	0.0	0.00	99	12	0.0	0	0.590
2:33	0.00	140	13.5	0.0	0.03	100	12	0.0	0	0.590
2:36	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
2:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:42	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
2:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:48	0.00	140	13.5	0.1	0.00	100	12	0.0	0	0.590
2:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
2:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:03	0.00	140	13.5	0.1	0.00	100	12	0.0	0	0.590
3:06	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
3:09	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
3:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:15	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
3:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:36	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
3:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:51	0.00	140	13.5	0.1	0.00	100	12	0.0	0	0.590
3:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
3:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:06	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
4:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:30	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
4:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:48	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
4:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590
4:57	0.00	140	13.5	0.0	0.00	101	12	0.0	0	0.590
5:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
5:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:24	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
5:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
5:51	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
5:54	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
5:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:00	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
6:03	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
6:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:18	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
6:21	0.00	140	13.5	0.0	0.00	120	12	0.0	0.0	0.590
6:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
6:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:06	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
7:09	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
7:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:30	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
7:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
7:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590



(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Dur	Stand off
7:40	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
7:51	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
7:54	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
7:57	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:00	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:03	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:06	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:09	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:12	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:15	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:18	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:21	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:24	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:27	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:30	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:33	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:36	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:39	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:42	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:45	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:48	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:51	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:54	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
8:57	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:00	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:03	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:06	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:09	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:12	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:15	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:18	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:21	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:24	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:27	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:30	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:33	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:36	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:39	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:42	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:45	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:48	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:51	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:54	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
9:57	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:00	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:03	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:06	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:09	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:12	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:15	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:18	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:21	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:24	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:27	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
10:30	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
10:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:48	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
10:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
10:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
11:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
12:57	0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	0.590
13:00	0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	0.590
13:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
13:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
13:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:10	0.00	>>> Arc Head manually locked by pendant button.								
14:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:41	0.00	>>> Arc Head unlocked by pendant button.								
14:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
14:57	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:00	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:03	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:06	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:09	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:12	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:15	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:18	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:21	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:24	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:27	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:30	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:33	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:36	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:39	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:42	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:45	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:48	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:51	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590
15:54	0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
15:57	0.00	140	13.5	0.0 15.9	0.00	12	0.0 0.0	0	0.590
16:00	0.00	140	13.5	0.0 15.5	0.00	12	0.0 0.0	0	0.590
16:03	0.00	140	13.5	0.0 15.2	0.00	12	0.0 0.0	0	0.590
16:06	0.00	140	13.5	0.0 14.3	0.01	12	0.0 0.0	0	0.590
16:09	0.00	140	13.5	0.0 13.6	0.00	12	0.0 0.0	0	0.590
16:12	0.00	140	13.5	0.0 13.6	0.00	12	0.0 0.0	0	0.590
16:15	0.00	140	13.5	0.0 13.4	0.00	12	0.0 0.0	0	0.590
16:18	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
16:21	0.00	140	13.5	0.0 13.4	0.00	12	0.0 0.0	0	0.590
16:24	0.00	140	13.5	0.0 13.5	0.00	12	0.0 0.0	0	0.590
16:27	0.00	140	13.5	0.0 12.9	0.00	12	0.0 0.0	0	0.590
16:30	0.00	140	13.5	0.0 12.7	0.00	12	0.0 0.0	0	0.590
16:33	0.00	140	13.5	0.0 12.9	0.00	12	0.0 0.0	0	0.590
16:36	0.00	140	13.5	0.0 12.9	0.00	12	0.0 0.0	0	0.590
16:39	0.00	140	13.5	0.0 12.9	0.00	12	0.0 0.0	0	0.590
16:42	0.00	140	13.5	0.0 12.6	0.00	12	0.0 0.0	0	0.590
16:45	0.00	140	13.5	0.0 12.4	0.00	12	0.0 0.0	0	0.590
16:46	0.00	140	13.5	0.0 11.6	0.00	12	0.0 0.0	0	0.590
16:51	0.00	140	13.5	0.0 13.6	0.00	12	0.0 0.0	0	0.590
16:54	0.00	140	13.5	0.0 13.1	0.00	12	0.0 0.0	0	0.590
16:57	0.00	140	13.5	0.0 14.9	0.00	12	0.0 0.0	0	0.590
17:00	0.00	140	13.5	0.0 12.4	0.00	12	0.0 0.0	0	0.590
17:03	0.00	140	13.5	0.0 13.9	0.00	12	0.0 0.0	0	0.590
17:06	0.00	140	13.5	0.0 13.4	0.01	12	0.0 0.0	0	0.590
17:09	0.00	140	13.5	0.0 13.0	0.00	12	0.0 0.0	0	0.590
17:12	0.00	140	13.5	0.0 12.7	0.00	12	0.0 0.0	0	0.590
17:15	0.00	140	13.5	0.0 14.2	0.00	12	0.0 0.0	0	0.590
17:18	0.00	140	13.5	0.0 14.2	0.1	12	0.0 0.0	0	0.590
17:21	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
17:24	0.00	140	13.5	0.0 12.6	0.1	12	0.0 0.0	0	0.590
17:27	0.00	140	13.5	0.0 13.9	0.00	12	0.0 0.0	0	0.590
17:30	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
17:33	0.00	140	13.5	0.0 12.5	0.00	12	0.0 0.0	0	0.590
17:36	0.00	140	13.5	0.0 12.1	0.00	12	0.0 0.0	0	0.590
17:39	0.00	140	13.5	0.0 10.8	0.00	12	0.0 0.0	0	0.590
17:42	0.00	140	13.5	0.0 12.6	0.00	12	0.0 0.0	0	0.590
17:45	0.00	140	13.5	0.0 13.3	0.00	12	0.0 0.0	0	0.590
17:46	0.00	140	13.5	0.0 13.4	0.00	12	0.0 0.0	0	0.590
17:51	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
17:54	0.00	140	13.5	0.0 13.0	0.00	12	0.0 0.0	0	0.590
17:57	0.00	140	13.5	0.0 13.1	0.00	12	0.0 0.0	0	0.590
18:00	0.00	140	13.5	0.0 13.0	0.00	12	0.0 0.0	0	0.590
18:03	0.00	140	13.5	0.0 12.9	0.00	12	0.0 0.0	0	0.590
18:06	0.00	140	13.5	0.0 12.8	0.00	12	0.0 0.0	0	0.590
18:09	0.00	140	13.5	0.0 12.6	0.00	12	0.0 0.0	0	0.590
18:12	0.00	140	13.5	0.0 12.6	0.00	12	0.0 0.0	0	0.590
18:15	0.00	140	13.5	0.0 12.5	0.00	12	0.0 0.0	0	0.590
18:18	0.00	140	13.5	0.0 12.3	0.1	12	0.0 0.0	0	0.590
18:21	0.00	140	13.5	0.0 12.1	0.00	12	0.0 0.0	0	0.590
18:24	0.00	140	13.5	0.0 12.3	0.00	12	0.0 0.0	0	0.590
18:27	0.00	140	13.5	0.0 12.7	0.00	12	0.0 0.0	0	0.590
18:30	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
18:33	0.00	140	13.5	0.0 13.6	0.00	12	0.0 0.0	0	0.590

===&gt; AVC Head manually locked by pendant button.

1	17:51	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
2	17:54	0.00	140	13.5	0.0 13.0	0.00	12	0.0 0.0	0	0.590
3	17:57	0.00	140	13.5	0.0 13.1	0.00	12	0.0 0.0	0	0.590
4	18:00	0.00	140	13.5	0.0 13.0	0.00	12	0.0 0.0	0	0.590
5	18:03	0.00	140	13.5	0.0 12.9	0.00	12	0.0 0.0	0	0.590
6	18:06	0.00	140	13.5	0.0 12.8	0.00	12	0.0 0.0	0	0.590
7	18:09	0.00	140	13.5	0.0 12.6	0.00	12	0.0 0.0	0	0.590
8	18:12	0.00	140	13.5	0.0 12.6	0.00	12	0.0 0.0	0	0.590
9	18:15	0.00	140	13.5	0.0 12.5	0.00	12	0.0 0.0	0	0.590
10	18:18	0.00	140	13.5	0.0 12.3	0.1	12	0.0 0.0	0	0.590
11	18:21	0.00	140	13.5	0.0 12.1	0.00	12	0.0 0.0	0	0.590
12	18:24	0.00	140	13.5	0.0 12.3	0.00	12	0.0 0.0	0	0.590
13	18:27	0.00	140	13.5	0.0 12.7	0.00	12	0.0 0.0	0	0.590
14	18:30	0.00	140	13.5	0.0 13.2	0.00	12	0.0 0.0	0	0.590
15	18:33	0.00	140	13.5	0.0 13.6	0.00	12	0.0 0.0	0	0.590

Date: 13-Nov-09 Time: 11:00

## Production Weld Fixture

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(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
18:36	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:39	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:42	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:45	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:48	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:48	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:51	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:54	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
18:57	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
19:00	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
19:02	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
19:02	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
19:03	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
19:06	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590
19:09	0.00	140	13.5	0.0	0.00	0.00	12	0.0	0.0	0.590

====> AWC Head manually locked by pendant button.

====> TRANSITION TO EMERGENCY STOP WELD SEQUENCE

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,

====> E-Stop is pressed. Time: 1142.7 Sec, pos.: 0.00 In. ESTOP is activated,



Start-up.....ROBTPASS3/ WELD FUME PASS 1 FLAT  
Main.....ROBTPASS3/ WELD FUME PASS 1 FLAT  
Termination.....ROBTPASS3/ WELD FUME PASS 1 FLAT  
E-Stop.....STANDARD/ Standard ESTOP for all welds.

5-Nov-09 13:12:31  
5-Nov-09 13:12:31  
5-Nov-09 13:12:31  
27-Sep-95 14:38:48

(Scheduled / % Trim / Actual)														
Time	Position	Arc	Current	Arc	Voltage	IPress	Plasma	Helium	IShield	Wire Feed	Rate	Travel	Rev	Stand off
0:00	0.00	0.00	75	0.0	13.0	0.0	0.7	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:03	0.00	135	0.0	137	13.0	0.0	11.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:06	0.00	135	0.0	136	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:09	0.00	135	0.0	135	13.0	0.0	14.5	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:12	0.00	135	0.0	135	13.0	0.0	13.5	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:15	0.00	135	0.0	135	13.0	0.0	13.4	0.00	0.02	0.00	0.0	0.0	0.0	0.590
0:18	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:20	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:21	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:24	0.00	135	0.0	135	13.0	0.0	12.6	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:27	0.00	135	0.0	135	13.0	0.0	12.5	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:30	0.00	135	0.0	136	13.0	0.0	15.2	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:33	0.00	135	0.0	135	13.0	0.0	13.0	0.00	0.04	0.00	0.0	0.0	0.0	0.590
0:36	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.08	0.00	0.0	0.0	0.0	0.590
0:39	0.00	135	0.0	135	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:42	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:45	0.00	135	0.0	135	13.0	0.0	13.0	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:48	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:51	0.00	135	0.0	135	13.0	0.0	13.2	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:54	0.00	135	0.0	135	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:57	0.00	135	0.0	134	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:00	0.00	135	0.0	134	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:03	0.00	135	0.0	135	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:06	0.00	135	0.0	135	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:09	0.00	135	0.0	135	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:12	0.00	135	0.0	134	13.0	0.0	13.2	0.00	0.02	0.00	0.0	0.0	0.0	0.590
1:15	0.00	135	0.0	135	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:18	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.02	0.00	0.0	0.0	0.0	0.590
1:21	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:24	0.00	135	0.0	134	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:27	0.00	135	0.0	135	13.0	0.0	13.6	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:30	0.00	135	0.0	136	13.0	0.0	11.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:33	0.00	135	0.0	136	13.0	0.0	13.3	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:36	0.00	135	0.0	135	13.0	0.0	11.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:39	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:42	0.00	135	0.0	136	13.0	0.0	13.0	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:45	0.00	135	0.0	135	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:48	0.00	135	0.0	135	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:51	0.00	135	0.0	135	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590
1:54	0.00	135	0.0	134	13.0	0.0	12.9	0.00	0.01	0.00	0.0	0.0	0.0	0.590
1:57	0.00	135	0.0	135	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
2:00	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
2:03	0.00	135	0.0	134	13.0	0.0	13.0	0.00	0.00	0.00	0.0	0.0	0.0	0.590
2:06	0.00	135	0.0	135	13.0	0.0	12.9	0.00	0.00	0.00	0.0	0.0	0.0	0.590
2:09	0.00	135	0.0	135	13.0	0.0	13.0	0.00	0.00	0.00	0.0	0.0	0.0	0.590
2:12	0.00	135	0.0	135	13.0	0.0	13.1	0.00	0.00	0.00	0.0	0.0	0.0	0.590
2:15	0.00	135	0.0	135	13.0	0.0	12.8	0.00	0.00	0.00	0.0	0.0	0.0	0.590







(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
7:48	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
7:51	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
7:54	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
7:57	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:00	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:03	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:06	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:09	0.00	135	13.0	0.0	0.00	79	11	0.0	0.0	0.590
8:12	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:15	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:18	0.00	135	13.0	0.0	0.00	79	11	0.0	0.0	0.590
8:21	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:24	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:27	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:30	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:33	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:36	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:39	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:42	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:45	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:48	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:51	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:54	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
8:57	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:00	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:03	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:06	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:09	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:12	0.00	135	13.0	0.0	0.00	81	11	0.0	0.0	0.590
9:15	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:18	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:21	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:24	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:27	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:30	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:33	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:36	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:39	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:42	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:45	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:48	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:51	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:54	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
9:57	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:00	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:03	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:06	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:09	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:12	0.00	135	13.0	0.0	0.00	81	11	0.0	0.0	0.590
10:15	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:18	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:21	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:24	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:27	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590
10:30	0.00	135	13.0	0.0	0.00	80	11	0.0	0.0	0.590

{Scheduled / % Trim / Actual}

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
10:23	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
10:36	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
10:39	0.00	135	0.0 13.0	0.0 13.1	0.0 0.00	80	11	0.0 0.0	0	0.590
10:42	0.00	135	0.0 13.0	0.0 13.1	0.0 0.00	80	11	0.0 0.0	0	0.590
10:45	0.00	135	0.0 13.0	0.0 13.2	0.0 0.00	80	11	0.0 0.0	0	0.590
10:48	0.00	135	0.0 13.0	0.0 13.1	0.0 0.00	80	11	0.0 0.0	0	0.590
10:51	0.00	135	0.0 13.0	0.0 13.2	0.0 0.00	79	11	0.0 0.0	0	0.590
10:54	0.00	135	0.0 13.0	0.0 13.3	0.0 0.00	80	11	0.0 0.0	0	0.590
10:57	0.00	135	0.0 13.0	0.0 13.3	0.0 0.00	80	11	0.0 0.0	0	0.590
11:00	0.00	135	0.0 13.0	0.0 13.4	0.0 0.00	80	11	0.0 0.0	0	0.590
11:03	0.00	135	0.0 13.0	0.0 13.4	0.0 0.00	80	11	0.0 0.0	0	0.590
11:06	0.00	135	0.0 13.0	0.0 13.2	0.0 0.00	80	11	0.0 0.0	0	0.590
11:09	0.00	135	0.0 13.0	0.0 13.0	0.0 0.00	80	11	0.0 0.0	0	0.590
11:12	0.00	135	0.0 13.0	0.0 13.0	0.0 0.00	80	11	0.0 0.0	0	0.590
11:15	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
11:18	0.00	135	0.0 13.0	0.0 12.8	0.0 0.00	80	11	0.0 0.0	0	0.590
11:21	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
11:24	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
11:27	0.00	135	0.0 13.0	0.0 12.7	0.0 0.00	80	11	0.0 0.0	0	0.590
11:30	0.00	135	0.0 13.0	0.0 12.6	0.0 0.00	80	11	0.0 0.0	0	0.590
11:33	0.00	135	0.0 13.0	0.0 12.6	0.0 0.00	80	11	0.0 0.0	0	0.590
11:36	0.00	135	0.0 13.0	0.0 12.6	0.0 0.00	80	11	0.0 0.0	0	0.590
11:39	0.00	135	0.0 13.0	0.0 12.6	0.0 0.00	80	11	0.0 0.0	0	0.590
11:42	0.00	135	0.0 13.0	0.0 12.5	0.0 0.00	80	11	0.0 0.0	0	0.590
11:45	0.00	135	0.0 13.0	0.0 12.4	0.0 0.00	80	11	0.0 0.0	0	0.590
11:48	0.00	135	0.0 13.0	0.0 12.1	0.0 0.00	80	11	0.0 0.0	0	0.590
11:51	0.00	135	0.0 13.0	0.0 12.0	0.0 0.00	80	11	0.0 0.0	0	0.590
11:54	0.00	135	0.0 13.0	0.0 11.9	0.0 0.00	80	11	0.0 0.0	0	0.590
11:57	0.00	135	0.0 13.0	0.0 11.8	0.0 0.00	80	11	0.0 0.0	0	0.590
12:00	0.00	135	0.0 13.0	0.0 12.0	0.0 0.00	80	11	0.0 0.0	0	0.590
12:03	0.00	135	0.0 13.0	0.0 12.5	0.0 0.00	80	11	0.0 0.0	0	0.590
12:06	0.00	135	0.0 13.0	0.0 12.7	0.0 0.00	80	11	0.0 0.0	0	0.590
12:09	0.00	135	0.0 13.0	0.0 13.0	0.0 0.00	80	11	0.0 0.0	0	0.590
12:12	0.00	135	0.0 13.0	0.0 13.1	0.0 0.00	80	11	0.0 0.0	0	0.590
12:15	0.00	135	0.0 13.0	0.0 13.3	0.0 0.00	80	11	0.0 0.0	0	0.590
12:18	0.00	135	0.0 13.0	0.0 13.3	0.0 0.00	80	11	0.0 0.0	0	0.590
12:21	0.00	135	0.0 13.0	0.0 13.4	0.0 0.00	80	11	0.0 0.0	0	0.590
12:24	0.00	135	0.0 13.0	0.0 13.8	0.0 0.00	80	11	0.0 0.0	0	0.590
12:27	0.00	135	0.0 13.0	0.0 13.9	0.0 0.00	80	11	0.0 0.0	0	0.590
12:30	0.00	135	0.0 13.0	0.0 14.0	0.0 0.00	81	11	0.0 0.0	0	0.590
12:33	0.00	135	0.0 13.0	0.0 14.6	0.0 0.00	80	11	0.0 0.0	0	0.590
12:36	0.00	135	0.0 13.0	0.0 14.8	0.0 0.00	80	11	0.0 0.0	0	0.590
12:39	0.00	135	0.0 13.0	0.0 14.6	0.0 0.00	80	11	0.0 0.0	0	0.590
12:42	0.00	135	0.0 13.0	0.0 13.8	0.0 0.00	80	11	0.0 0.0	0	0.590
12:45	0.00	135	0.0 13.0	0.0 13.4	0.0 0.00	79	11	0.0 0.0	0	0.590
12:48	0.00	135	0.0 13.0	0.0 13.3	0.0 0.00	80	11	0.0 0.0	0	0.590
12:51	0.00	135	0.0 13.0	0.0 13.2	0.0 0.00	80	11	0.0 0.0	0	0.590
12:54	0.00	135	0.0 13.0	0.0 13.1	0.0 0.00	80	11	0.0 0.0	0	0.590
12:57	0.00	135	0.0 13.0	0.0 13.0	0.0 0.00	80	11	0.0 0.0	0	0.590
13:00	0.00	135	0.0 13.0	0.0 13.0	0.0 0.00	81	11	0.0 0.0	0	0.590
13:03	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
13:06	0.00	135	0.0 13.0	0.0 12.9	0.0 0.00	80	11	0.0 0.0	0	0.590
13:09	0.00	135	0.0 13.0	0.0 12.8	0.0 0.00	80	11	0.0 0.0	0	0.590
13:12	0.00	135	0.0 13.0	0.0 12.8	0.0 0.00	80	11	0.0 0.0	0	0.590
13:15	0.00	135	0.0 13.0	0.0 12.7	0.0 0.00	80	11	0.0 0.0	0	0.590

Production Weld Fixture

Date: 10-Nov-09 Time: 13:11

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off				
13:18	0.00	135	0.0	134	13.0	0.0	12.6	0.0	11	0.0	0.0	0.0	0.0	0.590
13:21	0.00	135	0.0	135	13.0	0.0	12.5	0.0	11	0.0	0.0	0.0	0.0	0.590
13:24	0.00	135	0.0	133	13.0	0.0	12.5	0.0	11	0.0	0.0	0.0	0.0	0.590
13:27	0.00	135	0.0	136	13.0	0.0	12.4	0.0	11	0.0	0.0	0.0	0.0	0.590
13:30	0.00	135	0.0	134	13.0	0.0	12.5	0.0	11	0.0	0.0	0.0	0.0	0.590
13:33	0.00	135	0.0	135	13.0	0.0	12.8	0.0	11	0.0	0.0	0.0	0.0	0.590
13:36	0.00	135	0.0	135	13.0	0.0	12.8	0.0	11	0.0	0.0	0.0	0.0	0.590
13:39	0.00	135	0.0	134	13.0	0.0	12.9	0.0	11	0.0	0.0	0.0	0.0	0.590
13:42	0.00	135	0.0	135	13.0	0.0	13.2	0.0	11	0.0	0.0	0.0	0.0	0.590
13:45	0.00	135	0.0	136	13.0	0.0	13.2	0.0	11	0.0	0.0	0.0	0.0	0.590
13:48	0.00	135	0.0	135	13.0	0.0	13.3	0.0	11	0.0	0.0	0.0	0.0	0.590
13:51	0.00	135	0.0	136	13.0	0.0	13.4	0.0	11	0.0	0.0	0.0	0.0	0.590
13:54	0.00	135	0.0	134	13.0	0.0	13.4	0.0	11	0.0	0.0	0.0	0.0	0.590
13:57	0.00	135	0.0	135	13.0	0.0	13.6	0.0	11	0.0	0.0	0.0	0.0	0.590
14:00	0.00	135	0.0	135	13.0	0.0	13.6	0.0	11	0.0	0.0	0.0	0.0	0.590
14:03	0.00	135	0.0	135	13.0	0.0	13.5	0.0	11	0.0	0.0	0.0	0.0	0.590
14:06	0.00	135	0.0	136	13.0	0.0	13.4	0.0	11	0.0	0.0	0.0	0.0	0.590
14:09	0.00	135	0.0	136	13.0	0.0	13.3	0.0	11	0.0	0.0	0.0	0.0	0.590
14:12	0.00	135	0.0	136	13.0	0.0	13.1	0.0	11	0.0	0.0	0.0	0.0	0.590
14:15	0.00	135	0.0	135	13.0	0.0	13.2	0.0	11	0.0	0.0	0.0	0.0	0.590
14:18	0.00	135	0.0	135	13.0	0.0	12.9	0.0	11	0.0	0.0	0.0	0.0	0.590
14:21	0.00	135	0.0	135	13.0	0.0	12.9	0.0	11	0.0	0.0	0.0	0.0	0.590
14:24	0.00	135	0.0	135	13.0	0.0	12.8	0.0	11	0.0	0.0	0.0	0.0	0.590
14:27	0.00	135	0.0	135	13.0	0.0	12.8	0.0	11	0.0	0.0	0.0	0.0	0.590
14:30	0.00	135	0.0	135	13.0	0.0	12.8	0.0	11	0.0	0.0	0.0	0.0	0.590
14:33	0.00	135	0.0	135	13.0	0.0	12.7	0.0	11	0.0	0.0	0.0	0.0	0.590
14:36	0.00	135	0.0	135	13.0	0.0	12.7	0.0	11	0.0	0.0	0.0	0.0	0.590
14:39	0.00	135	0.0	134	13.0	0.0	12.4	0.0	11	0.0	0.0	0.0	0.0	0.590
14:42	0.00	135	0.0	134	13.0	0.0	12.4	0.0	11	0.0	0.0	0.0	0.0	0.590
14:45	0.00	135	0.0	135	13.0	0.0	12.2	0.0	11	0.0	0.0	0.0	0.0	0.590
14:48	0.00	135	0.0	134	13.0	0.0	11.7	0.0	11	0.0	0.0	0.0	0.0	0.590
14:51	0.00	135	0.0	135	13.0	0.0	10.7	0.0	11	0.0	0.0	0.0	0.0	0.590
14:54	0.00	135	0.0	135	13.0	0.0	7.8	0.0	11	0.0	0.0	0.0	0.0	0.590
14:57	0.00	135	0.0	135	13.0	0.0	0.6*	0.1	0.00	0.00	0.0	0.0	0.0	0.590
15:00	0.00	135	0.0	136	13.0	0.0	0.7*	0.1	0.00	0.00	0.0	0.0	0.0	0.590
15:03	0.00	135	0.0	135	13.0	0.0	0.6*	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:06	0.00	135	0.0	135	13.0	0.0	10.0	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:09	0.00	135	0.0	135	13.0	0.0	11.9	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:12	0.00	135	0.0	134	13.0	0.0	13.1	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:15	0.00	135	0.0	135	13.0	0.0	13.4	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:18	0.00	135	0.0	134	13.0	0.0	13.5	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:21	0.00	135	0.0	134	13.0	0.0	13.7	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:24	0.00	135	0.0	134	13.0	0.0	13.8	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:27	0.00	135	0.0	135	13.0	0.0	14.6	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:30	0.00	135	0.0	134	13.0	0.0	15.3	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:33	0.00	135	0.0	135	13.0	0.0	16.3	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:36	0.00	135	0.0	135	13.0	0.0	17.3	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:39	0.00	135	0.0	135	13.0	0.0	17.8	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:42	0.00	135	0.0	135	13.0	0.0	17.4	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:45	0.00	135	0.0	135	13.0	0.0	16.4	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:48	0.00	135	0.0	135	13.0	0.0	15.3	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:51	0.00	135	0.0	136	13.0	0.0	13.6	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:54	0.00	135	0.0	135	13.0	0.0	13.1	0.0	0.0	0.00	0.00	0.0	0.0	0.590
15:57	0.00	135	0.0	135	13.0	0.0	13.0	0.0	0.0	0.00	0.00	0.0	0.0	0.590
16:00	0.00	135	0.0	135	13.0	0.0	13.0	0.0	0.0	0.00	0.00	0.0	0.0	0.590





Production Weld Fixture



100

Time: 12:06

[illegible]

Configuration: 4.1

Pendant 1.00

HAYS: 4.0

on: LIF

Version Information

13-Nov-09 10:38:04

17-160-09 10:38:24

13-00000-62-029-01010-38=04

54-8614-100-23

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev	Stand off
0:00	0.00	==>> STARTUP SEQUENCE BEGIN								
0:00	0.00	75	0.0	13.5	0.0	0.6	0.2	0.00	0.00	0.0
0:03	0.00	==>> AVC Head manually locked by pendant button.								
0:03	0.00	140	0.0	13.5	0.0	0.2	0.0	0.00	0.00	0.0
0:06	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:09	0.00	==>> AVC Head unlocked by pendant button.								
0:09	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:12	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:15	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:18	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:20	0.00	==>> NORMAL TRANSITION TO MAIN WELD SCHEDULE								
0:21	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:24	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:27	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:30	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:33	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:36	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:39	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:42	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:45	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:48	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:51	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:54	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
0:57	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:00	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:03	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:06	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:09	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:12	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:15	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:18	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:21	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:24	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:27	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:30	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:33	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:36	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:39	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:42	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:45	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:48	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:51	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:54	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
1:57	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:00	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:03	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:06	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:09	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:12	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:15	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:18	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:21	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:24	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:27	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:30	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:33	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:36	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:39	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:42	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:45	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:48	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:51	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:54	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
2:57	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:00	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:03	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:06	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:09	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:12	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:15	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:18	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:21	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:24	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:27	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:30	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:33	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:36	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:39	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:42	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:45	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:48	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:51	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:54	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
3:57	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0
4:00	0.00	140	0.0	13.5	0.0	0.0	0.0	0.00	0.00	0.0

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
2:12	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.514
2:15	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
2:18	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
2:21	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
2:24	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.515
2:27	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
2:30	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.514
2:33	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
2:36	-0.00	140	13.5	0.1	0.00	99	12	0.0	0	-0.514
2:39	-0.00	140	13.5	0.1	0.00	99	12	0.0	0	-0.515
2:42	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.514
2:45	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
2:48	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.515
2:51	-0.00	140	13.5	0.2	0.00	100	12	0.0	0	-0.514
2:54	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
2:57	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
3:00	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
3:03	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
3:06	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.514
3:09	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
3:12	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
3:15	-0.00	140	13.5	0.2	0.00	100	12	0.0	0	-0.515
3:18	-0.00	140	13.5	0.2	0.00	101	12	0.0	0	-0.515
3:21	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
3:24	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
3:27	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.514
3:30	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.517
3:33	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.517
3:36	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
3:39	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
3:42	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
3:45	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.514
3:48	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.517
3:51	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.517
3:54	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
3:57	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
4:00	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.517
4:03	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.514
4:06	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.514
4:09	-0.00	140	13.5	0.2	0.00	100	12	0.0	0	-0.515
4:12	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
4:15	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.517
4:18	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
4:21	-0.00	140	13.5	0.2	0.00	100	12	0.0	0	-0.516
4:24	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.517
4:27	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
4:30	-0.00	140	13.5	0.2	0.00	101	12	0.0	0	-0.515
4:33	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.515
4:36	-0.00	140	13.5	0.0	0.00	101	12	0.0	0	-0.513
4:39	-0.00	140	13.5	0.2	0.00	100	12	0.0	0	-0.519
4:42	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.515
4:45	-0.00	140	13.5	0.0	0.00	100	12	0.0	0	-0.516
4:48	-0.00	140	13.5	0.1	0.00	101	12	0.0	0	-0.517
4:51	-0.00	140	13.5	0.1	0.00	100	12	0.0	0	-0.516
4:54	-0.00	140	13.5	0.1	0.00	101	12	0.0	0	-0.515

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
4:37	-0.00	140 0.0	142 13.5	0.0 3.4*	0.0 0.00	101	12 0.0	0.0 0.0	0	-0.518
5:00	-0.00	140 0.0	141 13.5	0.3 12.3	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.515
5:03	-0.00	140 0.0	141 13.5	0.1 12.7	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
5:06	-0.00	140 0.0	141 13.5	0.0 13.4	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.516
5:09	-0.00	140 0.0	141 13.5	0.0 13.6	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.515
5:12	-0.00	140 0.0	140 13.5	0.0 13.3	0.0 0.00	101	12 0.0	0.0 0.0	0	-0.517
5:15	-0.00	140 0.0	139 13.5	0.1 13.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.516
5:18	-0.00	140 0.0	140 13.5	0.0 13.3	0.0 0.00	101	12 0.0	0.0 0.0	0	-0.516
5:21	-0.00	140 0.0	140 13.5	0.2 13.4	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
5:24	-0.00	140 0.0	140 13.5	0.1 13.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.518
5:27	-0.00	140 0.0	141 13.5	0.1 13.6	0.0 0.00	101	12 0.0	0.0 0.0	0	-0.517
5:30	-0.00	140 0.0	139 13.5	0.1 13.5	0.0 0.01	100	12 0.0	0.0 0.0	0	-0.515
5:33	-0.00	140 0.0	140 13.5	0.1 13.7	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.515
5:36	-0.00	140 0.0	145 13.5	0.1 13.7	0.1 0.00	101	12 0.0	0.0 0.0	0	-0.519
5:39	-0.00	140 0.0	146 13.5	0.1 13.6	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
5:42	-0.00	140 0.0	147 13.5	0.1 13.2	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.516
5:45	-0.00	140 0.0	150 13.5	0.0 13.7	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.518
5:48	-0.00	140 0.0	148 13.5	0.0 13.4	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.518
5:51	-0.00	140 0.0	143 13.5	0.0 12.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
5:54	-0.00	140 0.0	143 13.5	0.0 13.1	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.518
5:57	-0.00	140 0.0	149 13.5	0.0 13.6	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.518
6:00	-0.00	140 0.0	150 13.5	0.1 14.6	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.518
6:03	-0.00	140 0.0	150 13.5	0.0 13.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.519
6:06	-0.00	140 0.0	149 13.5	0.1 14.1	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.517
6:09	-0.00	140 0.0	147 13.5	0.0 13.6	0.0 0.00	99	12 0.0	0.0 0.0	0	-0.518
6:12	-0.00	140 0.0	150 13.5	0.0 13.6	0.1 0.00	99	12 0.0	0.0 0.0	0	-0.519
6:15	-0.00	140 0.0	149 13.5	0.0 13.7	0.0 0.00	102	12 0.0	0.0 0.0	0	-0.515
6:18	-0.00	140 0.0	149 13.5	0.0 8.5	0.2 0.00	100	12 0.0	0.0 0.0	0	-0.519
6:21	-0.00	140 0.0	148 13.5	0.0 17.5	0.1 0.00	99	12 0.0	0.0 0.0	0	-0.518
6:24	-0.00	140 0.0	148 13.5	0.0 14.0	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.517
6:27	-0.00	140 0.0	149 13.5	0.0 13.9	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.518
6:30	-0.00	140 0.0	148 13.5	0.0 13.1	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.519
6:33	-0.00	140 0.0	150 13.5	0.0 13.3	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.517
6:36	-0.00	140 0.0	149 13.5	0.0 13.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.518
6:39	-0.00	140 0.0	148 13.5	0.0 13.8	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.517
6:42	-0.00	140 0.0	148 13.5	0.0 13.4	0.0 0.00	99	12 0.0	0.0 0.0	0	-0.517
6:45	-0.00	140 0.0	148 13.5	0.0 13.4	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
6:48	-0.00	140 0.0	149 13.5	0.0 13.8	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.519
6:51	-0.00	140 0.0	150 13.5	0.0 13.3	0.2 0.00	99	12 0.0	0.0 0.0	0	-0.519
6:54	-0.00	140 0.0	149 13.5	0.0 13.6	0.1 0.00	99	12 0.0	0.0 0.0	0	-0.518
6:57	-0.00	140 0.0	147 13.5	0.0 13.8	0.1 0.00	101	12 0.0	0.0 0.0	0	-0.518
7:00	-0.00	140 0.0	149 13.5	0.0 13.5	0.1 0.00	99	12 0.0	0.0 0.0	0	-0.518
7:03	-0.00	140 0.0	151 13.5	0.0 13.3	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.516
7:06	-0.00	140 0.0	149 13.5	0.0 13.4	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.515
7:09	-0.00	140 0.0	151 13.5	0.0 13.5	0.0 0.00	101	12 0.0	0.0 0.0	0	-0.517
7:12	-0.00	140 0.0	149 13.5	0.0 13.3	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.514
7:15	-0.00	140 0.0	149 13.5	0.0 13.3	0.1 0.00	100	12 0.0	0.0 0.0	0	-0.516
7:18	-0.00	140 0.0	148 13.5	0.0 13.2	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
7:21	-0.00	140 0.0	149 13.5	0.0 13.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.516
7:24	-0.00	140 0.0	150 13.5	0.0 13.5	0.0 0.00	101	12 0.0	0.0 0.0	0	-0.516
7:27	-0.00	140 0.0	149 13.5	0.0 13.5	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.517
7:30	-0.00	140 0.0	150 13.5	0.0 13.4	0.0 0.00	99	12 0.0	0.0 0.0	0	-0.521
7:33	-0.00	140 0.0	148 13.5	0.0 13.5	0.1 0.00	99	12 0.0	0.0 0.0	0	-0.519
7:36	-0.00	140 0.0	149 13.5	0.0 13.3	0.1 0.00	102	12 0.0	0.0 0.0	0	-0.518
7:39	-0.00	140 0.0	146 13.5	0.0 13.4	0.0 0.00	100	12 0.0	0.0 0.0	0	-0.515

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
7:42	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
7:45	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
7:48	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
7:51	-0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	-0.518
7:54	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
7:57	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
8:00	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
8:03	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.520
8:06	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
8:09	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
8:12	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
8:15	-0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	-0.517
8:18	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
8:21	-0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	-0.517
8:24	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
8:27	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
8:30	-0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	-0.520
8:33	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
8:36	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
8:39	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
8:42	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
8:45	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
8:48	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
8:51	-0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	-0.521
8:54	-0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	-0.518
8:57	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
9:00	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.515
9:03	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
9:06	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
9:09	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.520
9:12	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
9:15	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
9:18	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
9:21	-0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	-0.518
9:24	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
9:27	-0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	-0.518
9:30	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
9:33	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
9:36	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
9:39	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
9:42	-0.00	140	13.5	0.0	0.00	99	12	0.0	0.0	-0.519
9:45	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
9:48	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
9:51	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.520
9:54	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
9:57	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
10:00	-0.00	140	13.5	0.0	0.00	101	12	0.0	0.0	-0.518
10:03	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
10:06	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.521
10:09	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
10:12	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.517
10:15	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.519
10:18	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.518
10:21	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.516
10:24	-0.00	140	13.5	0.0	0.00	100	12	0.0	0.0	-0.513





Date: 04/13/2009 Time: 13:18:41 HAMS: 4.0 Defect: 1.0 Configuration: Weld Fixture

Weld ID: MTL-0039-09 TD F6457 WELD FUME CHARACTERIZATION TL-7191-11

Startup.....ROBOTSEAL3/ UPPA WELD FUME TEST FLAT 2219 BASE 2319 FILLER 14-Jan-10 12:45:46  
Main.....ROBOTSEAL3/ 14-Jan-10 12:45:46  
Termination.....ROBOTSEAL3/ 27-Sep-95 14:38:48  
E-Stop.....STANDARD/ Standard STOP for all welds.

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
0:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:00	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:03	0.00	1.17	0.00	95	26.0	0.00	0.00	0.00	0.00	0.00
0:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(Scheduled / % Trim / Actual)

(Scheduled / % Trim / Actual)														
Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off				
2:18	0.00	216	0.0	217	26.0	0.0 25.9	4.6	2.00	2.00	79	30	0.0 0.0	43	0.590
2:21	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	2.01	80	30	0.0 0.0	43	0.590
2:24	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	1.98	79	30	0.0 0.0	44	0.590
2:27	0.00	216	0.0	216	26.0	0.0 26.1	4.7	2.00	1.98	79	30	0.0 0.0	43	0.590
2:30	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	2.07	80	30	0.0 0.0	43	0.590
2:33	0.00	216	0.0	217	26.0	0.0 26.1	4.7	2.00	1.99	80	30	0.0 0.0	44	0.590
2:36	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.00	80	30	0.0 0.0	43	0.590
2:39	0.00	216	0.0	216	26.0	0.0 25.8	4.6	2.00	1.99	80	30	0.0 0.0	43	0.590
2:42	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.00	80	30	0.0 0.0	43	0.590
2:45	0.00	216	0.0	214	26.0	0.0 26.4	4.7	2.00	2.06	80	30	0.0 0.0	44	0.590
2:48	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	1.97	79	30	0.0 0.0	43	0.590
2:51	0.00	216	0.0	218	26.0	0.0 26.2	4.6	2.00	1.99	80	30	0.0 0.0	43	0.590
2:54	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	2.02	80	30	0.0 0.0	44	0.590
2:57	0.00	216	0.0	215	26.0	0.0 25.9	4.6	2.00	1.93	80	30	0.0 0.0	43	0.590
3:00	0.00	216	0.0	215	26.0	0.0 26.0	4.7	2.00	1.99	80	30	0.0 0.0	44	0.590
3:03	0.00	216	0.0	216	26.0	0.0 26.0	4.7	2.00	2.03	80	30	0.0 0.0	43	0.590
3:06	0.00	216	0.0	216	26.0	0.0 25.7	4.6	2.00	2.00	80	30	0.0 0.0	43	0.590
3:09	0.00	216	0.0	216	26.0	0.0 25.5	4.5	2.00	2.02	80	30	0.0 0.0	44	0.590
3:12	0.00	216	0.0	216	26.0	0.0 25.2	4.5	2.00	1.95	80	30	0.0 0.0	43	0.590
3:15	0.00	216	0.0	216	26.0	0.0 25.9	4.7	2.00	1.93	80	30	0.0 0.0	43	0.590
3:18	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	1.99	80	30	0.0 0.0	44	0.590
3:21	0.00	216	0.0	217	26.0	0.0 25.8	4.7	2.00	2.01	80	30	0.0 0.0	43	0.590
3:24	0.00	216	0.0	215	26.0	0.0 26.1	4.6	2.00	1.97	80	30	0.0 0.0	43	0.590
3:27	0.00	216	0.0	216	26.0	0.0 26.3	4.7	2.00	1.97	80	30	0.0 0.0	44	0.590
3:30	0.00	216	0.0	216	26.0	0.0 26.0	4.7	2.00	1.96	80	30	0.0 0.0	43	0.590
3:33	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	1.99	80	30	0.0 0.0	44	0.590
3:36	0.00	216	0.0	215	26.0	0.0 26.1	4.6	2.00	2.00	80	30	0.0 0.0	44	0.590
3:39	0.00	216	0.0	215	26.0	0.0 26.0	4.6	2.00	1.98	80	30	0.0 0.0	44	0.590
3:42	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.04	80	30	0.0 0.0	43	0.590
3:45	0.00	216	0.0	217	26.0	0.0 25.9	4.6	2.00	2.00	80	30	0.0 0.0	43	0.590
3:48	0.00	216	0.0	218	26.0	0.0 25.9	4.7	2.00	2.01	80	30	0.0 0.0	43	0.590
3:51	0.00	216	0.0	215	26.0	0.0 26.0	4.7	2.00	1.98	80	30	0.0 0.0	44	0.590
3:54	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	1.99	80	30	0.0 0.0	43	0.590
3:57	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	1.99	80	30	0.0 0.0	43	0.590
4:00	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	1.99	80	30	0.0 0.0	44	0.590
4:03	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	1.97	80	30	0.0 0.0	43	0.590
4:06	0.00	216	0.0	216	26.0	0.0 25.8	4.6	2.00	1.91	80	30	0.0 0.0	44	0.590
4:09	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	1.97	81	30	0.0 0.0	44	0.590
4:12	0.00	216	0.0	216	26.0	0.0 26.0	4.7	2.00	1.96	80	30	0.0 0.0	43	0.590
4:15	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.00	79	30	0.0 0.0	43	0.590
4:18	0.00	216	0.0	216	26.0	0.0 26.0	4.7	2.00	1.98	82	30	0.0 0.0	43	0.590
4:21	0.00	216	0.0	216	26.0	0.0 25.8	4.6	2.00	1.98	80	30	0.0 0.0	44	0.590
4:24	0.00	216	0.0	214	26.0	0.0 26.2	4.6	2.00	1.99	80	30	0.0 0.0	44	0.590
4:27	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	1.96	80	30	0.0 0.0	44	0.590
4:30	0.00	216	0.0	216	26.0	0.0 25.9	4.6	2.00	2.03	80	30	0.0 0.0	43	0.590
4:33	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.00	80	30	0.0 0.0	44	0.590
4:36	0.00	216	0.0	216	26.0	0.0 26.0	4.7	2.00	2.01	79	30	0.0 0.0	43	0.590
4:39	0.00	216	0.0	216	26.0	0.0 26.2	4.6	2.00	2.00	80	30	0.0 0.0	44	0.590
4:42	0.00	216	0.0	215	26.0	0.0 26.1	4.6	2.00	1.99	80	30	0.0 0.0	44	0.590
4:45	0.00	216	0.0	216	26.0	0.0 26.1	4.5	2.00	1.97	79	30	0.0 0.0	43	0.590
4:48	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	2.00	80	30	0.0 0.0	43	0.590
4:51	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.03	80	30	0.0 0.0	44	0.590
4:54	0.00	216	0.0	216	26.0	0.0 26.2	4.6	2.00	1.99	80	30	0.0 0.0	43	0.590
4:57	0.00	216	0.0	216	26.0	0.0 26.0	4.6	2.00	1.98	80	30	0.0 0.0	44	0.590
5:00	0.00	216	0.0	216	26.0	0.0 26.1	4.6	2.00	2.03	81	30	0.0 0.0	43	0.590

(Scheduled / % Tris / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off							
5:03	0.00	216	0.0	217	26.0	0.0	26.1	4.6	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
5:06	0.00	216	0.0	216	26.0	0.0	26.2	4.7	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
5:09	0.00	216	0.0	216	26.0	0.0	25.9	4.6	2.00	2.05	79	30	0.0	0.0	0.0	43	0.590
5:12	0.00	216	0.0	216	26.0	0.0	25.9	4.6	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
5:15	0.00	216	0.0	216	26.0	0.0	26.0	4.6	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
5:18	0.00	216	0.0	216	26.0	0.0	25.8	4.6	2.00	1.99	81	30	0.0	0.0	0.0	43	0.590
5:21	0.00	216	0.0	216	26.0	0.0	26.8	4.6	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
5:24	0.00	216	0.0	216	26.0	0.0	25.8	4.6	2.00	2.04	80	30	0.0	0.0	0.0	44	0.590
5:27	0.00	216	0.0	217	26.0	0.0	26.2	4.7	2.00	1.95	80	30	0.0	0.0	0.0	44	0.590
5:30	0.00	216	0.0	217	26.0	0.0	26.0	4.6	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
5:33	0.00	216	0.0	217	26.0	0.0	25.6	4.7	2.00	1.97	81	30	0.0	0.0	0.0	44	0.590
5:36	0.00	216	0.0	216	26.0	0.0	26.0	4.6	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
5:39	0.00	216	0.0	216	26.0	0.0	26.1	4.6	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
5:42	0.00	216	0.0	216	26.0	0.0	26.0	4.6	2.00	1.98	79	30	0.0	0.0	0.0	43	0.590
5:45	0.00	216	0.0	215	26.0	0.0	25.7	4.6	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
5:48	0.00	216	0.0	217	26.0	0.0	26.1	4.6	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
5:51	0.00	216	0.0	216	26.0	0.0	26.1	4.6	2.00	1.95	80	30	0.0	0.0	0.0	44	0.590
5:54	0.00	216	0.0	216	26.0	0.0	26.1	4.6	2.00	2.04	80	30	0.0	0.0	0.0	43	0.590
5:57	0.00	216	0.0	216	26.0	0.0	25.9	4.7	2.00	1.99	80	30	0.0	0.0	0.0	42	0.590
6:00	0.00	216	0.0	216	26.0	0.0	25.9	4.6	2.00	2.01	79	30	0.0	0.0	0.0	44	0.590
6:03	0.00	216	0.0	215	26.0	0.0	26.4	4.6	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
6:06	0.00	216	0.0	215	26.0	0.0	26.1	4.6	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
6:09	0.00	216	0.0	216	26.0	0.0	26.0	4.7	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
6:12	0.00	216	0.0	215	26.0	0.0	25.9	4.6	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
6:15	0.00	216	0.0	216	26.0	0.0	25.9	4.6	2.00	1.94	80	30	0.0	0.0	0.0	44	0.590
6:18	0.00	216	0.0	217	26.0	0.0	26.0	4.6	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
6:21	0.00	216	0.0	216	26.0	0.0	26.0	4.6	2.00	1.96	79	30	0.0	0.0	0.0	43	0.590
6:24	0.00	216	0.0	215	26.0	0.0	26.7	4.6	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
6:27	0.00	216	0.0	217	26.0	0.0	26.4	4.6	2.00	1.96	80	30	0.0	0.0	0.0	44	0.590
6:30	0.00	216	0.0	217	26.0	0.0	26.5	4.7	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
6:33	0.00	216	0.0	216	26.0	0.0	26.4	4.5	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
6:36	0.00	216	0.0	214	26.0	0.0	26.5	4.6	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
6:39	0.00	216	0.0	216	26.0	0.0	26.7	4.7	2.00	1.94	80	30	0.0	0.0	0.0	44	0.590
6:42	0.00	216	0.0	218	26.0	0.0	26.5	4.6	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
6:45	0.00	216	0.0	216	26.0	0.0	26.6	4.7	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
6:48	0.00	216	0.0	218	26.0	0.0	26.6	4.6	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
6:51	0.00	216	0.0	216	26.0	0.0	26.5	4.6	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
6:54	0.00	216	0.0	216	26.0	0.0	26.3	4.6	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
6:57	0.00	216	0.0	216	26.0	0.0	26.6	4.6	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
7:00	0.00	216	0.0	216	26.0	0.0	26.7	4.7	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
7:03	0.00	216	0.0	217	26.0	0.0	26.6	4.6	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
7:06	0.00	216	0.0	216	26.0	0.0	26.4	4.6	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
7:09	0.00	216	0.0	216	26.0	0.0	26.8	4.6	2.00	1.98	79	30	0.0	0.0	0.0	43	0.590
7:12	0.00	216	0.0	217	26.0	0.0	26.4	4.6	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
7:15	0.00	216	0.0	216	26.0	0.0	26.5	4.6	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
7:18	0.00	216	0.0	216	26.0	0.0	26.5	4.6	2.00	2.03	80	30	0.0	0.0	0.0	44	0.590
7:21	0.00	216	0.0	216	26.0	0.0	26.4	4.6	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
7:24	0.00	216	0.0	217	26.0	0.0	26.8	4.7	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
7:27	0.00	216	0.0	216	26.0	0.0	26.2	4.6	2.00	2.04	80	30	0.0	0.0	0.0	44	0.590
7:30	0.00	216	0.0	216	26.0	0.0	26.8	4.6	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
7:33	0.00	216	0.0	216	26.0	0.0	26.7	4.6	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
7:36	0.00	216	0.0	215	26.0	0.0	26.4	4.6	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
7:39	0.00	216	0.0	217	26.0	0.0	26.5	4.5	2.00	2.00	81	30	0.0	0.0	0.0	43	0.590
7:42	0.00	216	0.0	216	26.0	0.0	26.7	4.7	2.00	1.96	80	30	0.0	0.0	0.0	44	0.590
7:45	0.00	216	0.0	215	26.0	0.0	26.8	4.6	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590



(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cup	Stand Off					
7:48	0.00	216	26.0	2.0	26.7	4.6	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
7:51	0.00	216	26.0	2.0	26.4	4.6	2.00	1.94	81	30	0.0	0.0	0.0	43	0.590
7:54	0.00	216	26.0	2.0	26.7	4.5	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
7:57	0.00	216	26.0	2.0	26.3	4.7	2.00	1.96	79	30	0.0	0.0	0.0	44	0.590
8:00	0.00	216	26.0	2.0	26.5	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
8:03	0.00	216	26.0	2.0	26.1	4.7	2.00	2.07	80	30	0.0	0.0	0.0	44	0.590
8:06	0.00	216	26.0	2.0	26.6	4.9	2.00	1.93	80	30	0.0	0.0	0.0	44	0.590
8:09	0.00	216	26.0	2.0	26.5	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
8:12	0.00	216	26.0	2.0	26.8	4.7	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
8:15	0.00	216	26.0	2.0	27.0	4.7	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
8:18	0.00	216	26.0	2.0	26.6	4.7	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
8:21	0.00	216	26.0	2.0	26.8	4.6	2.00	2.03	80	30	0.0	0.0	0.0	43	0.590
8:24	0.00	216	26.0	2.0	26.3	4.7	2.00	2.05	80	30	0.0	0.0	0.0	43	0.590
8:27	0.00	216	26.0	2.0	26.6	4.7	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
8:30	0.00	216	26.0	2.0	26.2	4.7	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
8:33	0.00	216	26.0	2.0	26.2	4.8	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
8:36	0.00	216	26.0	2.0	26.6	4.7	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
8:39	0.00	216	26.0	2.0	26.7	4.8	2.00	2.00	79	30	0.0	0.0	0.0	43	0.590
8:42	0.00	216	26.0	2.0	26.6	4.7	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
8:45	0.00	216	26.0	2.0	26.7	4.8	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
8:48	0.00	216	26.0	2.0	26.5	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
8:51	0.00	216	26.0	2.0	26.5	4.7	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
8:54	0.00	216	26.0	2.0	26.6	4.7	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
8:57	0.00	216	26.0	2.0	26.6	4.6	2.00	2.05	80	30	0.0	0.0	0.0	43	0.590
9:00	0.00	216	26.0	2.0	26.6	4.8	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
9:03	0.00	216	26.0	2.0	26.6	4.8	2.00	2.03	80	30	0.0	0.0	0.0	44	0.590
9:06	0.00	216	26.0	2.0	26.5	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
9:09	0.00	216	26.0	2.0	26.5	4.7	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
9:12	0.00	216	26.0	2.0	26.6	4.7	2.00	1.96	80	30	0.0	0.0	0.0	44	0.590
9:15	0.00	216	26.0	2.0	26.4	4.7	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
9:18	0.00	216	26.0	2.0	26.5	4.8	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
9:21	0.00	216	26.0	2.0	26.7	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
9:24	0.00	216	26.0	2.0	26.7	4.8	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
9:27	0.00	216	26.0	2.0	26.6	4.7	2.00	1.93	80	30	0.0	0.0	0.0	44	0.590
9:30	0.00	216	26.0	2.0	26.6	4.7	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
9:33	0.00	216	26.0	2.0	26.5	4.8	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
9:36	0.00	216	26.0	2.0	26.6	4.7	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
9:39	0.00	216	26.0	2.0	26.4	4.8	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
9:42	0.00	216	26.0	2.0	26.4	4.8	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
9:45	0.00	216	26.0	2.0	26.3	4.8	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
9:48	0.00	216	26.0	2.0	26.2	4.6	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
9:51	0.00	216	26.0	2.0	26.4	4.6	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
9:54	0.00	216	26.0	2.0	26.6	4.7	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
9:57	0.00	216	26.0	2.0	27.0	4.8	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
10:00	0.00	216	26.0	2.0	26.5	4.8	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
10:03	0.00	216	26.0	2.0	27.1	4.7	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
10:06	0.00	216	26.0	2.0	26.5	4.7	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
10:09	0.00	216	26.0	2.0	26.4	4.8	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
10:12	0.00	216	26.0	2.0	26.2	4.9	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
10:15	0.00	216	26.0	2.0	26.3	4.8	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
10:18	0.00	216	26.0	2.0	26.3	4.6	2.00	2.04	81	30	0.0	0.0	0.0	44	0.590
10:21	0.00	216	26.0	2.0	26.3	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
10:24	0.00	216	26.0	2.0	26.6	4.8	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
10:27	0.00	216	26.0	2.0	26.6	4.8	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
10:30	0.00	216	26.0	2.0	26.5	4.7	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590

(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
1											
2											
3											
4											
5	10:33	0.00	216	26.0	4.8	2.00	2.00	30	0.0	44	0.590
6	10:36	0.00	216	26.0	4.7	2.00	1.95	30	0.0	44	0.590
7	10:39	0.00	216	26.0	4.7	2.00	1.98	30	0.0	43	0.590
8	10:42	0.00	216	26.0	4.8	2.00	2.06	30	0.0	43	0.590
9	10:45	0.00	216	26.0	4.8	2.00	2.00	30	0.0	44	0.590
10	10:49	0.00	216	26.0	4.8	2.00	1.97	30	0.0	44	0.590
11	10:51	0.00	216	26.0	4.8	2.00	2.02	30	0.0	43	0.590
12	10:54	0.00	216	26.0	4.8	2.00	1.97	30	0.0	44	0.590
13	10:57	0.00	216	26.0	4.7	2.00	2.00	30	0.0	43	0.590
14	11:00	0.00	216	26.0	4.8	2.00	1.98	30	0.0	44	0.590
15	11:03	0.00	216	26.0	4.7	2.00	2.00	30	0.0	43	0.590
16	11:06	0.00	216	26.0	4.7	2.00	1.98	30	0.0	43	0.590
17	11:09	0.00	216	26.0	4.8	2.00	1.96	30	0.0	43	0.590
18	11:12	0.00	216	26.0	4.8	2.00	2.02	30	0.0	44	0.590
19	11:15	0.00	216	26.0	4.8	2.00	2.06	30	0.0	43	0.590
20	11:18	0.00	216	26.0	4.7	2.00	2.00	30	0.0	44	0.590
21	11:21	0.00	216	26.0	4.8	2.00	2.01	30	0.0	44	0.590
22	11:24	0.00	216	26.0	4.8	2.00	2.04	30	0.0	43	0.590
23	11:27	0.00	216	26.0	4.7	2.00	2.00	30	0.0	44	0.590
24	11:30	0.00	216	26.0	4.9	2.00	2.01	30	0.0	44	0.590
25	11:33	0.00	216	26.0	4.8	2.00	2.01	30	0.0	43	0.590
26	11:36	0.00	216	26.0	4.7	2.00	2.04	30	0.0	44	0.590
27	11:39	0.00	216	26.0	4.7	2.00	2.01	30	0.0	44	0.590
28	11:42	0.00	216	26.0	4.7	2.00	1.94	30	0.0	44	0.590
29	11:45	0.00	216	26.0	4.7	2.00	1.98	30	0.0	43	0.590
30	11:48	0.00	216	26.0	4.8	2.00	2.00	30	0.0	44	0.590
31	11:51	0.00	216	26.0	4.8	2.00	2.00	30	0.0	43	0.590
32	11:54	0.00	216	26.0	4.7	2.00	1.98	30	0.0	43	0.590
33	11:57	0.00	216	26.0	4.8	2.00	1.96	30	0.0	43	0.590
34	12:00	0.00	216	26.0	4.8	2.00	1.95	30	0.0	44	0.590
35	12:03	0.00	216	26.0	4.7	2.00	1.95	30	0.0	44	0.590
36	12:06	0.00	216	26.0	4.8	2.00	1.95	30	0.0	43	0.590
37	12:09	0.00	216	26.0	4.7	2.00	2.01	30	0.0	43	0.590
38	12:12	0.00	216	26.0	4.7	2.00	2.02	30	0.0	44	0.590
39	12:15	0.00	216	26.0	4.7	2.00	2.00	30	0.0	44	0.590
40	12:18	0.00	216	26.0	4.8	2.00	1.94	30	0.0	43	0.590
41	12:21	0.00	216	26.0	4.7	2.00	1.95	30	0.0	44	0.590
42	12:24	0.00	216	26.0	4.7	2.00	1.95	30	0.0	44	0.590
43	12:27	0.00	216	26.0	4.7	2.00	1.97	30	0.0	43	0.590
44	12:30	0.00	216	26.0	4.7	2.00	1.98	30	0.0	44	0.590
45	12:33	0.00	216	26.0	4.8	2.00	2.00	30	0.0	43	0.590
46	12:36	0.00	216	26.0	4.8	2.00	1.98	30	0.0	43	0.590
47	12:39	0.00	216	26.0	4.8	2.00	1.97	30	0.0	43	0.590
48	12:42	0.00	216	26.0	4.8	2.00	2.00	30	0.0	44	0.590
49	12:45	0.00	216	26.0	4.8	2.00	1.97	30	0.0	44	0.590
50	12:48	0.00	216	26.0	4.8	2.00	2.07	30	0.0	43	0.590
51	12:51	0.00	216	26.0	4.7	2.00	1.97	30	0.0	44	0.590
52	12:54	0.00	216	26.0	4.8	2.00	1.96	30	0.0	43	0.590
53	12:57	0.00	216	26.0	4.8	2.00	2.00	30	0.0	43	0.590
54	13:00	0.00	216	26.0	4.8	2.00	1.97	30	0.0	44	0.590
55	13:03	0.00	216	26.0	4.8	2.00	2.01	30	0.0	43	0.590
56	13:06	0.00	216	26.0	4.8	2.00	1.97	30	0.0	43	0.590
57	13:09	0.00	216	26.0	4.7	2.00	1.98	30	0.0	44	0.590
58	13:12	0.00	216	26.0	4.8	2.00	1.99	30	0.0	44	0.590
59	13:15	0.00	216	26.0	4.8	2.00	2.00	30	0.0	43	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Lin	Stand Off		
13:19	0.00	216	26.0	2.0 26.6	4.9	2.00	1.98	30	0.0	0.0	43	0.590
13:21	0.00	216	26.0	2.0 26.5	4.9	2.00	2.00	30	0.0	0.0	44	0.590
13:24	0.00	216	26.0	2.0 26.6	4.9	2.00	1.95	30	0.0	0.0	43	0.590
13:27	0.00	216	26.0	2.0 26.6	4.8	2.00	1.98	30	0.0	0.0	44	0.590
13:30	0.00	216	26.0	2.0 27.2	4.8	2.00	2.01	30	0.0	0.0	44	0.590
13:33	0.00	216	26.0	2.0 26.8	4.8	2.00	1.98	30	0.0	0.0	43	0.590
13:36	0.00	216	26.0	2.0 26.5	4.8	2.00	1.98	30	0.0	0.0	44	0.590
13:39	0.00	216	26.0	2.0 26.6	4.9	2.00	2.00	30	0.0	0.0	44	0.590
13:42	0.00	216	26.0	2.0 26.5	4.8	2.00	2.00	30	0.0	0.0	44	0.590
13:45	0.00	216	26.0	2.0 26.6	4.8	2.00	1.95	30	0.0	0.0	43	0.590
13:48	0.00	216	26.0	2.0 26.5	4.9	2.00	1.98	30	0.0	0.0	44	0.590
13:51	0.00	216	26.0	2.0 26.4	4.9	2.00	1.98	30	0.0	0.0	44	0.590
13:54	0.00	216	26.0	2.0 26.3	4.7	2.00	1.99	30	0.0	0.0	43	0.590
13:57	0.00	216	26.0	2.0 26.4	4.7	2.00	2.00	30	0.0	0.0	44	0.590
14:00	0.00	216	26.0	3.0 26.4	4.9	2.00	1.97	30	0.0	0.0	44	0.590
14:03	0.00	216	26.0	4.0 27.1	4.8	2.00	1.99	30	0.0	0.0	43	0.590
14:06	0.00	216	26.0	4.0 27.2	4.8	2.00	1.97	30	0.0	0.0	44	0.590
14:09	0.00	216	26.0	4.0 27.1	4.8	2.00	2.03	30	0.0	0.0	43	0.590
14:12	0.00	216	26.0	4.0 27.1	4.8	2.00	1.96	30	0.0	0.0	43	0.590
14:15	0.00	216	26.0	4.0 27.0	4.9	2.00	2.00	30	0.0	0.0	43	0.590
14:18	0.00	216	26.0	4.0 26.9	4.9	2.00	2.02	30	0.0	0.0	44	0.590
14:21	0.00	216	26.0	4.0 26.9	4.8	2.00	1.98	30	0.0	0.0	43	0.590
14:24	0.00	216	26.0	4.0 27.2	4.7	2.00	2.02	30	0.0	0.0	43	0.590
14:27	0.00	216	26.0	4.0 27.0	4.8	2.00	1.98	30	0.0	0.0	44	0.590
14:30	0.00	216	26.0	4.0 27.2	4.8	2.00	1.99	30	0.0	0.0	43	0.590
14:33	0.00	216	26.0	4.0 26.9	4.8	2.00	1.99	30	0.0	0.0	43	0.590
14:36	0.00	216	26.0	4.0 27.1	4.8	2.00	1.95	30	0.0	0.0	44	0.590
14:39	0.00	216	26.0	4.0 27.1	4.8	2.00	1.98	30	0.0	0.0	43	0.590
14:42	0.00	216	26.0	4.0 26.9	4.8	2.00	2.00	30	0.0	0.0	43	0.590
14:45	0.00	216	26.0	4.0 26.9	4.8	2.00	2.02	30	0.0	0.0	43	0.590
14:48	0.00	216	26.0	4.0 27.1	4.8	2.00	1.99	30	0.0	0.0	44	0.590
14:51	0.00	216	26.0	4.0 27.0	4.8	2.00	1.98	30	0.0	0.0	43	0.590
14:54	0.00	216	26.0	4.0 27.1	4.8	2.00	1.97	30	0.0	0.0	43	0.590
14:57	0.00	216	26.0	4.0 27.0	4.8	2.00	1.97	30	0.0	0.0	44	0.590
15:00	0.00	216	26.0	4.0 26.9	4.8	2.00	1.99	30	0.0	0.0	43	0.590
15:03	0.00	216	26.0	4.0 27.1	4.8	2.00	1.98	30	0.0	0.0	44	0.590
15:06	0.00	216	26.0	4.0 27.1	4.8	2.00	2.01	30	0.0	0.0	44	0.590
15:09	0.00	216	26.0	4.0 27.1	4.8	2.00	1.98	30	0.0	0.0	43	0.590
15:12	0.00	216	26.0	4.0 27.1	4.8	2.00	2.01	30	0.0	0.0	43	0.590
15:15	0.00	216	26.0	4.0 27.1	4.8	2.00	1.97	30	0.0	0.0	43	0.590
15:18	0.00	216	26.0	4.0 26.9	4.8	2.00	1.99	30	0.0	0.0	43	0.590
15:21	0.00	216	26.0	4.0 27.0	4.7	2.00	2.00	30	0.0	0.0	44	0.590
15:24	0.00	216	26.0	4.0 27.0	4.7	2.00	1.97	30	0.0	0.0	43	0.590
15:27	0.00	216	26.0	4.0 27.0	4.8	2.00	1.97	30	0.0	0.0	43	0.590
15:30	0.00	216	26.0	4.0 27.1	4.7	2.00	2.01	30	0.0	0.0	44	0.590
15:33	0.00	216	26.0	4.0 27.0	4.8	2.00	2.00	30	0.0	0.0	43	0.590
15:36	0.00	216	26.0	4.0 27.1	4.8	2.00	2.02	30	0.0	0.0	43	0.590
15:39	0.00	216	26.0	4.0 27.2	4.8	2.00	1.98	30	0.0	0.0	44	0.590
15:42	0.00	148	22.0	4.0 22.7	4.3	2.00	2.01	16	0.0	0.0	43	0.590
15:45	0.00	50	22.0	4.0 18.3	3.5	2.00	2.01	7	0.0	0.0	41	0.590
15:48	0.00	0	22.0	4.0 20.0	3.0	2.00	2.03	0	0.0	0.0	0	0.590
0.00	0.00	0	0.0	0.0 0.0	0.0	0.0	0.0	0	0.0	0.0	0	0.590
===> TERMINATION SEQUENCE COMPLETED												

0.00 ==&gt; TERMINATION SEQUENCE COMPLETED

21-Jan-10 12:51:41  
 21-Jan-10 12:51:41  
 21-Jan-10 12:51:41  
 27-Sep-95 14:38:48

1 Start-up.....ROBOTPASS2/ WELD FUME PASS 1 FLAT  
 2 Main.....ROBOTPASS2/ WELD FUME PASS 1 FLAT  
 3 Termination.....ROBOTPASS2/ WELD FUME PASS 1 FLAT  
 4 E-Stop.....STANDARD/ Standard ESTOP for all welds.

(Scheduled / Actual)										Travel				Rev		Stand	
Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	Shield	Wire	Feed	Rate	Rate	Rate	Cor	Cor	Off	Off
0:00	0.00	0.00	75	0.0	16.5	0.0	0.7	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.590
0:00	0.00	0.00	170	0.0	16.5	0.0	10.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.590
0:03	0.00	0.00	170	0.0	16.5	0.0	14.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.584
0:06	0.00	0.00	170	0.0	16.5	0.0	16.2	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:09	0.00	0.00	170	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.488
0:12	0.00	0.00	170	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.491
0:15	0.00	0.00	170	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.496
0:18	0.00	0.00	170	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.493
0:20	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.493
0:24	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.493
0:27	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:30	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:33	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:36	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:39	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:42	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:45	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:48	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:51	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:54	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
0:57	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:00	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:03	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:06	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:09	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:12	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:15	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:18	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:21	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:24	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:27	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:30	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:33	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:36	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:39	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:42	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:45	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:48	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:51	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:54	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
1:57	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
2:00	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
2:03	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
2:06	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
2:09	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
2:12	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492
2:15	0.00	0.00	180	0.0	16.5	0.0	16.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	-0.492





(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
5:03	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:06	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:09	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:12	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:15	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:18	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:21	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:24	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:27	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:30	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:33	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:36	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:39	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:42	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:45	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:48	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:51	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:54	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
5:57	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:00	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:03	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:06	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:09	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:12	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:15	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:18	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:21	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:24	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:27	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:30	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:33	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:36	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:39	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:42	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:45	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:48	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:51	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:54	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
6:57	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:00	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:03	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:06	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:09	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:12	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:15	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:18	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:21	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:24	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:27	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:30	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:33	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:36	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:39	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:42	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0
7:45	0.00	180	16.5	0.0	0.00	100	15	0.0	0.0	0.0

(Scheduled / % Trim / Actual)

1	2	3	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
4	7:48	0.00	130	0.0	173	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
5	7:51	0.00	120	0.0	179	16.5	0.0	0.00	0.00	15	0.0	0	-0.494
6	7:54	0.00	130	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
7	7:57	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
8	8:00	0.00	180	0.0	180	16.5	0.1	0.00	0.00	15	0.0	0	-0.492
9	8:03	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
10	8:06	0.00	150	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
11	8:09	0.00	150	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
12	8:12	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
13	8:15	0.00	180	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
14	8:18	0.00	180	0.0	179	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
15	8:21	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
16	8:24	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
17	8:27	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
18	8:30	0.00	182	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
19	8:33	0.00	180	0.0	181	16.5	0.1	0.00	0.00	15	0.0	0	-0.492
20	8:36	0.00	150	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
21	8:39	0.00	150	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
22	8:42	0.00	150	0.0	181	16.5	0.0	0.00	0.01	15	0.0	0	-0.491
23	8:45	0.00	182	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
24	8:48	0.00	122	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
25	8:51	0.00	180	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
26	8:54	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
27	8:57	0.00	160	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
28	9:00	0.00	190	0.0	180	16.5	0.1	0.00	0.00	15	0.0	0	-0.493
29	9:03	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
30	9:06	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.494
31	9:09	0.00	180	0.0	179	16.5	0.1	0.00	0.00	15	0.0	0	-0.493
32	9:12	0.00	180	0.0	180	16.5	0.1	0.00	0.00	15	0.0	0	-0.493
33	9:15	0.00	180	0.0	179	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
34	9:18	0.00	180	0.0	178	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
35	9:21	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
36	9:24	0.00	182	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
37	9:27	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
38	9:30	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
39	9:33	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
40	9:36	0.00	190	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
41	9:39	0.00	150	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
42	9:42	0.00	180	0.0	180	16.5	0.1	0.00	0.00	15	0.0	0	-0.492
43	9:45	0.00	180	0.0	179	16.5	0.1	0.00	0.00	15	0.0	0	-0.492
44	9:48	0.00	180	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
45	9:51	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
46	9:54	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
47	9:57	0.00	180	0.0	180	16.5	0.1	0.00	0.00	15	0.0	0	-0.493
48	10:00	0.00	190	0.0	179	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
49	10:03	0.00	180	0.0	180	16.5	0.1	0.00	0.00	15	0.0	0	-0.490
50	10:06	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.491
51	10:09	0.00	190	0.0	179	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
52	10:12	0.00	180	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.493
53	10:15	0.00	180	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
54	10:18	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
55	10:21	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
56	10:24	0.00	180	0.0	181	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
57	10:27	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.492
58	10:30	0.00	180	0.0	180	16.5	0.0	0.00	0.00	15	0.0	0	-0.493



(Scheduled / % Trim / Actual)

1	2	3	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
4	10:23	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
5	10:36	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.493
6	10:39	0.00	180	0.0	16.5	0.0 16.4	0.0	0.00	100	15	0.0 0.0	0	-0.492
7	10:42	0.00	180	0.0	16.5	0.0 16.3	0.0	0.00	100	15	0.0 0.0	0	-0.492
8	10:45	0.00	180	0.0	16.5	0.0 16.2	0.1	0.00	100	15	0.0 0.0	0	-0.492
9	10:48	0.00	180	0.0	16.5	0.0 16.4	0.1	0.00	100	15	0.0 0.0	0	-0.492
10	10:51	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
11	10:54	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
12	10:57	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
13	11:00	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
14	11:03	0.00	180	0.0	16.5	0.0 16.7	0.0	0.00	100	15	0.0 0.0	0	-0.492
15	11:06	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
16	11:09	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.493
17	11:12	0.00	180	0.0	16.5	0.0 16.4	0.0	0.00	100	15	0.0 0.0	0	-0.492
18	11:15	0.00	180	0.0	16.5	0.0 16.7	0.1	0.00	100	15	0.0 0.0	0	-0.492
19	11:18	0.00	180	0.0	16.5	0.0 16.6	0.0	0.00	100	15	0.0 0.0	0	-0.493
20	11:21	0.00	180	0.0	16.5	0.0 16.6	0.1	0.00	101	15	0.0 0.0	0	-0.492
21	11:24	0.00	180	0.0	16.5	0.0 16.3	0.0	0.00	100	15	0.0 0.0	0	-0.491
22	11:27	0.00	180	0.0	16.5	0.0 16.6	0.0	0.00	100	15	0.0 0.0	0	-0.492
23	11:30	0.00	180	0.0	16.5	0.0 16.6	0.0	0.00	100	15	0.0 0.0	0	-0.491
24	11:33	0.00	180	0.0	16.5	0.0 16.5	0.1	0.00	100	15	0.0 0.0	0	-0.492
25	11:36	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.491
26	11:39	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.493
27	11:42	0.00	180	0.0	16.5	0.0 16.3	0.1	0.00	100	15	0.0 0.0	0	-0.494
28	11:45	0.00	180	0.0	16.5	0.0 16.4	0.0	0.00	100	15	0.0 0.0	0	-0.493
29	11:48	0.00	180	0.0	16.5	0.0 16.3	0.0	0.00	100	15	0.0 0.0	0	-0.492
30	11:51	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
31	11:54	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
32	11:57	0.00	180	0.0	16.5	0.0 16.6	0.0	0.00	100	15	0.0 0.0	0	-0.492
33	12:00	0.00	180	0.0	16.5	0.0 16.6	0.1	0.00	100	15	0.0 0.0	0	-0.492
34	12:03	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.493
35	12:06	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
36	12:09	0.00	180	0.0	16.5	0.0 16.4	0.1	0.00	100	15	0.0 0.0	0	-0.492
37	12:12	0.00	180	0.0	16.5	0.0 16.4	0.0	0.00	100	15	0.0 0.0	0	-0.492
38	12:15	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
39	12:18	0.00	180	0.0	16.5	0.0 16.6	0.1	0.00	100	15	0.0 0.0	0	-0.492
40	12:21	0.00	180	0.0	16.5	0.0 16.4	0.1	0.00	100	15	0.0 0.0	0	-0.492
41	12:24	0.00	180	0.0	16.5	0.0 16.6	0.0	0.00	100	15	0.0 0.0	0	-0.492
42	12:27	0.00	180	0.0	16.5	0.0 16.5	0.1	0.00	100	15	0.0 0.0	0	-0.492
43	12:30	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
44	12:33	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
45	12:36	0.00	180	0.0	16.5	0.0 16.5	0.1	0.00	100	15	0.0 0.0	0	-0.492
46	12:39	0.00	180	0.0	16.5	0.0 16.4	0.1	0.00	100	15	0.0 0.0	0	-0.492
47	12:42	0.00	180	0.0	16.5	0.0 16.6	0.0	0.00	100	15	0.0 0.0	0	-0.492
48	12:45	0.00	180	0.0	16.5	0.0 16.7	0.0	0.00	100	15	0.0 0.0	0	-0.492
49	12:48	0.00	180	0.0	16.5	0.0 16.3	0.1	0.00	100	15	0.0 0.0	0	-0.492
50	12:51	0.00	180	0.0	16.5	0.0 16.2	0.0	0.00	100	15	0.0 0.0	0	-0.492
51	12:54	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
52	12:57	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
53	13:00	0.00	180	0.0	16.5	0.0 16.4	0.0	0.00	100	15	0.0 0.0	0	-0.492
54	13:03	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
55	13:06	0.00	180	0.0	16.5	0.0 16.4	0.0	0.00	99	15	0.0 0.0	0	-0.492
56	13:09	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
57	13:12	0.00	180	0.0	16.5	0.0 16.5	0.0	0.00	100	15	0.0 0.0	0	-0.492
58	13:15	0.00	180	0.0	16.5	0.0 16.3	0.0	0.00	100	15	0.0 0.0	0	-0.491

(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off				
1	13:15	0.00	180	0.2	181	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.499
2	13:21	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
3	13:24	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
4	13:27	0.00	180	0.0	180	16.5	0.0	16.6	0.01	0.00	15	0.0	0.0	0	-0.492
5	13:30	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
6	13:32	0.00	180	0.0	179	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
7	13:36	0.00	180	0.0	180	16.5	0.0	16.7	0.00	0.00	15	0.0	0.0	0	-0.492
8	13:39	0.00	180	0.0	180	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.493
9	13:42	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.491
10	13:45	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.491
11	13:46	0.00	180	0.0	180	16.5	0.0	16.5	0.01	0.00	15	0.0	0.0	0	-0.493
12	13:51	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.493
13	13:54	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
14	13:57	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
15	14:00	0.00	180	0.0	179	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
16	14:03	0.00	180	0.0	181	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.492
17	14:06	0.00	180	0.0	182	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.492
18	14:09	0.00	180	0.0	180	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.492
19	14:12	0.00	180	0.0	180	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.492
20	14:15	0.00	180	0.0	179	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.491
21	14:18	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
22	14:21	0.00	180	0.0	181	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
23	14:24	0.00	180	0.0	179	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.491
24	14:27	0.00	180	0.0	180	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.492
25	14:30	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
26	14:33	0.00	180	0.0	179	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
27	14:36	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
28	14:39	0.00	180	0.0	179	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
29	14:42	0.00	180	0.0	180	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
30	14:45	0.00	180	0.0	180	16.5	0.0	16.4	0.00	0.00	15	0.0	0.0	0	-0.492
31	14:48	0.00	180	0.0	179	16.5	0.0	16.6	0.00	0.00	15	0.0	0.0	0	-0.492
32	14:51	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
33	14:54	0.00	180	0.0	180	16.5	0.0	16.5	0.00	0.00	15	0.0	0.0	0	-0.492
34	14:57	0.00	91	0.0	95	17.5	0.0	18.0	0.00	0.00	5	0.0	0.0	0	-0.492
35	14:59	0.00	Established arc when Oct. 11th, 1999. Gas, Pos., 0.00 in. TERMINATE is activated.										0.0	-0.590	
36	15:00	0.00	5	0.0	5	17.5	0.0	23.0	0.00	0.00	5	0.0	0.0	0	-0.484
37	15:03	0.00	3	0.0	1	17.5	0.0	20.0	0.00	0.00	5	0.0	0.0	0	-0.590
38	15:05	0.00	0	0.0	0	17.5	0.0	0.0	0.00	0.00	5	0.0	0.0	0	-0.590
39	15:06	0.00	TERMINATION SEQUENCE COMPLETED										0.0	-0.590	
40															
41															
42															
43															
44															
45															
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54															
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56															
57															

(Scheduled / % Trim / Actual)									
Time	Position	Arc Current	Arc Voltage	Plasma (Press)	Plasma (Melt)	Shield (Flow)	Wire Feed Rate	Travel Rate	Rev Cur Stand off
0:00	0:00	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:00	0:00	75	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:03	0:00	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:06	0:00	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:09	0:00	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:12	0:00	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:15	0:00	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:18	0:00	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:21	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:24	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:27	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:30	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:33	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:36	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:39	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:42	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:45	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:48	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:51	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:54	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0:57	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:00	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:03	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:06	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:09	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:12	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:15	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:18	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:21	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:24	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:27	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:30	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:33	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:36	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:39	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:42	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:45	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:48	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:51	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:54	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1:57	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2:00	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2:03	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2:06	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2:09	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2:12	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2:15	0:00	175	0.0	0.0	0.0	0.0	0.0	0.0	0.0

STARTUP SEQUENCE BEGIN

NORMAL TRANSITION TO MAIN WELD SCHEDULE





(Scheduled / % Trim / Actual)

1	2	3	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off	
4	5:03	0.00	175	4.0	182	16.5	0.0	16.5	0.2	0.00	0.00	0	0	-0.494
5	5:06	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.492
6	5:09	0.00	175	4.0	181	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.490
7	5:12	0.00	175	4.0	182	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.493
8	5:15	0.00	175	4.0	181	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.493
9	5:18	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.491
10	5:21	0.00	175	4.0	180	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.492
11	5:24	0.00	175	4.0	183	16.5	0.0	16.7	0.1	0.00	0.00	0	0	-0.492
12	5:27	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.492
13	5:30	0.00	175	4.0	182	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.492
14	5:33	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.492
15	5:36	0.00	175	4.0	182	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.493
16	5:39	0.00	175	4.0	183	16.5	0.0	16.9	0.1	0.00	0.00	0	0	-0.492
17	5:42	0.00	175	4.0	182	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.492
18	5:45	0.00	175	4.0	182	16.5	0.0	16.7	0.0	0.00	0.00	0	0	-0.492
19	5:48	0.00	175	4.0	182	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.492
20	5:51	0.00	175	4.0	182	16.5	0.0	16.6	0.1	0.00	0.00	0	0	-0.492
21	5:54	0.00	175	4.0	182	16.5	0.0	16.2	0.1	0.00	0.00	0	0	-0.493
22	5:57	0.00	175	4.0	182	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.492
23	6:00	0.00	175	4.0	183	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.494
24	6:03	0.00	175	4.0	183	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.494
25	6:06	0.00	175	4.0	181	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.493
26	6:09	0.00	175	4.0	182	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.493
27	6:12	0.00	175	4.0	181	16.5	0.0	16.4	0.0	0.00	0.00	0	0	-0.492
28	6:15	0.00	175	4.0	183	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.492
29	6:18	0.00	175	4.0	183	16.5	0.0	16.7	0.1	0.00	0.00	0	0	-0.492
30	6:21	0.00	175	4.0	183	16.5	0.0	16.3	0.1	0.00	0.00	0	0	-0.492
31	6:24	0.00	175	4.0	182	16.5	0.0	16.3	0.1	0.00	0.00	0	0	-0.492
32	6:27	0.00	175	4.0	183	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.494
33	6:30	0.00	175	4.0	182	16.5	0.0	16.6	0.1	0.00	0.00	0	0	-0.492
34	6:33	0.00	175	4.0	181	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.494
35	6:36	0.00	175	4.0	183	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.492
36	6:39	0.00	175	4.0	183	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.492
37	6:42	0.00	175	4.0	182	16.5	0.0	16.3	0.0	0.00	0.00	0	0	-0.492
38	6:45	0.00	175	4.0	181	16.5	0.0	16.6	0.1	0.00	0.00	0	0	-0.494
39	6:48	0.00	175	4.0	181	16.5	0.0	16.6	0.1	0.00	0.00	0	0	-0.493
40	6:51	0.00	175	4.0	183	16.5	0.0	16.6	0.1	0.00	0.00	0	0	-0.492
41	6:54	0.00	175	4.0	182	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.492
42	6:57	0.00	175	4.0	183	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.492
43	7:00	0.00	175	4.0	182	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.493
44	7:03	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.493
45	7:06	0.00	175	4.0	183	16.5	0.0	16.7	0.1	0.00	0.00	0	0	-0.492
46	7:09	0.00	175	4.0	183	16.5	0.0	16.7	0.0	0.00	0.00	0	0	-0.492
47	7:12	0.00	175	4.0	183	16.5	0.0	16.4	0.1	0.00	0.00	0	0	-0.492
48	7:15	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.493
49	7:18	0.00	175	4.0	182	16.5	0.0	16.6	0.1	0.00	0.00	0	0	-0.492
50	7:21	0.00	175	4.0	182	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.494
51	7:24	0.00	175	4.0	183	16.5	0.0	16.3	0.1	0.00	0.00	0	0	-0.492
52	7:27	0.00	175	4.0	182	16.5	0.0	16.4	0.0	0.00	0.00	0	0	-0.493
53	7:30	0.00	175	4.0	182	16.5	0.0	16.6	0.0	0.00	0.00	0	0	-0.492
54	7:33	0.00	175	4.0	181	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.492
55	7:36	0.00	175	4.0	181	16.5	0.0	16.5	0.1	0.00	0.00	0	0	-0.492
56	7:39	0.00	175	4.0	182	16.5	0.0	16.5	0.0	0.00	0.00	0	0	-0.494
57	7:42	0.00	175	4.0	182	16.5	0.0	16.4	0.0	0.00	0.00	0	0	-0.492
58	7:45	0.00	175	4.0	183	16.5	0.0	16.7	0.0	0.00	0.00	0	0	-0.492





(Scheduled / % Trim / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Dur	Stand off
1	10:33	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
2	10:36	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
3	10:39	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
4	10:42	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
5	10:45	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
6	10:48	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
7	10:51	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
8	10:54	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
9	10:57	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
10	11:00	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
11	11:03	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
12	11:06	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
13	11:09	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
14	11:12	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
15	11:15	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
16	11:18	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
17	11:21	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
18	11:24	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
19	11:27	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
20	11:30	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
21	11:33	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
22	11:36	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
23	11:39	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
24	11:42	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
25	11:45	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
26	11:48	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
27	11:51	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
28	11:54	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
29	11:57	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
30	12:00	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
31	12:03	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
32	12:06	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
33	12:09	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
34	12:12	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
35	12:15	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
36	12:18	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
37	12:21	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
38	12:24	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
39	12:27	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
40	12:30	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
41	12:33	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
42	12:36	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
43	12:39	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
44	12:42	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
45	12:45	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
46	12:48	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
47	12:51	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
48	12:54	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
49	12:57	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
50	13:00	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
51	13:03	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
52	13:06	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
53	13:09	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
54	13:12	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0
55	13:15	0.00	175	16.5	0.0	0.0	100	15	0.0	0.0	0



(Scheduled / % Trim / Actual)

1	Time	Position	Arc Current	Arc Voltage	Plasma IPress	Plasma Helium	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off							
2																		
3																		
4	16:03	0.00	175	0.0	175	16.5	0.0	16.5	0.1	0.00	0.00	15	0.0	15	0.0	0.0	0	-0.492
5	16:06	0.00	175	0.0	175	16.5	0.0	16.5	0.0	0.00	0.00	15	0.0	15	0.0	0.0	0	-0.492
6	16:09	0.00	175	0.0	177	16.5	0.0	16.5	0.1	0.00	0.00	15	0.0	15	0.0	0.0	0	-0.492
7	16:12	0.00	175	0.0	175	16.5	0.0	16.7	0.1	0.00	0.01	15	0.0	15	0.0	0.0	0	-0.492
8	16:15	0.00	175	0.0	175	16.5	0.0	16.4	0.0	0.00	0.00	15	0.0	15	0.0	0.0	0	-0.492
9	16:18	0.00	175	0.0	174	16.5	0.0	16.4	0.1	0.00	0.00	15	0.0	15	0.0	0.0	0	-0.492
10	16:20	0.00	===> AVC Head manually locked by pendant button.									15	0.0	15	0.0	0.0	0	-0.492
11	16:21	0.00	175	0.0	175	16.5	0.0	16.7	0.0	0.00	0.00	15	0.0	15	0.0	0.0	0	-0.493
12	16:22	0.00	===> OPERATOR TRANSITION TO TERMINATE SEQUENCE									15	0.0	15	0.0	0.0	0	-0.493
13	16:24	0.00	117	0.0	122	17.1	0.0	17.2	0.1	0.00	0.02	5	0.0	10	0.0	0.0	0	-0.583
14	16:27	0.00	127	0.0	29	17.5	0.0	29.4	0.0	0.00	0.00	78	0.0	0	0.0	0.0	0	-0.590
15	16:27	0.00	===> Established Arcment On Time: 987.7 Sec. Pos.: 2.00 in. TERMINATE is activated.									0	0.0	0	0.0	0.0	0	-0.590
16	16:30	0.00	1	0.0	0	17.5	0.0	0.0	0.1	0.00	0.00	79	0.0	0	0.0	0.0	0	-0.590
17	16:33	0.00	===> AVC Head unlocked by pendant button.									0	0.0	0	0.0	0.0	0	-0.590
18	16:33	0.00	0	0.0	0	17.5	0.0	0.0	0.1	0.00	0.01	79	0.0	0	0.0	0.0	0	-0.590
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(Scheduled / % Trim / Actual) |(Scheduled / Trim (%) / Actual)60



Serial Number: 13 Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim(%) / Actual)

Time	Position	Arc Current	Arc Voltage	IPlasma Press	Plasma Argon	IShield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
1:57.0	0.0	130	12 145 15.5	0.0	0.00	0.02	11 0.0	0.0	0.0	0.590
2:00.0	0.0	130	12 146 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:03.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:06.1	0.0	130	12 145 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
2:09.1	0.0	130	12 144 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:15.0	0.0	130	12 145 15.5	0.0	0.00	0.02	11 0.0	0.0	0.0	0.590
2:18.1	0.0	130	12 145 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
2:21.0	0.0	130	12 146 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:24.0	0.0	130	12 146 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:27.0	0.0	130	12 145 15.5	0.1	0.00	0.01	11 0.0	0.0	0.0	0.590
2:30.0	0.0	130	12 146 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
2:33.0	0.0	130	12 144 15.5	0.0	0.00	0.02	11 0.0	0.0	0.0	0.590
2:36.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:39.0	0.0	130	12 145 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
2:42.0	0.0	130	12 145 15.5	0.0	0.00	0.04	11 0.0	0.0	0.0	0.590
2:45.0	0.0	130	12 145 15.5	0.1	0.00	0.02	11 0.0	0.0	0.0	0.590
2:48.0	0.0	130	12 145 15.5	0.0	0.00	0.02	11 0.0	0.0	0.0	0.590
2:51.0	0.0	130	12 144 15.5	0.0	0.00	0.02	11 0.0	0.0	0.0	0.590
2:54.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
2:57.0	0.0	130	12 145 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
3:00.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:03.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:06.0	0.0	130	12 146 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:09.0	0.0	130	12 144 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
3:12.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:15.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:18.0	0.0	130	12 147 15.5	0.0	0.00	0.05	11 0.0	0.0	0.0	0.590
3:21.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:24.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:27.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:30.0	0.0	130	12 144 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:33.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:36.1	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:39.1	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:42.0	0.0	130	12 145 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:45.0	0.0	130	12 145 15.5	0.0	0.00	0.01	11 0.0	0.0	0.0	0.590
3:48.0	0.0	130	12 147 15.5	0.0	0.00	0.05	11 0.0	0.0	0.0	0.590
3:51.0	0.0	130	12 144 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
3:54.0	0.0	130	12 145 15.5	0.0	0.00	0.04	11 0.0	0.0	0.0	0.590
3:57.0	0.0	130	12 146 15.5	0.0	0.00	0.00	11 0.0	0.0	0.0	0.590
4:00.0	0.0	130	12 144 15.5	0.0	0.00	0.05	11 0.0	0.0	0.0	0.590
4:03.0	0.0	130	12 147 15.5	0.0	0.00	0.02	11 0.0	0.0	0.0	0.590
4:06.0	0.0	130	12 145 15.5	0.0	0.00	0.04	11 0.0	0.0	0.0	0.590

Serial Number:

Version Information:

UIF: 4.1

Pendant: 1.0

Configuration: 4.1

(Scheduled / Trim(%) / Actual)

Time	Position	Arc	Arc	Voltage	IPlasma	Plasma	IShield	Wire Feed	Travel	Rev	Stand
			Current		Press	Argon	Gas	Rate	Rate	Cur	off
4:09.0	0.0	130	12	145	15.5	2.0	15.8	0.02	11.0	0.0	0.590
4:12.0	0.0	130	12	145	15.5	2.0	15.7	0.03	11.0	0.0	0.590
4:15.0	0.0	130	12	145	15.5	2.0	15.7	0.00	11.0	0.0	0.590
4:18.0	0.0	130	12	145	15.5	2.0	15.7	0.01	11.0	0.0	0.590
4:21.0	0.0	130	12	145	15.5	2.0	15.7	0.00	11.0	0.0	0.590
4:24.0	0.0	130	12	144	15.5	2.0	15.9	0.00	11.0	0.0	0.590
4:27.0	0.0	130	12	145	15.5	2.0	15.8	0.01	11.0	0.0	0.590
4:30.0	0.0	130	12	144	15.5	2.0	15.8	0.01	11.0	0.0	0.590
4:33.0	0.0	130	12	145	15.5	2.0	15.7	0.01	11.0	0.0	0.590
4:36.1	0.0	130	12	146	15.5	2.0	15.7	0.00	11.0	0.0	0.590
4:39.0	0.0	130	12	145	15.5	2.0	15.7	0.01	11.0	0.0	0.590
4:42.1	0.0	130	12	144	15.5	2.0	15.7	0.00	11.0	0.0	0.590
4:45.0	0.0	130	12	145	15.5	2.0	15.7	0.00	11.0	0.0	0.590
4:48.0	0.0	130	12	146	15.5	2.0	15.8	0.00	11.0	0.0	0.590
4:51.0	0.0	130	12	145	15.5	2.0	15.7	0.00	11.0	0.0	0.590
4:54.1	0.0	130	12	145	15.5	2.0	15.8	0.02	11.0	0.0	0.590
4:57.0	0.0	130	12	145	15.5	2.0	15.8	0.02	11.0	0.0	0.590
5:00.0	0.0	130	12	146	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:03.0	0.0	130	12	145	15.5	2.0	15.8	0.01	11.0	0.0	0.590
5:06.0	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:09.1	0.0	130	12	146	15.5	2.0	15.7	0.04	11.0	0.0	0.590
5:12.1	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:15.0	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:18.0	0.0	130	12	146	15.5	2.0	15.7	0.00	11.0	0.0	0.590
5:21.0	0.0	130	12	144	15.5	2.0	15.7	0.00	11.0	0.0	0.590
5:24.0	0.0	130	12	145	15.5	2.0	15.8	0.01	11.0	0.0	0.590
5:27.0	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:30.0	0.0	130	12	145	15.5	2.0	15.9	0.01	11.0	0.0	0.590
5:33.0	0.0	130	12	145	15.5	2.0	15.8	0.01	11.0	0.0	0.590
5:36.0	0.0	130	12	146	15.5	2.0	15.7	0.00	11.0	0.0	0.590
5:39.0	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:42.0	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
5:45.0	0.0	130	12	145	15.5	2.0	15.9	0.00	11.0	0.0	0.590
5:48.0	0.0	130	12	145	15.5	2.0	15.9	0.00	11.0	0.0	0.590
5:51.0	0.0	130	12	145	15.5	2.0	15.9	0.01	11.0	0.0	0.590
5:54.0	0.0	130	12	145	15.5	2.0	15.9	0.01	11.0	0.0	0.590
5:57.1	0.0	130	12	145	15.5	2.0	16.0	0.00	11.0	0.0	0.590
6:00.1	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
6:03.1	0.0	130	12	145	15.5	2.0	15.9	0.00	11.0	0.0	0.590
6:06.1	0.0	130	12	145	15.5	2.0	15.7	0.00	11.0	0.0	0.590
6:09.1	0.0	130	12	145	15.5	2.0	15.8	0.00	11.0	0.0	0.590
6:12.0	0.0	130	12	145	15.5	2.0	15.7	0.00	11.0	0.0	0.590
6:15.0	0.0	130	12	144	15.5	2.0	15.7	0.01	11.0	0.0	0.590

Production Weld Fixture

Date: 11-Nov-09 Time: 10:49

Serial Number: Configuration: 4.1

Version Information: UIF: 4.1 HANCS: 4.0 Pendant: 1.0

(Scheduled / Trim (%) / Actual)

Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	Shield	Wire Feed	Travel	Rev	Stand
						Press	Argon	Gas	Rate	Rate	Cur	off
6:19.0	0.0	130	12	145	15.5	2.0 15.8	0.00	100	11	0.0	11.0	0
6:21.0	0.0	130	12	145	15.5	2.0 15.8	0.00	100	11	0.0	11.0	0
6:24.0	0.0	130	12	145	15.5	2.0 15.8	0.00	100	11	0.0	11.0	0
6:27.0	0.0	130	12	146	15.5	2.0 15.7	0.04	99	11	0.0	11.0	0
6:30.0	0.0	130	12	145	15.5	2.0 15.9	0.00	100	11	0.0	11.0	0
6:33.0	0.0	130	12	146	15.5	2.0 15.9	0.02	100	11	0.0	11.0	0
6:36.1	0.0	130	12	146	15.5	2.0 15.8	0.01	100	11	0.0	11.0	0
6:39.0	0.0	130	12	146	15.5	2.0 15.7	0.00	100	11	0.0	11.0	0
6:42.0	0.0	130	12	145	15.5	2.0 15.8	0.01	100	11	0.0	11.0	0
6:45.0	0.0	130	12	145	15.5	2.0 15.7	0.00	100	11	0.0	11.0	0
6:48.1	0.0	130	12	145	15.5	2.0 15.8	0.01	100	11	0.0	11.0	0
6:51.1	0.0	130	12	146	15.5	2.0 15.8	0.01	100	11	0.0	11.0	0
6:54.1	0.0	130	12	146	15.5	2.0 15.7	0.01	99	11	0.0	11.0	0
6:57.1	0.0	130	12	146	15.5	2.0 15.5	0.00	99	11	0.0	11.0	0
7:00.0	0.0	130	12	145	15.5	2.0 15.6	0.00	100	11	0.0	11.0	0
7:03.0	0.0	130	12	146	15.5	2.0 15.6	0.01	99	11	0.0	11.0	0
7:06.0	0.0	130	12	145	15.5	2.0 15.7	0.00	100	11	0.0	11.0	0
7:09.0	0.0	130	12	145	15.5	2.0 15.7	0.00	100	11	0.0	11.0	0
7:12.0	0.0	130	12	145	15.5	2.0 15.6	0.01	100	11	0.0	11.0	0
7:15.0	0.0	130	12	145	15.5	2.0 15.6	0.00	100	11	0.0	11.0	0
7:18.0	0.0	130	12	145	15.5	2.0 15.6	0.00	100	11	0.0	11.0	0
7:21.0	0.0	130	12	144	15.5	2.0 15.6	0.04	100	11	0.0	11.0	0
7:24.0	0.0	130	12	145	15.5	2.0 15.6	0.00	100	11	0.0	11.0	0
7:27.0	0.0	130	12	144	15.5	2.0 15.5	0.04	99	11	0.0	11.0	0
7:30.0	0.0	130	12	144	15.5	2.0 15.4	0.00	99	11	0.0	11.0	0
7:33.0	0.0	130	12	145	15.5	2.0 15.4	0.01	100	11	0.0	11.0	0
7:36.0	0.0	130	12	146	15.5	2.0 15.5	0.01	99	11	0.0	11.0	0
7:39.0	0.0	130	12	145	15.5	2.0 15.6	0.00	100	11	0.0	11.0	0
7:42.0	0.0	130	12	144	15.5	2.0 15.6	0.01	100	11	0.0	11.0	0
7:45.0	0.0	130	12	145	15.5	2.0 15.7	0.00	100	11	0.0	11.0	0
7:48.0	0.0	130	12	145	15.5	2.0 15.9	0.01	100	11	0.0	11.0	0
7:51.0	0.0	130	12	145	15.5	2.0 16.1	0.02	99	11	0.0	11.0	0
7:54.0	0.0	130	12	145	15.5	2.0 16.0	0.00	99	11	0.0	11.0	0
7:57.0	0.0	130	12	145	15.5	2.0 16.0	0.00	100	11	0.0	11.0	0
8:00.0	0.0	130	12	145	15.5	2.0 16.0	0.01	100	11	0.0	11.0	0
8:03.0	0.0	130	12	144	15.5	2.0 16.0	0.04	100	11	0.0	11.0	0
8:06.0	0.0	130	12	145	15.5	2.0 15.9	0.00	99	11	0.0	11.0	0
8:09.0	0.0	130	12	145	15.5	2.0 16.0	0.00	100	11	0.0	11.0	0
8:12.0	0.0	130	12	146	15.5	2.0 16.3	0.00	99	11	0.0	11.0	0
8:15.0	0.0	130	12	145	15.5	2.0 16.1	0.01	100	11	0.0	11.0	0
8:18.0	0.0	130	12	145	15.5	2.0 16.1	0.00	100	11	0.0	11.0	0
8:21.0	0.0	130	12	145	15.5	2.0 16.0	0.03	100	11	0.0	11.0	0
8:24.0	0.0	130	12	145	15.5	2.0 16.0	0.00	100	11	0.0	10.9	0



Serial Number:

Version Information: UIF: 4.1 HAMCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim (%) / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
8:27.0	0.0	130	12	145	15.5	2.0	16.0	0.00	0.0	0.590
8:30.0	0.0	130	12	146	15.5	2.0	15.9	0.00	0.0	0.590
8:33.0	0.0	130	12	146	15.5	2.0	15.9	0.01	0.0	0.590
8:36.0	0.0	130	12	145	15.5	2.0	15.9	0.00	0.0	0.590
8:39.0	0.0	130	12	145	15.5	2.0	16.0	0.01	0.0	0.590
8:42.0	0.0	130	12	144	15.5	2.0	15.9	0.01	0.0	0.590
8:45.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
8:48.0	0.0	130	12	143	15.5	2.0	15.9	0.01	0.0	0.590
8:51.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
8:54.0	0.0	130	12	145	15.5	2.0	15.8	0.03	0.0	0.590
8:57.0	0.0	130	12	144	15.5	2.0	15.7	0.00	0.0	0.590
9:00.0	0.0	130	12	145	15.5	2.0	15.8	0.02	0.0	0.590
9:03.0	0.0	130	12	144	15.5	2.0	15.8	0.01	0.0	0.590
9:06.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
9:09.0	0.0	130	12	146	15.5	2.0	15.8	0.00	0.0	0.590
9:12.0	0.0	130	12	145	15.5	2.0	15.7	0.00	0.0	0.590
9:15.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
9:18.0	0.0	130	12	145	15.5	2.0	15.7	0.01	0.0	0.590
9:21.0	0.0	130	12	145	15.5	2.0	15.7	0.00	0.0	0.590
9:24.0	0.0	130	12	145	15.5	2.0	15.6	0.02	0.0	0.590
9:27.0	0.0	130	12	145	15.5	2.0	15.9	0.03	0.0	0.590
9:30.0	0.0	130	12	146	15.5	2.0	15.6	0.00	0.0	0.590
9:33.0	0.0	130	12	145	15.5	2.0	15.8	0.02	0.0	0.590
9:36.0	0.0	130	12	145	15.5	2.0	15.8	0.01	0.0	0.590
9:39.0	0.0	130	12	146	15.5	2.0	15.9	0.00	0.0	0.590
9:42.0	0.0	130	12	145	15.5	2.0	15.9	0.01	0.0	0.590
9:45.0	0.0	130	12	144	15.5	2.0	15.7	0.01	0.0	0.590
9:48.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
9:51.0	0.0	130	12	143	15.5	2.0	15.6	0.02	0.0	0.590
9:54.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
9:57.1	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
10:00.0	0.0	130	12	146	15.5	2.0	15.7	0.00	0.0	0.590
10:03.0	0.0	130	12	145	15.5	2.0	15.7	0.00	0.0	0.590
10:06.0	0.0	130	12	144	15.5	2.0	15.5	0.07	0.0	0.590
10:09.0	0.0	130	12	145	15.5	2.0	15.8	0.00	0.0	0.590
10:12.0	0.0	130	2.0	134	15.5	2.0	15.5	0.00	0.0	0.590
10:15.0	0.0	130	-2.0	126	15.5	2.0	15.6	0.01	0.0	0.590
10:18.0	0.0	130	0.0	127	15.5	2.0	15.4	0.01	0.0	0.590
10:21.0	0.0	130	0.0	128	15.5	2.0	15.6	0.01	0.0	0.590
10:24.0	0.0	130	0.0	130	15.5	2.0	15.7	0.00	0.0	0.590
10:27.0	0.0	130	0.0	129	15.5	2.0	15.4	0.02	0.0	0.590
10:30.0	0.0	130	0.0	130	15.5	2.0	15.8	0.01	0.0	0.590
10:33.0	0.0	130	0.0	130	15.5	2.0	16.0	0.01	0.0	0.590
10:36.0	0.0	130	0.0	129	15.5	2.0	16.0	0.03	0.0	0.590

Production Weld Fixture

Date: 11-Nov-09 Time: 10:49

Serial Number: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim%) / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off								
10:39.0	0.0	130	0.0	129	15.5	2.0	15.9	0.0	0.00	0.01	99	11	0.0	11.0	0.0	0.0	0.0	0.590
10:42.0	0.0	130	0.0	129	15.5	2.0	15.7	0.0	0.00	0.04	100	11	0.0	11.0	0.0	0.0	0.0	0.590
10:45.0	0.0	130	0.0	129	15.5	2.0	15.3	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
10:48.0	0.0	130	0.0	130	15.5	2.0	15.9	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
10:51.0	0.0	130	0.0	130	15.5	2.0	15.8	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
10:54.0	0.0	130	0.0	130	15.5	2.0	15.9	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
10:57.0	0.0	130	0.0	128	15.5	2.0	15.9	0.0	0.00	0.01	99	11	0.0	11.0	0.0	0.0	0.0	0.590
11:00.0	0.0	130	0.0	128	15.5	2.0	16.0	0.0	0.00	0.01	99	11	0.0	11.0	0.0	0.0	0.0	0.590
11:03.0	0.0	130	0.0	131	15.5	2.0	16.1	0.0	0.00	0.02	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:06.0	0.0	130	0.0	129	15.5	2.0	16.4	0.0	0.00	0.00	99	11	0.0	11.0	0.0	0.0	0.0	0.590
11:09.0	0.0	130	0.0	130	15.5	2.0	16.4	0.0	0.00	0.01	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:12.0	0.0	130	0.0	129	15.5	2.0	16.2	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:15.0	0.0	130	0.0	130	15.5	2.0	16.0	0.0	0.00	0.01	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:18.1	0.0	130	0.0	129	15.5	2.0	15.3	0.0	0.00	0.02	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:21.1	0.0	130	0.0	129	15.5	2.0	16.2	0.0	0.00	0.02	99	11	0.0	11.0	0.0	0.0	0.0	0.590
11:24.1	0.0	130	0.0	129	15.5	2.0	15.8	0.0	0.00	0.00	99	11	0.0	11.0	0.0	0.0	0.0	0.590
11:27.1	0.0	130	0.0	129	15.5	2.0	16.0	0.0	0.00	0.02	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:30.1	0.0	130	0.0	129	15.5	2.0	16.0	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:36.0	0.0	130	0.0	130	15.5	2.0	15.5	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:39.0	0.0	130	0.0	131	15.5	2.0	15.6	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:42.0	0.0	130	0.0	129	15.5	2.0	15.4	0.0	0.00	0.00	99	11	0.0	11.0	0.0	0.0	0.0	0.590
11:45.0	0.0	130	0.0	129	15.5	2.0	15.6	0.0	0.00	0.01	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:48.0	0.0	130	4.0	135	15.5	2.0	15.4	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:51.0	0.0	130	6.0	137	15.5	2.0	15.3	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:54.0	0.0	130	6.0	138	15.5	2.0	15.1	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
11:57.0	0.0	130	6.0	138	15.5	2.0	15.1	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:00.0	0.0	130	6.0	137	15.5	2.0	15.1	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:03.0	0.0	130	6.0	138	15.5	2.0	15.0	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:06.0	0.0	130	6.0	137	15.5	2.0	15.3	0.0	0.00	0.00	99	11	0.0	11.0	0.0	0.0	0.0	0.590
12:09.0	0.0	130	6.0	138	15.5	2.0	15.7	0.0	0.00	0.03	99	11	0.0	11.0	0.0	0.0	0.0	0.590
12:12.0	0.0	130	6.0	137	15.5	2.0	16.3	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:15.0	0.0	130	6.0	137	15.5	2.0	16.5	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:18.0	0.0	130	6.0	137	15.5	2.0	17.0	0.0	0.00	0.02	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:21.0	0.0	130	6.0	137	15.5	2.0	17.4	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:24.0	0.0	130	6.0	137	15.5	2.0	16.9	0.0	0.00	0.01	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:27.1	0.0	130	6.0	137	15.5	2.0	17.8	0.0	0.00	0.01	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:33.0	0.0	130	6.0	135	15.5	2.0	16.4	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:36.0	0.0	130	6.0	136	15.5	2.0	16.2	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:39.1	0.0	130	6.0	137	15.5	2.0	15.9	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:45.0	0.0	130	6.0	137	15.5	2.0	15.5	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:48.0	0.0	130	6.0	140	15.5	2.0	15.5	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:51.0	0.0	130	8.0	140	15.5	2.0	15.3	0.0	0.00	0.01	100	11	0.0	11.0	0.0	0.0	0.0	0.590
12:54.0	0.0	130	8.0	143	15.5	2.0	15.1	0.0	0.00	0.00	100	11	0.0	11.0	0.0	0.0	0.0	0.590

Serial Number:

Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim(%) / Actual)

Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	IShield	Wire	Feed	Travel	Rev	Stand
						Press	Argon	Gas	Rate	Rate	Rate	Cur	off
12:57.0	0.0	130	8.0	139	15.5	2.0	14.8	0.03	11	0.0	11.0	0.0	0.590
13:00.0	0.0	130	8.0	140	15.5	2.0	14.8	0.01	11	0.0	11.0	0.0	0.590
13:03.1	0.0	130	8.0	140	15.5	2.0	14.4	0.00	11	0.0	11.0	0.0	0.590
13:06.0	0.0	130	8.0	140	15.5	2.0	13.9	0.04	11	0.0	11.0	0.0	0.590
13:09.0	0.0	130	8.0	140	15.5	2.0	13.8	0.00	11	0.0	11.0	0.0	0.590
13:12.0	0.0	130	8.0	140	15.5	2.0	14.1	0.00	11	0.0	10.9	0.0	0.590
13:15.0	0.0	130	8.0	139	15.5	2.0	14.9	0.00	11	0.0	11.0	0.0	0.590
13:18.0	0.0	130	8.0	139	15.5	2.0	16.4	0.01	11	0.0	11.0	0.0	0.590
13:21.0	0.0	130	8.0	140	15.5	2.0	16.5	0.00	11	0.0	11.0	0.0	0.590
13:24.0	0.0	130	8.0	140	15.5	2.0	17.7	0.00	11	0.0	11.0	0.0	0.590
13:27.0	0.0	130	8.0	140	15.5	2.0	18.8	0.00	11	0.0	11.0	0.0	0.590
13:30.0	0.0	130	8.0	140	15.5	2.0	19.6	0.01	11	0.0	11.0	0.0	0.590
13:33.0	0.0	130	8.0	140	15.5	2.0	19.4	0.00	11	0.0	11.0	0.0	0.590
13:36.0	0.0	130	8.0	140	15.5	2.0	19.5	0.00	11	0.0	11.0	0.0	0.590
13:39.1	0.0	130	8.0	140	15.5	2.0	19.0	0.00	11	0.0	11.0	0.0	0.590
13:45.0	0.0	130	8.0	140	15.5	2.0	16.3	0.00	11	0.0	11.0	0.0	0.590
13:48.0	0.0	130	8.0	140	15.5	2.0	15.6	0.00	11	0.0	11.0	0.0	0.590
13:51.0	0.0	130	8.0	141	15.5	2.0	15.7	0.00	11	0.0	11.0	0.0	0.590
13:54.0	0.0	130	8.0	139	15.5	2.0	15.7	0.00	11	0.0	11.0	0.0	0.590
13:57.0	0.0	130	8.0	141	15.5	2.0	15.3	0.00	11	0.0	11.0	0.0	0.590
14:00.0	0.0	130	8.0	139	15.5	2.0	15.2	0.00	11	0.0	11.0	0.0	0.590
14:03.0	0.0	130	8.0	140	15.5	2.0	15.2	0.00	11	0.0	11.0	0.0	0.590
14:06.0	0.0	130	8.0	141	15.5	2.0	13.8	0.00	11	0.0	11.0	0.0	0.590
14:09.1	0.0	130	8.0	140	15.5	2.0	12.4	0.01	11	0.0	11.0	0.0	0.590
14:12.1	0.0	130	8.0	140	15.5	2.0	13.8	0.00	11	0.0	11.0	0.0	0.590
14:15.1	0.0	130	8.0	142	15.5	2.0	0.8	0.04	11	0.0	11.0	0.0	0.590
14:15.2	0.0	====	====	====	====	====	====	====	====	====	====	====	====
14:15.2	0.0	====	====	====	====	====	====	====	====	====	====	====	====
14:16.1	0.0	0	8.0	0	0.0	2.0	0.0	0.4	0.00	0.00	0.0	0.0	0.590
14:21.1	0.0	0	8.0	0	0.0	2.0	0.0	0.00	0.00	0.00	0.0	0.0	0.590

TRANSITION TO EMERGENCY STOP WELD SEQUENCE

E-Stop is pressed. Time: 855.2 Sec, Pos.: 0.00 In. ESTOP is activated,

Production Weld Fixture

Date: 12-Nov-09 Time: 14:25

Serial Number: 2195 BASE 4043

Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

Weld ID: MTL-0039-09 TD F6457 WELD FUME CHARACTERIZATION TL-7191-18

Start-up: ROBOTPASS3/ WELD FUME PASS 1 FLAT BASE 2195 WIRE 4043

Main: ROBOTPASS3/ WELD FUME PASS 1 FLAT

Termination: ROBOTPASS3/ WELD FUME PASS 1 FLAT

E-Stop: STANDARD/ Standard STOP for all welds.

12-Nov-09 13:06:58

12-Nov-09 13:06:58

12-Nov-09 13:06:58

27-Sep-95 14:38:48

(Scheduled / Trim(%) / Actual)

Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	Shield	Wire	Feed	Travel	Rev	Stand
						Press	Argon	Gas	Rate	Rate	Rate	Cur	off
0:03.1	0.0	135	0.0	135	13.5	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.590
0:06.0	0.0	135	0.0	136	13.5	0.0	0.00	0.02	0.0	0.0	0.0	0.0	0.590
0:09.0	0.0	135	0.0	136	13.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.590
0:12.0	0.0	135	0.0	136	13.5	0.0	0.00	0.00	3	0.0	1.1	0.0	0.590
0:15.0	0.0	135	0.0	132	13.5	0.0	0.00	0.04	10	0.0	7.9	0.0	0.590
0:18.0	0.0	135	0.0	135	13.5	0.0	0.00	0.07	12	0.0	12.0	0.0	0.590
0:20.6	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.1	0.0	0.590
0:21.0	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:24.0	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:27.0	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:30.0	0.0	135	0.0	133	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:33.0	0.0	135	0.0	134	13.5	0.0	0.00	0.01	12	0.0	12.0	0.0	0.590
0:36.1	0.0	135	0.0	135	13.5	0.0	0.00	0.02	12	0.0	12.0	0.0	0.590
0:39.1	0.0	135	0.0	134	13.5	0.0	0.00	0.01	12	0.0	12.0	0.0	0.590
0:42.1	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:45.1	0.0	135	0.0	134	13.5	0.0	0.00	0.01	12	0.0	11.9	0.0	0.590
0:48.1	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:51.1	0.0	135	0.0	134	13.5	0.0	0.00	0.05	12	0.0	12.0	0.0	0.590
0:54.1	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
0:57.1	0.0	135	0.0	134	13.5	0.0	0.00	0.04	12	0.0	12.0	0.0	0.590
1:00.1	0.0	135	0.0	135	13.5	0.0	0.00	0.01	12	0.0	12.0	0.0	0.590
1:03.1	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:06.0	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:12.0	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:15.0	0.0	135	0.0	134	13.5	0.0	0.00	0.02	12	0.0	12.0	0.0	0.590
1:18.0	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:21.0	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:24.0	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:27.0	0.0	135	0.0	135	13.5	0.0	0.00	0.02	12	0.0	12.0	0.0	0.590
1:30.0	0.0	135	0.0	135	13.5	0.0	0.00	0.01	12	0.0	12.0	0.0	0.590
1:33.1	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:36.1	0.0	135	0.0	134	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:42.0	0.0	135	0.0	136	13.5	0.0	0.00	0.05	12	0.0	12.0	0.0	0.590
1:45.0	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:48.0	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:51.0	0.0	135	0.0	134	13.5	0.0	0.00	0.02	12	0.0	12.0	0.0	0.590
1:54.0	0.0	135	0.0	135	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590
1:57.0	0.0	135	0.0	136	13.5	0.0	0.00	0.00	12	0.0	12.0	0.0	0.590

NORMAL TRANSITION TO MAIN WELD SCHEDULE

(Scheduled / Trim(x) / Actual)

Time	Position	Arc	Current	Arc	Voltage	Plasma	Shield	Wire	Feed	Travel	Rev	Stand
						Press	Gas	Rate	Rate	Rate	Cur	off
2:00.1	0.0	135	0.0	135	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:03.1	0.0	135	0.0	135	13.5	0.0	99	12	0.0	0.0	0.0	0.590
2:06.1	0.0	135	0.0	136	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:12.0	0.0	135	0.0	134	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:15.1	0.0	135	0.0	134	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:18.0	0.0	135	0.0	135	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:21.0	0.0	135	0.0	134	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:24.0	0.0	135	0.0	135	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:27.0	0.0	135	0.0	133	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:30.0	0.0	135	0.0	133	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:33.0	0.0	135	0.0	134	13.5	0.0	99	12	0.0	0.0	0.0	0.590
2:36.0	0.0	135	0.0	136	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:39.0	0.0	135	0.0	135	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:42.0	0.0	135	0.0	135	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:45.1	0.0	135	0.0	134	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:48.1	0.0	135	0.0	134	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:51.1	0.0	135	0.0	135	13.5	0.0	100	12	0.0	0.0	0.0	0.590
2:57.0	0.0	135	2.0	138	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:00.0	0.0	135	2.0	138	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:03.0	0.0	135	2.0	137	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:06.0	0.0	135	2.0	136	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:09.0	0.0	135	2.0	137	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:12.0	0.0	135	2.0	136	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:15.0	0.0	135	2.0	137	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:18.0	0.0	135	4.0	139	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:21.0	0.0	135	4.0	140	13.5	0.0	99	12	0.0	0.0	0.0	0.590
3:24.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:27.0	0.0	135	4.0	139	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:30.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:33.0	0.0	135	4.0	141	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:36.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:39.1	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:42.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:45.0	0.0	135	4.0	140	13.5	0.0	101	12	0.0	0.0	0.0	0.590
3:48.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:51.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
3:54.0	0.0	135	4.0	140	13.5	0.0	99	12	0.0	0.0	0.0	0.590
3:57.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
4:00.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
4:03.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
4:06.0	0.0	135	4.0	140	13.5	0.0	100	12	0.0	0.0	0.0	0.590
4:09.0	0.0	135	4.0	138	13.5	0.0	100	12	0.0	0.0	0.0	0.590
4:12.0	0.0	135	4.0	140	13.5	0.0	99	12	0.0	0.0	0.0	0.590



Production Weld Fixture

Date: 12-Nov-09 Time: 14:25

Serial Number: Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trimix) / Actual

Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	Argon	Shield	Wire	Feed	Travel	Rev	Stand
						Press	Press		Gas	Rate	Rate	Rate	Cur	off
4:15.0	0.0	135	4.0	135	13.5	0.0	13.4	0.0	100	12	0.0	0.0	0	0.590
4:16.0	0.0	135	4.0	141	13.5	0.0	13.5	0.01	100	12	0.0	0.0	0	0.590
4:21.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	101	12	0.0	0.0	0	0.590
4:24.0	0.0	135	4.0	140	13.5	0.0	13.6	0.01	100	12	0.0	0.0	0	0.590
4:27.0	0.0	135	4.0	140	13.5	0.0	13.6	0.03	100	12	0.0	0.0	0	0.590
4:30.0	0.0	135	4.0	140	13.5	0.0	13.7	0.00	99	12	0.0	0.0	0	0.590
4:33.0	0.0	135	4.0	138	13.5	0.0	13.4	0.00	100	12	0.0	0.0	0	0.590
4:36.0	0.0	135	4.0	140	13.5	0.0	13.5	0.05	99	12	0.0	0.0	0	0.590
4:39.0	0.0	135	4.0	141	13.5	0.0	13.6	0.00	100	12	0.0	0.0	0	0.590
4:42.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	99	12	0.0	0.0	0	0.590
4:45.0	0.0	135	4.0	139	13.5	0.0	13.6	0.00	99	12	0.0	0.0	0	0.590
4:48.0	0.0	135	4.0	140	13.5	0.0	13.4	0.01	100	12	0.0	0.0	0	0.590
4:51.0	0.0	135	4.0	140	13.5	0.0	13.6	0.01	100	12	0.0	0.0	0	0.590
4:54.0	0.0	135	4.0	140	13.5	0.0	13.6	0.01	100	12	0.0	0.0	0	0.590
4:57.0	0.0	135	4.0	140	13.5	0.0	13.5	0.00	99	12	0.0	0.0	0	0.590
5:00.0	0.0	135	4.0	139	13.5	0.0	13.5	0.00	100	12	0.0	0.0	0	0.590
5:03.1	0.0	135	4.0	140	13.5	0.0	13.5	0.00	99	12	0.0	0.0	0	0.590
5:06.1	0.0	135	4.0	140	13.5	0.0	13.6	0.04	100	12	0.0	0.0	0	0.590
5:12.1	0.0	135	4.0	139	13.5	0.0	13.6	0.01	99	12	0.0	0.0	0	0.590
5:15.1	0.0	135	4.0	141	13.5	0.0	13.6	0.00	100	12	0.0	0.0	0	0.590
5:21.1	0.0	135	4.0	140	13.5	0.0	13.4	0.02	100	12	0.0	0.0	0	0.590
5:24.1	0.0	135	4.0	141	13.5	0.0	13.4	0.02	100	12	0.0	0.0	0	0.590
5:27.1	0.0	135	4.0	140	13.5	0.0	13.4	0.00	100	12	0.0	0.0	0	0.590
5:30.1	0.0	135	4.0	140	13.5	0.0	13.5	0.00	100	12	0.0	0.0	0	0.590
5:33.0	0.0	135	4.0	140	13.5	0.0	13.3	0.00	99	12	0.0	0.0	0	0.590
5:36.0	0.0	135	4.0	140	13.5	0.0	13.5	0.02	100	12	0.0	0.0	0	0.590
5:39.1	0.0	135	4.0	140	13.5	0.0	13.5	0.00	100	12	0.0	0.0	0	0.590
5:42.0	0.0	135	4.0	140	13.5	0.0	13.5	0.03	100	12	0.0	0.0	0	0.590
5:45.0	0.0	135	4.0	140	13.5	0.0	13.7	0.01	100	12	0.0	0.0	0	0.590
5:48.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	100	12	0.0	0.0	0	0.590
5:51.1	0.0	135	4.0	140	13.5	0.0	13.5	0.00	100	12	0.0	0.0	0	0.590
5:57.0	0.0	135	4.0	140	13.5	0.0	13.4	0.04	99	12	0.0	0.0	0	0.590
6:00.0	0.0	135	4.0	140	13.5	0.0	13.5	0.00	100	12	0.0	0.0	0	0.590
6:03.1	0.0	135	4.0	138	13.5	0.0	13.4	0.01	100	12	0.0	0.0	0	0.590
6:06.0	0.0	135	4.0	141	13.5	0.0	13.4	0.00	99	12	0.0	0.0	0	0.590
6:09.0	0.0	135	4.0	139	13.5	0.0	13.5	0.01	100	12	0.0	0.0	0	0.590
6:12.0	0.0	135	4.0	140	13.5	0.0	13.7	0.01	100	12	0.0	0.0	0	0.590
6:15.0	0.0	135	4.0	141	13.5	0.0	13.4	0.01	100	12	0.0	0.0	0	0.590
6:18.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	100	12	0.0	0.0	0	0.590
6:21.0	0.0	135	4.0	141	13.5	0.0	13.5	0.01	100	12	0.0	0.0	0	0.590
6:24.0	0.0	135	4.0	140	13.5	0.0	13.6	0.00	99	12	0.0	0.0	0	0.590
6:27.0	0.0	135	4.0	140	13.5	0.0	13.6	0.00	100	12	0.0	0.0	0	0.590
6:30.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	100	12	0.0	0.0	0	0.590

Serial Number: Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim (%) / Actual)

Time	Position	Arc	Current	Arc	Voltage	IPress	Plasma	IShield	Wire Feed	Travel	Rev	Stand
							Argon	Gas	Rate	Rate	Cur	off
6:33.0	0.0	135	4.0	139	13.5	0.0	13.4	0.0	12.0	0.0	0.0	0.590
6:36.1	0.0	135	4.0	141	13.5	0.0	13.5	0.01	12.0	0.0	0.0	0.590
6:39.0	0.0	135	4.0	140	13.5	0.0	13.5	0.03	12.0	0.0	0.0	0.590
6:42.0	0.0	135	4.0	140	13.5	0.0	13.5	0.00	12.0	0.0	0.0	0.590
6:45.0	0.0	135	4.0	141	13.5	0.0	13.4	0.02	12.0	0.0	0.0	0.590
6:48.0	0.0	135	4.0	141	13.5	0.0	13.6	0.04	12.0	0.0	0.0	0.590
6:51.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12.0	0.0	0.0	0.590
6:54.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
6:57.0	0.0	135	4.0	140	13.5	0.0	13.4	0.01	12.0	0.0	0.0	0.590
7:00.0	0.0	135	4.0	140	13.5	0.0	13.5	0.00	12.0	0.0	0.0	0.590
7:03.0	0.0	135	4.0	140	13.5	0.0	13.5	0.02	12.0	0.0	0.0	0.590
7:06.0	0.0	135	4.0	140	13.5	0.0	13.4	0.01	12.0	0.0	0.0	0.590
7:09.0	0.0	135	4.0	139	13.5	0.0	13.6	0.00	12.0	0.0	0.0	0.590
7:12.1	0.0	135	4.0	139	13.5	0.0	13.5	0.02	12.0	0.0	0.0	0.590
7:15.1	0.0	135	4.0	139	13.5	0.0	13.5	0.01	12.0	0.0	0.0	0.590
7:18.1	0.0	135	4.0	140	13.5	0.0	13.6	0.01	12.0	0.0	0.0	0.590
7:21.1	0.0	135	4.0	139	13.5	0.0	13.3	0.00	12.0	0.0	0.0	0.590
7:24.1	0.0	135	4.0	141	13.5	0.0	13.6	0.00	12.0	0.0	0.0	0.590
7:27.1	0.0	135	4.0	141	13.5	0.0	13.4	0.01	12.0	0.0	0.0	0.590
7:30.1	0.0	135	4.0	140	13.5	0.0	13.5	0.00	12.0	0.0	0.0	0.590
7:33.1	0.0	135	4.0	140	13.5	0.0	13.4	0.03	12.0	0.0	0.0	0.590
7:36.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12.0	0.0	0.0	0.590
7:39.0	0.0	135	4.0	139	13.5	0.0	13.5	0.01	12.0	0.0	0.0	0.590
7:42.0	0.0	135	4.0	140	13.5	0.0	13.6	0.00	12.0	0.0	0.0	0.590
7:45.0	0.0	135	4.0	140	13.5	0.0	13.6	0.00	12.0	0.0	0.0	0.590
7:48.0	0.0	135	4.0	140	13.5	0.0	13.6	0.01	12.0	0.0	0.0	0.590
7:51.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
7:54.0	0.0	135	4.0	140	13.5	0.0	13.4	0.02	12.0	0.0	0.0	0.590
7:57.1	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12.0	0.0	0.0	0.590
8:00.0	0.0	135	4.0	140	13.5	0.0	13.3	0.04	12.0	0.0	0.0	0.590
8:03.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
8:06.0	0.0	135	4.0	140	13.5	0.0	13.3	0.02	12.0	0.0	0.0	0.590
8:09.0	0.0	135	4.0	140	13.5	0.0	13.2	0.01	12.0	0.0	0.0	0.590
8:12.0	0.0	135	4.0	139	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
8:15.0	0.0	135	4.0	140	13.5	0.0	13.2	0.01	12.0	0.0	0.0	0.590
8:18.0	0.0	135	4.0	140	13.5	0.0	13.4	0.01	12.0	0.0	0.0	0.590
8:21.0	0.0	135	4.0	139	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
8:24.0	0.0	135	4.0	140	13.5	0.0	13.3	0.00	12.0	0.0	0.0	0.590
8:27.0	0.0	135	4.0	139	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
8:30.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12.0	0.0	0.0	0.590
8:33.0	0.0	135	4.0	141	13.5	0.0	13.6	0.03	12.0	0.0	0.0	0.590
8:36.0	0.0	135	4.0	140	13.5	0.0	13.6	0.01	12.0	0.0	0.0	0.590
8:39.0	0.0	135	4.0	140	13.5	0.0	13.7	0.01	12.0	0.0	0.0	0.590

Production Weld Fixture

Date: 12-Nov-09 Time: 14:25

Serial Number:

Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim(x) / Actual)

Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	IShield	Wire Feed	Travel	Rev	Stand
						Press	Argon	Gas	Rate	Rate	Cur	off
8:42.0	0.0	135	4.0	139	13.5	0.0	13.8	0.01	12	0.0	0.0	0.590
8:43.0	0.0	135	4.0	143	13.5	0.0	13.7	0.04	12	0.0	0.0	0.590
8:48.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12	0.0	0.0	0.590
8:51.0	0.0	135	4.0	141	13.5	0.0	13.6	0.00	12	0.0	0.0	0.590
8:54.0	0.0	135	4.0	142	13.5	0.0	13.4	0.01	12	0.0	0.0	0.590
8:57.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12	0.0	0.0	0.590
9:00.1	0.0	135	4.0	140	13.5	0.0	13.3	0.00	12	0.0	0.0	0.590
9:03.1	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12	0.0	0.0	0.590
9:06.1	0.0	135	4.0	139	13.5	0.0	13.6	0.00	12	0.0	0.0	0.590
9:09.1	0.0	135	4.0	139	13.5	0.0	13.6	0.00	12	0.0	0.0	0.590
9:12.0	0.0	135	4.0	140	13.5	0.0	13.5	0.00	12	0.0	0.0	0.590
9:15.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12	0.0	0.0	0.590
9:18.0	0.0	135	4.0	141	12.5	0.0	13.5	0.02	12	0.0	0.0	0.590
9:21.0	0.0	135	4.0	141	13.5	0.0	13.4	0.00	12	0.0	0.0	0.590
9:24.0	0.0	135	4.0	140	13.5	0.0	13.5	0.01	12	0.0	0.0	0.590
9:27.0	0.0	135	4.0	140	13.5	0.0	13.3	0.00	12	0.0	0.0	0.590
9:30.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12	0.0	0.0	0.590
9:33.0	0.0	135	4.0	140	13.5	0.0	13.4	0.01	12	0.0	0.0	0.590
9:36.0	0.0	135	4.0	140	13.5	0.0	13.4	0.00	12	0.0	0.0	0.590
9:39.0	0.0	135	4.0	140	13.5	0.0	13.3	0.00	12	0.0	0.0	0.590
9:42.0	0.0	135	4.0	139	13.5	0.0	13.3	0.00	12	0.0	0.0	0.590
9:45.0	0.0	135	4.0	140	13.5	0.0	13.3	0.01	12	0.0	0.0	0.590
9:48.0	0.0	135	4.0	140	13.5	0.0	13.3	0.01	12	0.0	0.0	0.590
9:51.0	0.0	135	4.0	140	13.5	0.0	13.4	0.02	12	0.0	0.0	0.590
9:54.0	0.0	135	4.0	141	13.5	0.0	13.6	0.00	12	0.0	0.0	0.590
9:57.0	0.0	135	4.0	139	13.5	0.0	13.5	0.00	12	0.0	0.0	0.590
10:00.0	0.0	135	4.0	140	13.5	0.0	13.7	0.01	12	0.0	0.0	0.590
10:03.0	0.0	135	4.0	140	13.5	0.0	13.6	0.01	12	0.0	0.0	0.590
10:06.0	0.0	135	4.0	141	13.5	0.0	13.7	0.01	12	0.0	0.0	0.590
10:09.0	0.0	135	4.0	141	13.5	0.0	13.7	0.00	12	0.0	0.0	0.590
10:12.0	0.0	135	4.0	140	13.5	0.0	13.7	0.01	12	0.0	0.0	0.590
10:15.0	0.0	135	4.0	140	13.5	0.0	13.7	0.00	12	0.0	0.0	0.590
10:18.0	0.0	135	4.0	140	13.5	0.0	13.5	0.00	12	0.0	0.0	0.590
10:21.0	0.0	135	4.0	140	13.5	0.0	14.1	0.01	12	0.0	0.0	0.590
10:24.0	0.0	135	4.0	141	13.5	0.0	13.8	0.01	12	0.0	0.0	0.590
10:27.0	0.0	135	4.0	140	13.5	0.0	13.7	0.00	12	0.0	0.0	0.590
10:30.0	0.0	135	4.0	138	13.5	0.0	13.9	0.02	12	0.0	0.0	0.590
10:33.1	0.0	135	4.0	140	13.5	0.0	13.6	0.01	12	0.0	0.0	0.590
10:36.1	0.0	135	4.0	139	13.5	0.0	13.5	0.01	12	0.0	0.0	0.590
10:39.1	0.0	135	4.0	140	13.5	0.0	13.3	0.00	12	0.0	0.0	0.590
10:42.1	0.0	135	4.0	140	13.5	0.0	13.3	0.03	12	0.0	0.0	0.590
10:45.1	0.0	135	4.0	140	13.5	0.0	13.3	0.00	12	0.0	0.0	0.590
10:48.1	0.0	135	4.0	140	13.5	0.0	13.2	0.03	12	0.0	0.0	0.590



Production Weld Fixture

Date: 12-Nov-09 Time: 14:25

Serial Number: 10157.0  
 Version Information: UIF: 4.1 HAWDS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / (Print%) / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off	
10:54.0	0.0	135	4.0	140	13.5	0.0	13.4	0.0	12.0	0.0	0.590
10:57.0	0.0	135	4.0	140	13.5	0.0	13.1	0.0	12.0	0.0	0.590
11:00.0	0.0	135	4.0	140	13.5	0.0	12.9	0.0	12.0	0.0	0.590
11:03.0	0.0	135	4.0	140	13.5	0.0	13.1	0.0	12.0	0.0	0.590
11:06.0	0.0	135	4.0	140	13.5	0.0	12.8	0.0	12.0	0.0	0.590
11:09.0	0.0	135	4.0	139	13.5	0.0	13.1	0.0	11.9	0.0	0.590
11:12.0	0.0	135	4.0	140	13.5	0.0	13.1	0.0	12.0	0.0	0.590
11:15.0	0.0	135	4.0	139	13.5	0.0	13.2	0.0	12.0	0.0	0.590
11:18.0	0.0	135	4.0	140	13.5	0.0	13.6	0.0	12.0	0.0	0.590
11:21.0	0.0	135	4.0	141	13.5	0.0	13.7	0.0	12.0	0.0	0.590
11:24.0	0.0	135	4.0	141	13.5	0.0	13.9	0.0	12.0	0.0	0.590
11:27.0	0.0	135	4.0	140	13.5	0.0	13.9	0.0	12.0	0.0	0.590
11:30.0	0.0	135	4.0	140	13.5	0.0	13.8	0.0	12.0	0.0	0.590
11:33.0	0.0	135	4.0	140	13.5	0.0	13.8	0.0	12.0	0.0	0.590
11:36.0	0.0	135	4.0	140	13.5	0.0	13.9	0.0	12.0	0.0	0.590
11:39.0	0.0	135	4.0	140	13.5	0.0	13.6	0.0	12.0	0.0	0.590
11:42.0	0.0	135	4.0	139	13.5	0.0	13.9	0.0	12.0	0.0	0.590
11:45.0	0.0	135	4.0	140	13.5	0.0	13.8	0.0	12.0	0.0	0.590
11:48.0	0.0	135	4.0	139	13.5	0.0	14.7	0.0	12.0	0.0	0.590
11:51.0	0.0	135	4.0	140	13.5	0.0	13.6	0.0	12.0	0.0	0.590
11:54.0	0.0	135	4.0	140	13.5	0.0	13.4	0.0	12.0	0.0	0.590
11:57.0	0.0	135	4.0	140	13.5	0.0	13.7	0.0	12.0	0.0	0.590
12:00.0	0.0	135	4.0	140	13.5	0.0	13.2	0.0	12.0	0.0	0.590
12:03.0	0.0	135	4.0	140	13.5	0.0	13.5	0.0	12.0	0.0	0.590
12:06.0	0.0	135	4.0	139	13.5	0.0	13.3	0.0	12.0	0.0	0.590
12:09.0	0.0	135	4.0	138	13.5	0.0	13.3	0.0	12.0	0.0	0.590
12:12.0	0.0	135	4.0	139	13.5	0.0	13.3	0.0	12.0	0.0	0.590
12:15.0	0.0	135	4.0	140	13.5	0.0	13.3	0.0	12.0	0.0	0.590
12:18.0	0.0	135	4.0	141	13.5	0.0	13.4	0.0	12.0	0.0	0.590
12:21.0	0.0	135	4.0	140	13.5	0.0	13.2	0.0	12.0	0.0	0.590
12:24.0	0.0	135	4.0	140	13.5	0.0	13.4	0.0	12.0	0.0	0.590
12:27.0	0.0	135	4.0	138	13.5	0.0	12.7	0.0	12.0	0.0	0.590
12:30.0	0.0	135	4.0	140	13.5	0.0	13.6	0.0	12.0	0.0	0.590
12:33.1	0.0	135	4.0	140	13.5	0.0	13.3	0.0	12.0	0.0	0.590
12:36.1	0.0	135	4.0	139	13.5	0.0	13.3	0.0	12.0	0.0	0.590
12:39.1	0.0	135	4.0	139	13.5	0.0	13.5	0.0	12.0	0.0	0.590
12:42.1	0.0	135	4.0	140	13.5	0.0	12.9	0.0	12.0	0.0	0.590
12:45.1	0.0	135	4.0	140	13.5	0.0	13.5	0.0	12.0	0.0	0.590
12:48.1	0.0	135	4.0	141	13.5	0.0	13.8	0.0	12.0	0.0	0.590
12:51.1	0.0	135	4.0	140	13.5	0.0	13.8	0.0	12.0	0.0	0.590
12:54.1	0.0	135	4.0	140	13.5	0.0	13.8	0.0	12.0	0.0	0.590
13:00.1	0.0	135	4.0	140	13.5	0.0	13.5	0.0	12.0	0.0	0.590
13:06.0	0.0	135	4.0	139	13.5	0.0	13.8	0.0	12.0	0.0	0.590

Serial Number: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim (%) / Actual)

Time	Position	Arc	Arc	Arc	Plasma	Shield	Wire	Travel	Rev	Stand
		Current	Voltage	Press	Argon	Gas	Feed	Rate	Car	off
13:09.0	0.0	135	4.0	140	13.5	0.0	13.7	0.0	0.0	0.0
13:12.0	0.0	135	4.0	140	13.5	0.0	13.7	0.0	0.0	0.0
13:15.0	0.0	135	4.0	140	13.5	0.0	13.5	0.0	0.0	0.0
13:18.1	0.0	135	4.0	139	13.5	0.0	13.2	0.0	0.0	0.0
13:21.1	0.0	135	4.0	140	13.5	0.0	13.6	0.0	0.0	0.0
13:24.1	0.0	135	4.0	139	13.5	0.0	13.4	0.0	0.0	0.0
13:27.1	0.0	135	4.0	140	13.5	0.0	13.5	0.0	0.0	0.0
13:30.1	0.0	135	4.0	140	13.5	0.0	13.5	0.0	0.0	0.0
13:33.1	0.0	135	4.0	140	13.5	0.0	13.5	0.0	0.0	0.0
13:36.1	0.0	135	4.0	140	13.5	0.0	13.3	0.0	0.0	0.0
13:39.1	0.0	135	4.0	140	13.5	0.0	13.3	0.0	0.0	0.0
13:42.1	0.0	135	4.0	141	13.5	0.0	13.3	0.0	0.0	0.0
13:45.1	0.0	135	4.0	141	13.5	0.0	13.1	0.0	0.0	0.0
13:48.1	0.0	135	4.0	140	13.5	0.0	13.1	0.0	0.0	0.0
13:51.1	0.0	135	4.0	139	13.5	0.0	12.7	0.0	0.0	0.0
13:54.1	0.0	135	4.0	140	13.5	0.0	12.6	0.0	0.0	0.0
13:57.1	0.0	135	4.0	140	13.5	0.0	12.6	0.0	0.0	0.0
14:00.0	0.0	135	4.0	138	13.5	0.0	13.3	0.0	0.0	0.0
14:03.0	0.0	135	4.0	140	13.5	0.0	13.3	0.0	0.0	0.0
14:06.0	0.0	135	4.0	140	13.5	0.0	13.4	0.0	0.0	0.0
14:09.0	0.0	135	4.0	139	13.5	0.0	13.7	0.0	0.0	0.0
14:12.0	0.0	135	4.0	139	13.5	0.0	13.8	0.0	0.0	0.0
14:15.0	0.0	135	4.0	140	13.5	0.0	13.6	0.0	0.0	0.0
14:18.0	0.0	135	4.0	140	13.5	0.0	14.2	0.0	0.0	0.0
14:21.0	0.0	135	4.0	140	13.5	0.0	13.8	0.0	0.0	0.0
14:24.0	0.0	135	4.0	140	13.5	0.0	14.1	0.0	0.0	0.0
14:27.0	0.0	135	4.0	140	13.5	0.0	14.2	0.0	0.0	0.0
14:30.0	0.0	135	4.0	140	13.5	0.0	13.7	0.0	0.0	0.0
14:33.0	0.0	135	4.0	138	13.5	0.0	13.8	0.0	0.0	0.0
14:36.0	0.0	135	4.0	141	13.5	0.0	13.6	0.0	0.0	0.0
14:39.0	0.0	135	4.0	139	13.5	0.0	13.5	0.0	0.0	0.0
14:42.1	0.0	135	4.0	140	13.5	0.0	13.5	0.0	0.0	0.0
14:45.1	0.0	135	4.0	140	13.5	0.0	13.2	0.0	0.0	0.0
14:48.1	0.0	135	4.0	139	13.5	0.0	13.2	0.0	0.0	0.0
14:51.1	0.0	135	4.0	140	13.5	0.0	13.6	0.0	0.0	0.0
14:57.0	0.0	135	4.0	140	13.5	0.0	13.4	0.0	0.0	0.0
15:00.0	0.0	135	4.0	139	13.5	0.0	13.6	0.0	0.0	0.0
15:03.0	0.0	135	4.0	140	13.5	0.0	13.4	0.0	0.0	0.0
15:06.0	0.0	135	4.0	140	13.5	0.0	13.2	0.0	0.0	0.0
15:09.1	0.0	135	4.0	140	13.5	0.0	13.4	0.0	0.0	0.0
15:09.5	0.0	135	4.0	140	13.5	0.0	13.4	0.0	0.0	0.0
15:15.0	0.0	12	4.0	14	17.5	0.0	26.5	0.0	0.0	0.0
15:15.3	0.0	=====								

Established Arc went Out. Time: 915.3 Sec, Pos.: 0.00 In. TERMINATE is activated,

Serial Number: 21  
 Version Information: UIF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(SCHEDULED / TRIM%) / ACTUAL

Time	Position	Arc	Current	Arc	Voltage	Plasma	Plasma	Shield	Wire	Feed	Rate	Travel	Rate	Rev	Stand
15:18.1	0.0	1	0	4.0	0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.592
15:21.1	0.0	1	0	4.0	0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.592
999:99.0	0.0	1	0	4.0	0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.592

TERMINATION SEQUENCE COMPLETED

Serial Number: UFF: 4.1 HAWGS: 4.0 Pendant: 1.0 Configuration: 4.1  
Weld ID: MTL-0039-09 ID F6457 WELD FUME CHARACTERIZATION TL-719115 3219 BASE 2319 WIRE  
Startup: ROBOTPASS2/ WELD FUME PASS 1 FLAT  
Main: ROBOTPASS2/ WELD FUME PASS 1 FLAT  
Termination: ROBOTPASS2/ WELD FUME PASS 1 FLAT  
E-Stop: STANDARD/ Standard ESTOP for all welds.

(Scheduled / Trim (%) / Actual)															Travel			
Time			Position		Current		Voltage		Plasma		Shield		Wire Feed		Rate		Rev	
																	Cur	
																	off	
0:03.1	0.0	145	0.0	150	15.5	0.0	0.5	0.0	0.00	0.00	101	0.0	0.0	0.0	0.0	0.0	0	0.590
0:09.0	0.0	145	0.0	146	15.5	0.0	15.4	0.1	0.00	0.00	100	15	0.0	14.1	0.0	0.0	0	-0.491
0:12.0	0.0	145	0.0	144	15.5	0.0	14.6	0.1	0.00	0.05	100	15	0.0	15.2	0.0	0.0	0	-0.496
0:15.0	0.0	145	0.0	145	15.5	0.0	14.7	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
0:18.0	0.0	145	0.0	144	15.5	0.0	13.8	0.0	0.00	0.01	100	15	0.0	14.9	0.0	0.0	0	-0.491
0:20.5	0.0	145	0.0	144	15.5	0.0	13.8	0.0	0.00	0.00	100	15	0.0	14.9	0.0	0.0	0	-0.491
0:21.0	0.0	160	0.0	161	15.5	0.0	15.6	0.0	0.00	0.00	100	15	0.0	15.1	0.0	0.0	0	-0.492
0:24.0	0.0	160	0.0	160	15.5	0.0	15.0	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.492
0:27.0	0.0	160	0.0	160	15.5	0.0	13.7	0.0	0.00	0.01	100	15	0.0	15.1	0.0	0.0	0	-0.492
0:30.0	0.0	160	0.0	160	15.5	0.0	16.9	0.0	0.00	0.01	100	15	0.0	15.1	0.0	0.0	0	-0.492
0:33.0	0.0	160	0.0	159	15.5	0.0	14.5	0.1	0.00	0.02	100	15	0.0	15.0	0.0	0.0	0	-0.494
0:36.0	0.0	160	0.0	159	15.5	0.0	16.0	0.1	0.00	0.05	100	15	0.0	15.1	0.0	0.0	0	-0.494
0:39.0	0.0	160	0.0	159	15.5	0.0	14.7	0.1	0.00	0.00	100	15	0.0	14.9	0.0	0.0	0	-0.493
0:42.0	0.0	160	0.0	159	15.5	0.0	16.3	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.492
0:45.0	0.0	160	0.0	159	15.5	0.0	15.8	0.1	0.00	0.05	100	15	0.0	15.0	0.0	0.0	0	-0.493
0:48.0	0.0	160	0.0	160	15.5	0.0	14.3	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.491
0:51.0	0.0	160	0.0	159	15.5	0.0	15.9	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.493
0:54.0	0.0	160	0.0	159	15.5	0.0	16.1	0.1	0.00	0.02	99	15	0.0	15.0	0.0	0.0	0	-0.493
0:57.0	0.0	160	0.0	160	15.5	0.0	14.6	0.1	0.00	0.00	100	15	0.0	14.9	0.0	0.0	0	-0.494
1:00.0	0.0	160	0.0	158	15.5	0.0	16.5	0.0	0.00	0.02	101	15	0.0	15.0	0.0	0.0	0	-0.492
1:03.0	0.0	160	0.0	160	15.5	0.0	16.8	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:06.0	0.0	160	0.0	160	15.5	0.0	16.5	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.494
1:09.0	0.0	160	0.0	159	15.5	0.0	16.3	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.489
1:12.0	0.0	160	0.0	160	15.5	0.0	16.5	0.0	0.00	0.03	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:15.0	0.0	160	0.0	159	15.5	0.0	16.1	0.1	0.00	0.05	100	15	0.0	15.0	0.0	0.0	0	-0.493
1:18.0	0.0	160	0.0	162	15.5	0.0	16.5	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:21.0	0.0	160	0.0	166	15.5	0.0	16.5	0.0	0.00	0.02	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:24.0	0.0	160	0.0	166	15.5	0.0	16.6	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.493
1:27.0	0.0	160	0.0	165	15.5	0.0	16.3	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.493
1:30.0	0.0	160	0.0	166	15.5	0.0	16.5	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.493
1:33.0	0.0	160	0.0	166	15.5	0.0	16.1	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:36.0	0.0	160	0.0	167	15.5	0.0	16.4	0.0	0.00	0.02	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:39.0	0.0	160	0.0	166	15.5	0.0	16.4	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:42.0	0.0	160	0.0	166	15.5	0.0	16.3	0.0	0.00	0.00	100	15	0.0	14.9	0.0	0.0	0	-0.492
1:45.0	0.0	160	0.0	165	15.5	0.0	16.4	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.496
1:48.0	0.0	160	0.0	165	15.5	0.0	16.4	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
1:51.0	0.0	160	0.0	167	15.5	0.0	16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
1:54.0	0.0	160	0.0	172	15.5	0.0	16.4	0.0	0.00	0.01	100	15	0.0	15.0	0.0	0.0	0	-0.492







Date: 21-Jan-10 Time: 10:07

Serial Number:

Version Information: UHF: 4.1 RWCMS: 4.0 Pendant: 1.2 Configuration: 4.1

(Scheduled / Trim (%) / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off						
4:12.0	0.0	12	179	15.5	7.0 16.7	0.1	0.00	0.00	15	0.0	14.9	0.0	0.0	0	-0.492	
4:15.0	0.0	12	179	15.5	7.0 16.8	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
4:18.0	0.0	12	180*	15.5	7.0 16.4	0.1	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
4:21.0	0.0	12	177	15.5	7.0 16.7	0.1	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.491
4:24.0	0.0	12	179	15.5	7.0 16.4	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
4:27.0	0.0	12	179	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.491
4:30.0	0.0	12	178	15.5	7.0 16.5	0.2	0.00	0.00	99	15	0.0	15.1	0.0	0.0	0	-0.492
4:33.0	0.0	12	178	15.5	7.0 16.4	0.1	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
4:36.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
4:39.0	0.0	12	176	15.5	7.0 16.5	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
4:42.0	0.0	12	178	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.494
4:45.0	0.0	12	178	15.5	7.0 16.7	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
4:48.0	0.0	12	180*	15.5	7.0 16.4	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.493
4:51.0	0.0	12	179	15.5	7.0 16.7	0.0	0.00	0.00	100	15	0.0	15.1	0.0	0.0	0	-0.493
4:54.0	0.0	12	178	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
4:57.0	0.0	12	179	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
5:00.0	0.0	12	179	15.5	7.0 16.8	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
5:03.0	0.0	12	176	15.5	7.0 16.7	0.1	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
5:06.0	0.0	12	177	15.5	7.0 16.6	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.491
5:09.0	0.0	12	178	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
5:12.0	0.0	12	179	15.5	7.0 16.4	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
5:15.0	0.0	12	179	15.5	7.0 16.7	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.491
5:18.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	99	15	0.0	15.1	0.0	0.0	0	-0.491
5:21.0	0.0	12	178	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
5:24.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.1	0.0	0.0	0	-0.491
5:27.0	0.0	12	178	15.5	7.0 16.6	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.491
5:30.0	0.0	12	180*	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
5:33.0	0.0	12	179	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
5:36.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	99	15	0.0	15.1	0.0	0.0	0	-0.493
5:39.0	0.0	12	179	15.5	7.0 16.7	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.491
5:42.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.491
5:45.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
5:48.0	0.0	12	178	15.5	7.0 16.6	0.1	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
5:51.0	0.0	12	179	15.5	7.0 16.6	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.491
5:54.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.491
5:57.0	0.0	12	179	15.5	7.0 16.6	0.0	0.00	0.00	100	15	0.0	15.1	0.0	0.0	0	-0.492
6:00.0	0.0	12	180*	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
6:03.0	0.0	12	180*	15.5	7.0 16.4	0.1	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.493
6:06.0	0.0	12	178	15.5	7.0 16.6	0.0	0.00	0.00	100	15	0.0	15.1	0.0	0.0	0	-0.493
6:09.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	99	15	0.0	15.0	0.0	0.0	0	-0.492
6:12.0	0.0	12	179	15.5	7.0 16.5	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.493
6:15.0	0.0	12	179	15.5	7.0 16.4	0.0	0.00	0.00	99	15	0.0	14.9	0.0	0.0	0	-0.492
6:18.0	0.0	12	178	15.5	7.0 16.4	0.0	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492
6:21.0	0.0	12	179	15.5	7.0 16.5	0.1	0.00	0.00	100	15	0.0	15.0	0.0	0.0	0	-0.492









Serial Number:

Version Information:

UHF: 4.1

HAWCS: 4.0

Pendant: 1.0

Configuration: 4.1

(Scheduled / Trim(%) / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev	Stand off
13:27.0	0.0	160	12 179	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.492
13:30.0	0.0	160	12 179	15.5	7.0 16.5	0.01	0.00	15.0	0.0	-0.492
13:33.0	0.0	160	12 178	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.492
13:36.0	0.0	160	12 179	15.5	7.0 16.5	0.01	0.00	15.0	0.0	-0.492
13:39.0	0.0	160	12 182*	15.5	7.0 16.7	0.01	0.00	15.1	0.0	-0.492
13:42.0	0.0	160	12 179	15.5	7.0 16.5	0.01	0.00	15.0	0.0	-0.492
13:45.0	0.0	160	12 178	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.491
13:48.0	0.0	160	12 179	15.5	7.0 16.5	0.00	0.00	15.1	0.0	-0.491
13:51.0	0.0	160	12 179	15.5	7.0 16.7	0.01	0.00	15.0	0.0	-0.492
13:54.0	0.0	160	12 180*	15.5	7.0 16.4	0.00	0.00	15.1	0.0	-0.493
13:57.0	0.0	160	12 179	15.5	7.0 16.7	0.01	0.00	15.0	0.0	-0.492
14:00.0	0.0	160	12 179	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.493
14:03.0	0.0	160	12 178	15.5	7.0 16.5	0.01	0.00	15.0	0.0	-0.493
14:06.0	0.0	160	12 178	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.492
14:09.0	0.0	160	12 181*	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.494
14:12.0	0.0	160	12 179	15.5	7.0 16.7	0.01	0.00	14.9	0.0	-0.493
14:15.0	0.0	160	12 179	15.5	7.0 16.6	0.00	0.00	14.9	0.0	-0.491
14:18.0	0.0	160	12 178	15.5	7.0 16.5	0.00	0.00	14.9	0.0	-0.495
14:21.0	0.0	160	12 179	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.492
14:24.0	0.0	160	12 180*	15.5	7.0 16.6	0.00	0.00	14.9	0.0	-0.493
14:27.1	0.0	160	12 179	15.5	7.0 16.4	0.00	0.00	15.0	0.0	-0.492
14:30.0	0.0	160	12 179	15.5	7.0 16.5	0.01	0.00	14.9	0.0	-0.492
14:33.1	0.0	160	12 178	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.486
14:36.1	0.0	160	12 179	15.5	7.0 16.6	0.00	0.00	15.0	0.0	-0.490
14:42.0	0.0	160	12 177	15.5	7.0 16.6	0.01	0.00	15.0	0.0	-0.492
14:45.0	0.0	160	12 179	15.5	7.0 16.6	0.00	0.00	15.0	0.0	-0.492
14:48.0	0.0	160	12 178	15.5	7.0 16.6	0.00	0.00	14.9	0.0	-0.492
14:51.0	0.0	160	12 179	15.5	7.0 16.7	0.01	0.00	15.0	0.0	-0.491
14:54.0	0.0	160	12 178	15.5	7.0 16.5	0.01	0.00	15.0	0.0	-0.492
14:57.0	0.0	160	12 179	15.5	7.0 16.6	0.00	0.00	15.0	0.0	-0.492
15:00.0	0.0	160	12 178	15.5	7.0 16.7	0.01	0.00	15.0	0.0	-0.492
15:03.0	0.0	160	12 179	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.492
15:06.0	0.0	160	12 179	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.492
15:09.0	0.0	160	12 179	15.5	7.0 16.8	0.00	0.00	14.9	0.0	-0.492
15:12.0	0.0	160	12 178	15.5	7.0 16.8	0.00	0.00	15.1	0.0	-0.490
15:15.0	0.0	160	12 179	15.5	7.0 16.3	0.00	0.00	15.1	0.0	-0.491
15:18.0	0.0	160	12 179	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.492
15:21.0	0.0	160	12 179	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.492
15:24.1	0.0	160	12 179	15.5	7.0 16.7	0.00	0.00	15.0	0.0	-0.491
15:27.1	0.0	160	12 179	15.5	7.0 16.5	0.00	0.00	15.0	0.0	-0.492
15:30.1	0.0	160	12 182*	15.5	7.0 16.6	0.00	0.00	15.0	0.0	-0.491
15:33.0	0.0	160	12 179	15.5	7.0 16.6	0.00	0.00	15.0	0.0	-0.492
15:36.0	0.0	160	12 179	15.5	7.0 16.6	0.01	0.00	15.0	0.0	-0.490

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Serial Number:

Version Information: UHF: 4.1 HAWCS: 4.0 Pendant: 1.0 Configuration: 4.1

(Scheduled / Trim(%) / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off	
7	15:39.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.03	15 0.0 15.0	0.0 0.0	0	-0.491	
8	15:42.0	0.0	12 179	15.5 7.0 16.7	0.0	0.00	0.01	15 0.0 15.0	0.0 0.0	0	-0.492	
9	15:45.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.02	15 0.0 15.0	0.0 0.0	0	-0.491	
10	15:48.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.492	
11	15:51.0	0.0	12 179	15.5 7.0 16.6	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.492	
12	15:54.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.493	
13	15:57.0	0.0	12 178	15.5 7.0 16.5	0.0	0.00	0.02	15 0.0 15.0	0.0 0.0	0	-0.492	
14	16:00.0	0.0	12 179	15.5 7.0 16.7	0.0	0.00	0.01	15 0.0 15.0	0.0 0.0	0	-0.492	
15	16:03.1	0.0	12 179	15.5 7.0 16.5	0.1	0.00	0.01	15 0.0 15.0	0.0 0.0	0	-0.488	
16	16:06.0	0.0	12 178	15.5 7.0 17.0	0.0	0.00	0.03	15 0.0 14.9	0.0 0.0	0	-0.493	
17	16:12.0	0.0	12 179	15.5 7.0 17.3	0.0	0.00	0.01	15 0.0 14.9	0.0 0.0	0	-0.491	
18	16:15.0	0.0	12 179	15.5 7.0 16.6	0.0	0.00	0.01	15 0.0 14.9	0.0 0.0	0	-0.492	
19	16:18.0	0.0	12 179	15.5 7.0 17.4	0.0	0.00	0.04	15 0.0 15.0	0.0 0.0	0	-0.494	
20	16:21.0	0.0	12 177	15.5 7.0 16.6	0.0	0.00	0.00	15 0.0 14.9	0.0 0.0	0	-0.493	
21	16:24.0	0.0	12 179	15.5 7.0 16.4	0.0	0.00	0.01	15 0.0 14.9	0.0 0.0	0	-0.494	
22	16:27.0	0.0	12 179	15.5 7.0 15.3	0.1	0.00	0.00	15 0.0 14.9	0.0 0.0	0	-0.493	
23	16:30.1	0.0	12 178	15.5 7.0 15.6	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.490	
24	16:33.1	0.0	12 179	15.5 7.0 16.7	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.494	
25	16:36.1	0.0	12 178	15.5 7.0 17.0	0.1	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.492	
26	16:39.1	0.0	12 180*	15.5 7.0 16.4	0.1	0.00	0.02	15 0.0 15.1	0.0 0.0	0	-0.492	
27	16:42.0	0.0	12 179	15.5 7.0 15.9	0.0	0.00	0.01	15 0.0 15.0	0.0 0.0	0	-0.492	
28	16:45.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.00	15 0.0 15.1	0.0 0.0	0	-0.492	
29	16:48.0	0.0	12 179	15.5 7.0 16.6	0.0	0.00	0.02	15 0.0 15.0	0.0 0.0	0	-0.490	
30	16:54.0	0.0	12 178	15.5 7.0 16.7	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.492	
31	16:57.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.493	
32	17:00.0	0.0	12 179	15.5 7.0 16.5	0.0	0.00	0.01	15 0.0 15.0	0.0 0.0	0	-0.492	
33	17:03.0	0.0	12 178	15.5 7.0 16.7	0.0	0.00	0.00	15 0.0 15.0	0.0 0.0	0	-0.492	
34	17:06.0	0.0	12 179	15.5 7.0 16.9	0.0	0.00	0.01	15 0.0 15.1	0.0 0.0	0	-0.491	
35	17:09.0	0.0	12 178	15.5 7.0 16.3	0.0	0.00	0.01	15 0.0 15.0	0.0 0.0	0	-0.492	
36	17:12.1	0.0	12 179	15.5 7.0 16.7	0.1	0.00	0.05	15 0.0 15.0	0.0 0.0	0	-0.492	
37	17:15.0	0.0	12 180*	15.5 7.0 16.5	0.0	0.00	0.02	15 0.0 14.9	0.0 0.0	0	-0.493	
38	17:21.0	0.0	12 178	15.5 7.0 16.2	0.0	0.00	0.01	15 0.0 14.9	0.0 0.0	0	-0.493	
39	17:23.0	0.0	OPERATOR TERMINATION TO TERMINATE SEQUENCE									
40	17:24.0	0.0	12 178	15.6 7.0 16.8	0.0	0.00	0.00	14 0.0 15.0	0.0 0.0	0	-0.497	
41	17:27.0	0.0	12 27	17.5 7.0 19.9	0.1	0.00	0.02	0 0.0 3.7	0.0 0.0	0	-0.590	
42	17:29.6	0.0	Established Arc went Out. Time: 18:49.7 Sec. Gas: 0.00 in. TERMINATE is activated.									
43	17:30.0	0.0	12 0	17.5 7.0 46.3*	0.0	0.00	0.01	78 -15 0.0 5.6	0.0 0.0	1	-0.475	
44	17:33.0	0.0	12 0	17.5 7.0 0.0*	0.1	0.00	0.01	78 0 0.0 0.4	0.0 0.0	0	-0.590	
45	17:33.0	0.0	TERMINATION SEQUENCE COMPLETED									

OPERATOR TRANSITION TO TERMINATE SEQUENCE

Established Arc went Out. Time: 16:37.7 Sec. Desc: 0.00 in. VERMINATE is activated.

TERMINATION SEQUENCE COMPLETED





Serial Number:

UHF: 4.1

HAWCS: 4.0

Pendant: 1.0

Configuration: 4.1

Production Weld Fixture

(Scheduled / Trim(%) / Actual)

Time	Position	Current	Ave	Voltage	IPress	Plasma	Argon	Shield	Wire Feed	Travel	Rev	Stand
								Gas	Rate	Rate	Cur	off
1:57.1	0.0	160	174	16.5	0.0	16.6	0.00	99	15	0.0	0.0	0.494
2:00.0	0.0	160	176	16.5	0.0	16.2	0.00	99	15	0.0	0.0	0.491
2:03.0	0.0	160	177	16.5	0.0	16.6	0.00	99	15	0.0	0.0	0.491
2:06.0	0.0	160	176	16.5	0.0	16.5	0.00	100	15	0.0	0.0	0.492
2:09.0	0.0	160	176	16.5	0.0	16.5	0.01	99	15	0.0	0.0	0.493
2:12.0	0.0	160	178	16.5	0.0	16.6	0.00	99	15	0.0	0.0	0.493
2:15.0	0.0	160	176	16.5	0.0	16.6	0.00	100	15	0.0	0.0	0.493
2:18.0	0.0	160	176	16.5	0.0	16.5	0.01	99	15	0.0	0.0	0.492
2:21.0	0.0	160	176	16.5	0.0	16.7	0.00	100	15	0.0	0.0	0.492
2:24.0	0.0	160	176	16.5	0.0	16.6	0.00	100	15	0.0	0.0	0.492
2:27.0	0.0	160	175	16.5	0.0	16.6	0.02	99	15	0.0	0.0	0.492
2:30.0	0.0	160	175	16.5	0.0	16.3	0.01	100	15	0.0	0.0	0.492
2:33.0	0.0	160	176	16.5	0.0	16.5	0.00	99	15	0.0	0.0	0.493
2:36.0	0.0	160	175	16.5	0.0	16.6	0.00	100	15	0.0	0.0	0.492
2:39.0	0.0	160	176	16.5	0.0	16.4	0.01	100	15	0.0	0.0	0.492
2:42.0	0.0	160	176	16.5	0.0	16.5	0.00	100	15	0.0	0.0	0.493
2:45.0	0.0	160	175	16.5	0.0	16.6	0.01	99	15	0.0	0.0	0.487
2:48.0	0.0	160	176	16.5	0.0	16.4	0.00	100	15	0.0	0.0	0.492
2:51.0	0.0	160	174	16.5	0.0	16.3	0.00	99	15	0.0	0.0	0.492
2:54.0	0.0	160	176	16.5	0.0	16.8	0.03	99	15	0.0	0.0	0.491
2:57.0	0.0	160	176	16.5	0.0	16.3	0.00	100	15	0.0	0.0	0.492
3:00.0	0.0	160	176	16.5	0.0	16.4	0.00	100	15	0.0	0.0	0.493
3:03.0	0.0	160	173	16.5	0.0	16.5	0.00	100	15	0.0	0.0	0.492
3:06.0	0.0	160	175	16.5	0.0	16.5	0.01	100	15	0.0	0.0	0.492
3:09.0	0.0	160	175	16.5	0.0	16.3	0.00	99	15	0.0	0.0	0.492
3:12.0	0.0	160	175	16.5	0.0	16.5	0.02	100	15	0.0	0.0	0.492
3:15.0	0.0	160	177	16.5	0.0	16.3	0.01	99	15	0.0	0.0	0.492
3:18.0	0.0	160	176	16.5	0.0	16.4	0.00	99	15	0.0	0.0	0.492
3:21.0	0.0	160	175	16.5	0.0	16.3	0.01	100	15	0.0	0.0	0.492
3:24.0	0.0	160	175	16.5	0.0	16.3	0.00	99	15	0.0	0.0	0.491
3:27.0	0.0	160	175	16.5	0.0	16.5	0.00	99	15	0.0	0.0	0.492
3:30.0	0.0	160	175	16.5	0.0	16.5	0.02	100	15	0.0	0.0	0.493
3:33.0	0.0	160	172	16.5	0.0	16.8	0.02	100	15	0.0	0.0	0.493
3:36.0	0.0	160	176	16.5	0.0	16.4	0.00	99	15	0.0	0.0	0.492
3:39.0	0.0	160	169	16.5	0.0	16.5	0.04	99	15	0.0	0.0	0.492
3:42.0	0.0	160	169	16.5	0.0	16.5	0.00	99	15	0.0	0.0	0.492
3:45.0	0.0	160	167	16.5	0.0	16.6	0.04	100	15	0.0	0.0	0.492
3:48.0	0.0	160	170	16.5	0.0	16.6	0.01	100	15	0.0	0.0	0.492
3:51.0	0.0	160	170	16.5	0.0	16.7	0.01	100	15	0.0	0.0	0.491
3:54.1	0.0	160	169	16.5	0.0	16.4	0.00	99	15	0.0	0.0	0.492
3:57.1	0.0	160	169	16.5	0.0	16.5	0.01	100	15	0.0	0.0	0.492
4:00.1	0.0	160	169	16.5	0.0	16.4	0.02	99	15	0.0	0.0	0.492
4:03.1	0.0	160	168	16.5	0.0	16.3	0.00	99	15	0.0	0.0	0.491

(Scheduled / Trim(%) / Actual)											
Time	Position	App Current	App Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev	Stand off	
4:06.1	0.0	160	16.5	0.0	16.4	0.0	15.0	0.0	0	-0.492	
4:09.1	0.0	160	16.5	0.0	16.6	0.0	15.0	0.0	0	-0.492	
4:12.1	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.492	
4:15.1	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.492	
4:18.1	0.0	160	16.5	0.0	16.4	0.0	15.0	0.0	0	-0.493	
4:21.1	0.0	160	16.5	0.0	16.2	0.0	15.0	0.0	0	-0.492	
4:24.1	0.0	160	16.5	0.0	16.2	0.0	15.0	0.0	0	-0.492	
4:27.1	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.491	
4:30.1	0.0	160	16.5	0.0	16.2	0.0	15.0	0.0	0	-0.492	
4:33.1	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.491	
4:36.1	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.493	
4:39.1	0.0	160	16.5	0.0	16.2	0.0	15.0	0.0	0	-0.492	
4:42.1	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.492	
4:45.1	0.0	160	16.5	0.0	16.4	0.0	15.0	0.0	0	-0.494	
4:48.1	0.0	160	16.5	0.0	16.4	0.0	15.0	0.0	0	-0.492	
4:51.1	0.0	160	16.5	0.0	16.4	0.0	15.0	0.0	0	-0.492	
4:54.0	0.0	160	16.5	0.0	16.6	0.0	15.0	0.0	0	-0.492	
4:57.0	0.0	160	16.5	0.0	16.6	0.0	15.0	0.0	0	-0.492	
5:00.0	0.0	160	16.5	0.0	16.5	0.0	15.0	0.0	0	-0.492	
5:03.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.491	
5:06.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.492	
5:09.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.492	
5:12.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.494	
5:15.0	0.0	160	16.5	0.0	16.6	0.0	15.0	0.0	0	-0.492	
5:18.0	0.0	160	16.5	0.0	16.5	0.0	15.0	0.0	0	-0.493	
5:21.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.492	
5:24.0	0.0	160	16.5	0.0	16.6	0.0	15.0	0.0	0	-0.493	
5:27.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.493	
5:30.0	0.0	160	16.5	0.0	16.5	0.0	15.0	0.0	0	-0.492	
5:33.0	0.0	160	16.5	0.0	16.5	0.0	15.0	0.0	0	-0.492	
5:36.0	0.0	160	16.5	0.0	16.5	0.0	15.0	0.0	0	-0.493	
5:39.0	0.0	160	16.5	0.0	16.4	0.0	15.0	0.0	0	-0.492	
5:42.0	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.493	
5:45.0	0.0	160	16.5	0.0	16.7	0.0	15.0	0.0	0	-0.492	
5:48.0	0.0	160	16.5	0.0	16.3	0.0	15.0	0.0	0	-0.492	
5:51.0	0.0	160	16.5	0.0	16.2	0.0	15.0	0.0	0	-0.491	
5:54.0	0.0	160	16.5	0.0	16.1	0.0	15.0	0.0	0	-0.493	
5:57.0	0.0	160	16.5	0.0	16.5	0.0	15.0	0.0	0	-0.493	
6:00.0	0.0	160	16.5	0.0	16.1	0.0	15.0	0.0	0	-0.492	
6:03.0	0.0	160	16.5	0.0	15.9	0.0	15.0	0.0	0	-0.493	
6:06.0	0.0	160	16.5	0.0	16.0	0.0	15.0	0.0	0	-0.492	
6:09.0	0.0	160	16.5	0.0	16.0	0.0	15.0	0.0	0	-0.494	
6:12.0	0.0	160	16.5	0.0	16.0	0.0	15.0	0.0	0	-0.494	

(Scheduled / Trim(%) / Actual)												
Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Gas	Wire Feed Rate	Travel Rate	Rev Cur	Stand off		
6:15.0	0.0	159	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
6:18.0	0.0	158	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
6:21.0	0.0	160	16.5	0.1	0.00	0.02	15	0.0	0.0	0.492		
6:24.0	0.0	160	16.5	0.0	0.00	0.05	15	0.0	0.0	0.494		
6:27.0	0.0	160	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
6:30.0	0.0	159	16.5	0.0	0.00	0.00	15	0.0	0.0	0.491		
6:33.0	0.0	159	16.5	0.0	0.00	0.03	15	0.0	0.0	0.492		
6:36.0	0.0	160	16.5	0.0	0.00	0.02	15	0.0	0.0	0.492		
6:39.1	0.0	158	16.5	0.1	0.00	0.00	15	0.0	0.0	0.492		
6:42.1	0.0	159	16.5	0.1	0.00	0.01	15	0.0	0.0	0.493		
6:45.1	0.0	160	16.5	0.0	0.00	0.00	15	0.0	0.0	0.496		
6:48.1	0.0	158	16.5	0.1	0.00	0.04	15	0.0	0.0	0.492		
6:51.1	0.0	163	16.5	0.1	0.00	0.02	15	0.0	0.0	0.492		
6:57.0	0.0	160	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
7:00.0	0.0	162	16.5	0.1	0.00	0.01	15	0.0	0.0	0.493		
7:03.0	0.0	163	16.5	0.1	0.00	0.01	15	0.0	0.0	0.492		
7:06.0	0.0	164	16.5	0.1	0.00	0.00	15	0.0	0.0	0.492		
7:09.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.491		
7:12.0	0.0	163	16.5	0.0	0.00	0.01	15	0.0	0.0	0.494		
7:15.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
7:18.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
7:21.0	0.0	162	16.5	0.0	0.00	0.02	15	0.0	0.0	0.492		
7:24.0	0.0	163	16.5	0.0	0.00	0.02	15	0.0	0.0	0.492		
7:27.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
7:30.0	0.0	162	16.5	0.0	0.00	0.02	15	0.0	0.0	0.493		
7:33.0	0.0	163	16.5	0.0	0.00	0.01	15	0.0	0.0	0.493		
7:36.0	0.0	163	16.5	0.0	0.00	0.05	15	0.0	0.0	0.493		
7:39.0	0.0	163	16.5	0.1	0.00	0.01	15	0.0	0.0	0.493		
7:42.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.494		
7:45.0	0.0	162	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
7:48.0	0.0	163	16.5	0.0	0.00	0.01	15	0.0	0.0	0.492		
7:51.0	0.0	160	16.5	0.0	0.00	0.01	15	0.0	0.0	0.492		
7:54.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
7:57.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
8:00.0	0.0	164	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
8:03.0	0.0	162	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
8:06.0	0.0	162	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
8:09.0	0.0	160	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
8:12.0	0.0	162	16.5	0.0	0.00	0.00	15	0.0	0.0	0.492		
8:15.0	0.0	162	16.5	0.0	0.00	0.01	15	0.0	0.0	0.493		
8:18.0	0.0	166	16.5	0.0	0.00	0.01	15	0.0	0.0	0.492		
8:21.0	0.0	163	16.5	0.0	0.00	0.00	15	0.0	0.0	0.493		
8:24.0	0.0	163	16.5	0.0	0.00	0.02	15	0.0	0.0	0.492		



Serial Number:

Version Information:

UIF: 4.1

HAWCS: 4.0

SECRET

Configuration: 4.1

 (Scheduled / Trim (%) / Actual) |

Time	Position	Acc	Current	Volage	Plasma	Shield	Wire	Feed	Travel	Rev	Stand
					Press	Argon	Gas	Rate	Rate	Cur	off
8:27.0	0.0	162	2.0	16.5	0.0	14.3	0.1	0.00	0.02	100	0.0
8:30.0	0.0	160	2.0	16.5	0.0	12.9	0.1	0.00	0.01	100	0.0
8:33.0	0.0	160	2.0	16.5	0.0	13.4	0.1	0.00	0.02	100	0.0
8:36.0	0.0	160	2.0	16.5	0.0	13.2	0.0	0.00	0.00	99	0.0
8:39.0	0.0	160	2.0	16.5	0.0	14.7	0.1	0.00	0.00	99	0.0
8:42.0	0.0	160	2.0	16.5	0.0	13.9	0.1	0.00	0.01	99	0.0
8:45.0	0.0	160	2.0	16.5	0.0	13.8	0.0	0.00	0.00	99	0.0
8:48.0	0.0	160	2.0	16.5	0.0	15.1	0.1	0.00	0.01	99	0.0
8:51.0	0.0	160	2.0	16.5	0.0	16.4	0.1	0.00	0.00	100	0.0
8:54.0	0.0	160	2.0	16.5	0.0	17.0	0.0	0.00	0.01	100	0.0
8:57.0	0.0	160	2.0	16.5	0.0	17.1	0.0	0.00	0.03	99	0.0
9:00.0	0.0	160	2.0	16.5	0.0	17.4	0.0	0.00	0.00	99	0.0
9:03.0	0.0	160	2.0	16.5	0.0	17.5	0.0	0.00	0.01	100	0.0
9:06.1	0.0	160	2.0	16.5	0.0	18.1	0.0	0.00	0.01	100	0.0
9:09.1	0.0	160	2.0	16.5	0.0	18.3	0.0	0.00	0.00	100	0.0
9:12.0	0.0	160	2.0	16.5	0.0	16.6	0.1	0.00	0.04	100	0.0
9:15.0	0.0	160	2.0	16.5	0.0	20.4	0.0	0.00	0.01	99	0.0
9:18.0	0.0	160	2.0	16.5	0.0	20.4	0.1	0.00	0.00	100	0.0
9:21.0	0.0	160	2.0	16.5	0.0	19.7	0.1	0.00	0.01	100	0.0
9:24.0	0.0	160	2.0	16.5	0.0	19.2	0.0	0.00	0.00	100	0.0
9:27.0	0.0	160	2.0	16.5	0.0	16.1	0.1	0.00	0.00	99	0.0
9:30.0	0.0	160	2.0	16.5	0.0	15.6	0.0	0.00	0.00	99	0.0
9:33.0	0.0	160	2.0	16.5	0.0	16.6	0.1	0.00	0.04	100	0.0
9:36.1	0.0	160	2.0	16.5	0.0	15.1	0.2	0.00	0.01	99	0.0
9:39.0	0.0	160	2.0	16.5	0.0	12.7	0.1	0.00	0.00	99	0.0
9:42.0	0.0	160	2.0	16.5	0.0	18.2	0.0	0.00	0.00	99	0.0
9:45.0	0.0	160	2.0	16.5	0.0	12.6	0.1	0.00	0.02	99	0.0
9:48.1	0.0	160	2.0	16.5	0.0	13.1	0.1	0.00	0.01	99	0.0
9:51.1	0.0	160	2.0	16.5	0.0	13.6	0.1	0.00	0.00	100	0.0
9:54.0	0.0	160	2.0	16.5	0.0	14.9	0.0	0.00	0.01	99	0.0
9:57.0	0.0	160	2.0	16.5	0.0	16.4	0.0	0.00	0.00	99	0.0
10:00.0	0.0	160	2.0	16.5	0.0	16.7	0.0	0.00	0.00	99	0.0
10:03.1	0.0	160	2.0	16.5	0.0	17.0	0.1	0.00	0.04	100	0.0
10:05.7	0.0	AVC Head manually locked by pendant button.									
10:09.0	0.0	160	2.0	16.5	0.0	17.1	0.0	0.00	0.04	99	0.0
10:12.0	0.0	160	2.0	16.5	0.0	21.0	0.0	0.00	0.03	100	0.0
10:15.0	0.0	160	2.0	16.5	0.0	17.7	0.0	0.00	0.04	99	0.0
10:18.0	0.0	160	2.0	16.5	0.0	17.7	0.0	0.00	0.00	100	0.0
10:21.0	0.0	160	2.0	16.5	0.0	16.4	0.1	0.00	0.01	99	0.0
10:24.0	0.0	160	2.0	16.5	0.0	17.6	0.1	0.00	0.00	100	0.0
10:27.0	0.0	160	2.0	16.5	0.0	17.0	0.0	0.00	0.00	100	0.0
10:30.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:33.0	0.0	160	2.0	16.5	0.0	16.2	0.0	0.00	0.01	100	0.0
10:36.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:39.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:42.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:45.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:48.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:51.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:54.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
10:57.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:00.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:03.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:06.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:09.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:12.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:15.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:18.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:21.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:24.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:27.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:30.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0
11:33.0	0.0	160	2.0	16.5	0.0	16.3	0.0	0.00	0.00	99	0.0

(Scheduled / Trim(%) / Actual)														
Time	Position	Amperage	Current	Voltage	Pressure	Argon	Shield	Gas	Weld	Rate	Rate	Rev	Stand	off
10:26.1	0.0	160	2.0	16.5	0.0	14.8	0.01	99	15	0.0	0.0	0	0	-0.492
10:39.1	0.0	160	2.0	16.5	0.0	16.2	0.01	100	15	0.0	0.0	0	0	-0.493
10:42.0	0.0	160	2.0	16.5	0.0	15.5	0.00	100	15	0.0	0.0	0	0	-0.492
10:45.0	0.0	160	2.0	16.5	0.0	16.4	0.01	100	15	0.0	0.0	0	0	-0.493
10:48.0	0.0	160	2.0	16.5	0.0	16.4	0.01	99	15	0.0	0.0	0	0	-0.492
10:51.0	0.0	160	2.0	16.5	0.0	13.4	0.00	100	15	0.0	0.0	0	0	-0.492
10:54.0	0.0	160	2.0	16.5	0.0	17.2	0.01	99	15	0.0	0.0	0	0	-0.493
10:57.0	0.0	160	2.0	16.5	0.0	17.8	0.01	100	15	0.0	0.0	0	0	-0.491
11:00.1	0.0	160	2.0	16.5	0.0	17.2	0.01	99	15	0.0	0.0	0	0	-0.492
11:03.1	0.0	160	2.0	16.5	0.0	17.4	0.01	99	15	0.0	0.0	0	0	-0.489
11:06.0	0.0	160	2.0	16.5	0.0	19.2	0.01	99	15	0.0	0.0	0	0	-0.492
11:09.0	0.0	160	2.0	16.5	0.0	17.9	0.00	99	15	0.0	0.0	0	0	-0.492
11:12.1	0.0	160	2.0	16.5	0.0	20.4	0.01	100	15	0.0	0.0	0	0	-0.495
11:15.1	0.0	160	2.0	16.5	0.0	15.9	0.00	100	15	0.0	0.0	0	0	-0.493
11:18.0	0.0	160	2.0	16.5	0.0	14.1	0.01	99	15	0.0	0.0	0	0	-0.492
11:21.0	0.0	160	2.0	16.5	0.0	17.5	0.00	99	15	0.0	0.0	0	0	-0.494
11:24.0	0.0	160	2.0	16.5	0.0	16.5	0.00	99	15	0.0	0.0	0	0	-0.493
11:27.0	0.0	160	2.0	16.5	0.0	20.5	0.01	99	15	0.0	0.0	0	0	-0.492
11:30.0	0.0	160	2.0	16.5	0.0	18.0	0.01	100	15	0.0	0.0	0	0	-0.492
11:33.0	0.0	160	2.0	16.5	0.0	19.4	0.01	99	15	0.0	0.0	0	0	-0.492
11:36.1	0.0	160	2.0	16.5	0.0	18.7	0.00	100	15	0.0	0.0	0	0	-0.492
11:39.1	0.0	160	2.0	16.5	0.0	15.3	0.00	99	15	0.0	0.0	0	0	-0.492
11:42.1	0.0	160	2.0	16.5	0.0	19.1	0.01	100	15	0.0	0.0	0	0	-0.492
11:45.0	0.0	160	2.0	16.5	0.0	18.8	0.00	100	15	0.0	0.0	0	0	-0.493
11:48.0	0.0	160	2.0	16.5	0.0	18.3	0.01	99	15	0.0	0.0	0	0	-0.492
11:51.0	0.0	160	2.0	16.5	0.0	15.4	0.01	99	15	0.0	0.0	0	0	-0.492
11:54.0	0.0	160	2.0	16.5	0.0	14.2	0.00	100	15	0.0	0.0	0	0	-0.491
11:57.0	0.0	160	2.0	16.5	0.0	15.3	0.00	100	15	0.0	0.0	0	0	-0.492
12:00.0	0.0	160	2.0	16.5	0.0	18.2	0.00	100	15	0.0	0.0	0	0	-0.491
12:03.0	0.0	160	2.0	16.5	0.0	16.6	0.00	100	15	0.0	0.0	0	0	-0.494
12:06.0	0.0	160	2.0	16.5	0.0	15.5	0.01	100	15	0.0	0.0	0	0	-0.491
12:09.0	0.0	160	2.0	16.5	0.0	18.8	0.00	99	15	0.0	0.0	0	0	-0.493
12:12.0	0.0	160	2.0	16.5	0.0	19.8	0.00	100	15	0.0	0.0	0	0	-0.492
12:15.0	0.0	160	2.0	16.5	0.0	19.1	0.01	100	15	0.0	0.0	0	0	-0.492
12:18.0	0.0	160	2.0	16.5	0.0	19.0	0.00	100	15	0.0	0.0	0	0	-0.493
12:21.1	0.0	160	2.0	16.5	0.0	21.9	0.01	100	15	0.0	0.0	0	0	-0.492
12:24.1	0.0	160	2.0	16.5	0.0	17.3	0.00	99	15	0.0	0.0	0	0	-0.492
12:27.0	0.0	160	2.0	16.5	0.0	17.4	0.01	100	15	0.0	0.0	0	0	-0.494
12:30.0	0.0	160	2.0	16.5	0.0	16.4	0.00	100	15	0.0	0.0	0	0	-0.492
12:33.0	0.0	160	2.0	16.5	0.0	16.4	0.00	100	15	0.0	0.0	0	0	-0.488
12:36.0	0.0	160	2.0	16.5	0.0	14.5	0.01	100	15	0.0	0.0	0	0	-0.492
12:39.1	0.0	160	2.0	16.5	0.0	13.4	0.01	99	15	0.0	0.0	0	0	-0.492
12:42.0	0.0	160	2.0	16.5	0.0	17.3	0.00	100	15	0.0	0.0	0	0	-0.492
12:45.1	0.0	160	2.0	16.5	0.0	21.0	0.01	99	15	0.0	0.0	0	0	-0.492









(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Power	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off							
2:18	0.00	155	44	223*	26.0	5.0	27.3	4.7	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
2:21	0.00	155	44	223*	26.0	5.0	27.2	4.8	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
2:24	0.00	155	44	223*	26.0	5.0	27.1	4.7	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
2:27	0.00	155	44	223*	26.0	5.0	27.1	4.8	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
2:30	0.00	155	44	223*	26.0	5.0	27.4	4.7	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
2:33	0.00	155	44	222*	26.0	5.0	27.6	4.8	2.00	2.04	80	30	0.0	0.0	0.0	44	0.590
2:36	0.00	155	44	223*	26.0	5.0	27.4	4.8	2.00	2.02	80	30	0.0	0.0	0.0	43	0.590
2:39	0.00	155	44	223*	26.0	5.0	27.5	4.7	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
2:42	0.00	155	44	220*	26.0	5.0	27.0	4.7	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
2:45	0.00	155	44	226*	26.0	5.0	27.4	4.8	2.00	2.06	80	30	0.0	0.0	0.0	44	0.590
2:48	0.00	155	44	224*	26.0	5.0	27.3	4.8	2.00	2.02	79	30	0.0	0.0	0.0	43	0.590
2:51	0.00	155	44	224*	26.0	5.0	27.2	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
2:54	0.00	155	44	223*	26.0	5.0	27.1	4.8	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
2:57	0.00	155	44	223*	26.0	5.0	26.9	4.8	2.00	1.97	80	30	0.0	0.0	0.0	44	0.590
3:00	0.00	155	44	223*	26.0	5.0	27.2	4.7	2.00	2.02	80	30	0.0	0.0	0.0	44	0.590
3:03	0.00	155	44	223*	26.0	5.0	27.3	4.7	2.00	2.03	80	30	0.0	0.0	0.0	43	0.590
3:06	0.00	155	44	223*	26.0	5.0	27.3	4.7	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
3:09	0.00	155	44	223*	26.0	5.0	27.3	4.8	2.00	1.95	80	30	0.0	0.0	0.0	43	0.590
3:12	0.00	155	44	223*	26.0	5.0	27.2	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
3:15	0.00	155	44	223*	26.0	5.0	27.3	4.8	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
3:18	0.00	155	44	224*	26.0	5.0	27.2	4.7	2.00	1.99	79	30	0.0	0.0	0.0	43	0.590
3:21	0.00	155	44	224*	26.0	5.0	27.2	4.7	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
3:24	0.00	155	44	224*	26.0	5.0	27.2	4.8	2.00	1.99	81	30	0.0	0.0	0.0	44	0.590
3:27	0.00	155	44	224*	26.0	5.0	27.3	4.8	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
3:30	0.00	155	44	223*	26.0	5.0	27.3	4.7	2.00	2.01	80	30	0.0	0.0	0.0	43	0.590
3:33	0.00	155	44	224*	26.0	5.0	26.8	4.8	2.00	2.04	80	30	0.0	0.0	0.0	44	0.590
3:36	0.00	155	44	224*	26.0	5.0	26.5	4.7	2.00	1.96	80	30	0.0	0.0	0.0	43	0.590
3:39	0.00	155	44	223*	26.0	5.0	26.5	4.7	2.00	2.00	79	30	0.0	0.0	0.0	43	0.590
3:42	0.00	155	44	223*	26.0	5.0	27.1	4.8	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
3:45	0.00	155	44	224*	26.0	5.0	27.4	4.8	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
3:48	0.00	155	44	224*	26.0	5.0	27.3	4.8	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
3:51	0.00	155	44	223*	26.0	5.0	27.0	4.7	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
3:54	0.00	155	46	226*	26.0	4.0	27.1	4.9	2.00	2.01	80	30	0.0	0.0	0.0	44	0.590
3:57	0.00	155	46	225*	26.0	4.0	27.2	4.7	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
4:00	0.00	155	46	227*	26.0	4.0	27.1	4.8	2.00	1.94	79	30	0.0	0.0	0.0	43	0.590
4:03	0.00	155	46	226*	26.0	4.0	27.1	4.8	2.00	2.00	81	30	0.0	0.0	0.0	44	0.590
4:06	0.00	155	46	227*	26.0	4.0	27.1	4.7	2.00	1.99	80	30	0.0	0.0	0.0	43	0.590
4:09	0.00	155	46	226*	26.0	4.0	27.1	4.8	2.00	1.99	79	30	0.0	0.0	0.0	43	0.590
4:12	0.00	155	46	227*	26.0	4.0	27.0	4.8	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
4:15	0.00	155	46	226*	26.0	4.0	27.1	4.8	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
4:18	0.00	155	46	226*	26.0	4.0	27.1	4.8	2.00	1.98	80	30	0.0	0.0	0.0	44	0.590
4:21	0.00	155	46	227*	26.0	4.0	27.1	4.7	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
4:24	0.00	155	46	226*	26.0	4.0	26.9	4.8	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
4:27	0.00	155	46	227*	26.0	4.0	27.0	4.8	2.00	2.03	80	30	0.0	0.0	0.0	44	0.590
4:30	0.00	155	46	225*	26.0	4.0	27.0	4.8	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590
4:33	0.00	155	46	226*	26.0	4.0	27.3	4.8	2.00	1.99	80	30	0.0	0.0	0.0	44	0.590
4:36	0.00	155	46	226*	26.0	4.0	27.2	4.8	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
4:39	0.00	155	46	227*	26.0	4.0	27.2	4.8	2.00	1.98	80	30	0.0	0.0	0.0	43	0.590
4:42	0.00	155	46	227*	26.0	4.0	27.0	4.8	2.00	1.98	79	30	0.0	0.0	0.0	43	0.590
4:45	0.00	155	46	227*	26.0	4.0	27.2	4.7	2.00	2.01	79	30	0.0	0.0	0.0	43	0.590
4:48	0.00	155	46	226*	26.0	4.0	27.1	4.8	2.00	2.00	80	30	0.0	0.0	0.0	44	0.590
4:51	0.00	155	46	226*	26.0	4.0	26.9	4.8	2.00	2.03	80	30	0.0	0.0	0.0	43	0.590
4:54	0.00	155	46	227*	26.0	4.0	26.9	4.8	2.00	2.00	80	30	0.0	0.0	0.0	43	0.590
4:57	0.00	155	46	226*	26.0	4.0	27.1	4.8	2.00	1.99	79	30	0.0	0.0	0.0	44	0.590
5:00	0.00	155	46	227*	26.0	4.0	27.2	4.8	2.00	1.97	80	30	0.0	0.0	0.0	43	0.590

(Scheduled / % Tair / Actual)

Time	Position	Arc Current	Arc Voltage	IPlasma Press	Plasma Argon	IShield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
5:03	0.00	155	46 226*1 26.0	4.8	2.00	2.01	30 0.0	0.0	43	0.590
5:06	0.00	155	46 227*1 26.0	4.7	2.00	2.00	30 0.0	0.0	43	0.590
5:09	0.00	155	46 225*1 26.0	4.8	2.00	1.96	30 0.0	0.0	43	0.590
5:12	0.00	155	46 228*1 26.0	4.7	2.00	2.00	30 0.0	0.0	44	0.590
5:15	0.00	155	46 226*1 26.0	4.8	2.00	2.00	30 0.0	0.0	44	0.590
5:18	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	43	0.590
5:21	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	44	0.590
5:24	0.00	155	46 226*1 26.0	4.8	2.00	2.04	30 0.0	0.0	43	0.590
5:27	0.00	155	46 227*1 26.0	4.8	2.00	1.94	30 0.0	0.0	43	0.590
5:30	0.00	155	46 227*1 26.0	4.9	2.00	2.02	30 0.0	0.0	44	0.590
5:33	0.00	155	46 225*1 26.0	4.9	2.00	1.99	30 0.0	0.0	43	0.590
5:36	0.00	155	46 226*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590
5:39	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	43	0.590
5:42	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	44	0.590
5:45	0.00	155	46 227*1 26.0	4.7	2.00	2.01	30 0.0	0.0	43	0.590
5:48	0.00	155	46 226*1 26.0	4.8	2.00	1.96	30 0.0	0.0	43	0.590
5:51	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	44	0.590
5:54	0.00	155	46 226*1 26.0	4.7	2.00	1.98	30 0.0	0.0	43	0.590
5:57	0.00	155	46 226*1 26.0	4.8	2.00	2.00	30 0.0	0.0	43	0.590
6:00	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	44	0.590
6:03	0.00	155	46 227*1 26.0	4.8	2.00	1.96	30 0.0	0.0	43	0.590
6:06	0.00	155	46 226*1 26.0	4.8	2.00	2.00	30 0.0	0.0	43	0.590
6:09	0.00	155	46 226*1 26.0	4.8	2.00	2.00	30 0.0	0.0	44	0.590
6:12	0.00	155	46 228*1 26.0	4.7	2.00	1.97	30 0.0	0.0	44	0.590
6:15	0.00	155	46 226*1 26.0	4.8	2.00	1.99	30 0.0	0.0	43	0.590
6:18	0.00	155	46 226*1 26.0	4.9	2.00	2.01	30 0.0	0.0	43	0.590
6:21	0.00	155	44 224*1 26.0	4.7	2.00	2.01	30 0.0	0.0	44	0.590
6:24	0.00	155	40 218*1 26.0	4.8	2.00	1.98	30 0.0	0.0	43	0.590
6:27	0.00	155	38 214*1 26.0	4.7	2.00	2.03	30 0.0	0.0	43	0.590
6:30	0.00	155	36 214*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590
6:33	0.00	155	36 211*1 26.0	4.7	2.00	1.99	30 0.0	0.0	44	0.590
6:36	0.00	155	36 208*1 26.0	4.6	2.00	1.99	30 0.0	0.0	44	0.590
6:39	0.00	155	38 214*1 26.0	4.7	2.00	2.00	30 0.0	0.0	43	0.590
6:42	0.00	155	40 218*1 26.0	4.6	2.00	1.99	30 0.0	0.0	43	0.590
6:45	0.00	155	40 217*1 26.0	4.8	2.00	2.00	30 0.0	0.0	43	0.590
6:48	0.00	155	40 215*1 26.0	4.7	2.00	2.01	30 0.0	0.0	44	0.590
6:51	0.00	155	40 218*1 26.0	4.7	2.00	1.97	30 0.0	0.0	43	0.590
6:54	0.00	155	40 217*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590
6:57	0.00	155	40 217*1 26.0	4.7	2.00	2.00	30 0.0	0.0	44	0.590
7:00	0.00	155	40 218*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590
7:03	0.00	155	40 217*1 26.0	4.7	2.00	2.06	30 0.0	0.0	43	0.590
7:06	0.00	155	40 218*1 26.0	4.7	2.00	1.96	30 0.0	0.0	44	0.590
7:09	0.00	155	40 217*1 26.0	4.7	2.00	1.97	30 0.0	0.0	44	0.590
7:12	0.00	155	40 217*1 26.0	4.7	2.00	2.04	30 0.0	0.0	43	0.590
7:15	0.00	155	40 216*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590
7:18	0.00	155	40 217*1 26.0	4.7	2.00	1.98	30 0.0	0.0	43	0.590
7:21	0.00	155	40 217*1 26.0	4.7	2.00	1.91	30 0.0	0.0	44	0.590
7:24	0.00	155	40 217*1 26.0	4.7	2.00	1.96	30 0.0	0.0	44	0.590
7:27	0.00	155	40 217*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590
7:30	0.00	155	40 217*1 26.0	4.6	2.00	1.99	30 0.0	0.0	44	0.590
7:33	0.00	155	40 219*1 26.0	4.7	2.00	1.97	30 0.0	0.0	44	0.590
7:36	0.00	155	40 217*1 26.0	4.7	2.00	1.97	30 0.0	0.0	43	0.590
7:39	0.00	155	40 217*1 26.0	4.7	2.00	2.00	30 0.0	0.0	43	0.590
7:42	0.00	155	40 217*1 26.0	4.7	2.00	1.99	30 0.0	0.0	44	0.590
7:45	0.00	155	40 216*1 26.0	4.7	2.00	1.99	30 0.0	0.0	43	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Dress	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cps	Stand off
7:48	0.00	155	40 217* 26.0	4.7	2.00	1.95	30	0.0	0.0	0.590
7:51	0.00	155	40 217* 26.0	4.7	2.00	1.98	30	0.0	0.0	0.590
7:54	0.00	155	40 216* 26.0	4.8	2.00	2.00	30	0.0	0.0	0.590
7:57	0.00	155	40 217* 26.0	4.6	2.00	1.98	30	0.0	0.0	0.590
8:00	0.00	155	40 217* 26.0	4.8	2.00	1.99	30	0.0	0.0	0.590
8:03	0.00	155	40 215* 26.0	4.7	2.00	1.98	30	0.0	0.0	0.590
8:06	0.00	155	40 217* 26.0	4.7	2.00	1.98	30	0.0	0.0	0.590
8:09	0.00	155	40 218* 26.0	4.7	2.00	2.01	30	0.0	0.0	0.590
8:12	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
8:15	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
8:18	0.00	155	40 217* 26.0	4.7	2.00	1.96	30	0.0	0.0	0.590
8:21	0.00	155	40 217* 26.0	4.8	2.00	2.00	30	0.0	0.0	0.590
8:24	0.00	155	40 217* 26.0	4.7	2.00	2.00	30	0.0	0.0	0.590
8:27	0.00	155	40 217* 26.0	4.5	2.00	2.01	30	0.0	0.0	0.590
8:30	0.00	155	40 217* 26.0	4.7	2.00	1.98	30	0.0	0.0	0.590
8:33	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
8:36	0.00	155	40 218* 26.0	4.8	2.00	1.99	30	0.0	0.0	0.590
8:39	0.00	155	40 215* 26.0	4.7	2.00	2.00	30	0.0	0.0	0.590
8:42	0.00	155	40 217* 26.0	4.7	2.00	1.92	30	0.0	0.0	0.590
8:45	0.00	155	40 217* 26.0	4.7	2.00	1.96	30	0.0	0.0	0.590
8:48	0.00	155	40 217* 26.0	4.6	2.00	1.98	30	0.0	0.0	0.590
8:51	0.00	155	40 216* 26.0	4.8	2.00	1.93	30	0.0	0.0	0.590
8:54	0.00	155	40 217* 26.0	4.7	2.00	1.95	30	0.0	0.0	0.590
8:57	0.00	155	40 217* 26.0	4.7	2.00	2.00	30	0.0	0.0	0.590
9:00	0.00	155	40 217* 26.0	4.7	2.00	2.00	30	0.0	0.0	0.590
9:03	0.00	155	40 217* 26.0	4.7	2.00	1.98	30	0.0	0.0	0.590
9:06	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
9:09	0.00	155	40 217* 26.0	4.6	2.00	2.00	30	0.0	0.0	0.590
9:12	0.00	155	40 217* 26.0	4.7	2.00	2.01	30	0.0	0.0	0.590
9:15	0.00	155	40 217* 26.0	4.8	2.00	2.02	30	0.0	0.0	0.590
9:18	0.00	155	40 216* 26.0	4.7	2.00	1.92	30	0.0	0.0	0.590
9:21	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
9:24	0.00	155	40 216* 26.0	4.6	2.00	1.99	30	0.0	0.0	0.590
9:27	0.00	155	40 217* 26.0	4.8	2.00	1.99	30	0.0	0.0	0.590
9:30	0.00	155	40 216* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
9:33	0.00	155	40 215* 26.0	4.7	2.00	2.01	30	0.0	0.0	0.590
9:36	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
9:39	0.00	155	40 217* 26.0	4.8	2.00	1.93	30	0.0	0.0	0.590
9:42	0.00	155	40 217* 26.0	4.8	2.00	1.97	30	0.0	0.0	0.590
9:45	0.00	155	40 217* 26.0	4.8	2.00	2.03	30	0.0	0.0	0.590
9:48	0.00	155	40 217* 26.0	4.6	2.00	1.94	30	0.0	0.0	0.590
9:51	0.00	155	40 218* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
9:54	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
9:57	0.00	155	40 217* 26.0	4.7	2.00	1.97	30	0.0	0.0	0.590
10:00	0.00	155	40 218* 26.0	4.7	2.00	2.03	30	0.0	0.0	0.590
10:03	0.00	155	40 216* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
10:06	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
10:09	0.00	155	40 217* 26.0	4.8	2.00	1.96	30	0.0	0.0	0.590
10:12	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
10:15	0.00	155	40 216* 26.0	4.7	2.00	2.00	30	0.0	0.0	0.590
10:18	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
10:21	0.00	155	40 217* 26.0	4.7	2.00	1.99	30	0.0	0.0	0.590
10:24	0.00	155	40 218* 26.0	4.7	2.00	2.03	30	0.0	0.0	0.590
10:27	0.00	155	40 219* 26.0	4.7	2.00	1.97	30	0.0	0.0	0.590
10:30	0.00	155	40 217* 26.0	4.8	2.00	2.00	30	0.0	0.0	0.590



Date: 13-Jan-10 Time: 10:12

(Scheduled / % In / Actual)

	Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off						
1	10:33	0.00	155	40	217*	26.0	4.0	27.0	4.6	2.00	1.97	80	30	0.0	0.0	43	0.590
2	10:36	0.00	155	40	218*	26.0	4.0	27.0	4.7	2.00	2.00	80	30	0.0	0.0	44	0.590
3	10:39	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.98	80	30	0.0	0.0	44	0.590
4	10:42	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.11	80	30	0.0	0.0	43	0.590
5	10:45	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	2.02	80	30	0.0	0.0	43	0.590
6	10:48	0.00	155	40	216*	26.0	4.0	27.0	4.7	2.00	2.00	80	30	0.0	0.0	44	0.590
7	10:51	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.97	80	30	0.0	0.0	44	0.590
8	10:54	0.00	155	40	216*	26.0	4.0	27.0	4.7	2.00	1.99	80	30	0.0	0.0	43	0.590
9	10:57	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.96	80	30	0.0	0.0	44	0.590
10	11:00	0.00	155	40	217*	26.0	4.0	27.1	4.8	2.00	2.00	80	30	0.0	0.0	44	0.590
11	11:03	0.00	155	40	218*	26.0	4.0	27.0	4.7	2.00	1.99	80	30	0.0	0.0	43	0.590
12	11:06	0.00	155	40	216*	26.0	4.0	27.1	4.7	2.00	2.00	80	30	0.0	0.0	44	0.590
13	11:09	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.97	79	30	0.0	0.0	43	0.590
14	11:12	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.99	80	30	0.0	0.0	44	0.590
15	11:15	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	2.00	80	30	0.0	0.0	44	0.590
16	11:18	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	2.00	80	30	0.0	0.0	44	0.590
17	11:21	0.00	155	40	218*	26.0	4.0	27.1	4.7	2.00	2.02	80	30	0.0	0.0	44	0.590
18	11:24	0.00	155	40	219*	26.0	4.0	27.1	4.7	2.00	2.02	80	30	0.0	0.0	44	0.590
19	11:27	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.95	80	30	0.0	0.0	43	0.590
20	11:30	0.00	155	40	218*	26.0	4.0	27.2	4.6	2.00	1.98	80	30	0.0	0.0	44	0.590
21	11:33	0.00	155	40	216*	26.0	4.0	27.2	4.8	2.00	2.02	80	30	0.0	0.0	43	0.590
22	11:36	0.00	155	40	218*	26.0	4.0	27.1	4.7	2.00	2.00	80	30	0.0	0.0	43	0.590
23	11:39	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	2.01	80	30	0.0	0.0	44	0.590
24	11:42	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.97	80	30	0.0	0.0	43	0.590
25	11:45	0.00	155	40	216*	26.0	4.0	27.1	4.7	2.00	1.95	80	30	0.0	0.0	43	0.590
26	11:48	0.00	155	40	218*	26.0	4.0	27.1	4.7	2.00	1.94	80	30	0.0	0.0	44	0.590
27	11:51	0.00	155	40	218*	26.0	4.0	27.1	4.8	2.00	1.96	81	30	0.0	0.0	43	0.590
28	11:54	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.94	80	30	0.0	0.0	43	0.590
29	11:57	0.00	155	40	216*	26.0	4.0	27.1	4.9	2.00	2.00	80	30	0.0	0.0	43	0.590
30	12:00	0.00	155	40	216*	26.0	4.0	27.0	4.8	2.00	2.00	80	30	0.0	0.0	43	0.590
31	12:03	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	2.02	80	30	0.0	0.0	44	0.590
32	12:06	0.00	155	40	217*	26.0	4.0	27.2	4.7	2.00	1.99	80	30	0.0	0.0	44	0.590
33	12:09	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.94	79	30	0.0	0.0	44	0.590
34	12:12	0.00	155	40	217*	26.0	4.0	27.1	4.8	2.00	2.01	80	30	0.0	0.0	44	0.590
35	12:15	0.00	155	40	218*	26.0	4.0	27.3	4.7	2.00	2.01	80	30	0.0	0.0	43	0.590
36	12:18	0.00	155	40	218*	26.0	4.0	26.9	4.7	2.00	2.01	80	30	0.0	0.0	43	0.590
37	12:21	0.00	155	40	218*	26.0	4.0	27.1	4.7	2.00	1.98	80	30	0.0	0.0	43	0.590
38	12:24	0.00	155	40	217*	26.0	4.0	26.9	4.8	2.00	1.97	80	30	0.0	0.0	43	0.590
39	12:27	0.00	155	40	217*	26.0	4.0	27.3	4.7	2.00	1.99	79	30	0.0	0.0	43	0.590
40	12:30	0.00	155	40	215*	26.0	4.0	27.0	4.7	2.00	1.97	80	30	0.0	0.0	43	0.590
41	12:33	0.00	155	40	218*	26.0	4.0	27.0	4.7	2.00	1.98	80	30	0.0	0.0	43	0.590
42	12:36	0.00	155	40	218*	26.0	4.0	27.0	4.7	2.00	1.99	80	30	0.0	0.0	44	0.590
43	12:39	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	2.00	80	30	0.0	0.0	44	0.590
44	12:42	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	1.98	80	30	0.0	0.0	43	0.590
45	12:45	0.00	155	40	217*	26.0	4.0	27.1	4.8	2.00	1.97	80	30	0.0	0.0	43	0.590
46	12:48	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.01	80	30	0.0	0.0	43	0.590
47	12:51	0.00	155	40	218*	26.0	4.0	26.9	4.6	2.00	1.99	80	30	0.0	0.0	44	0.590
48	12:54	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	1.95	81	30	0.0	0.0	43	0.590
49	12:57	0.00	155	40	216*	26.0	4.0	27.0	4.8	2.00	1.99	80	30	0.0	0.0	43	0.590
50	13:00	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.01	80	30	0.0	0.0	44	0.590
51	13:03	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.98	80	30	0.0	0.0	43	0.590
52	13:06	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.99	80	30	0.0	0.0	43	0.590
53	13:09	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	2.01	80	30	0.0	0.0	43	0.590
54	13:12	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	2.01	80	30	0.0	0.0	44	0.590
55	13:15	0.00	155	40	217*	26.0	4.0	27.1	4.8	2.00	2.01	80	30	0.0	0.0	44	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev	Stand off						
13:18	0.00	155	40	217*	26.0	4.0	27.2	4.7	2.00	2.03	51	30	0.0	0.0	43	0.590
13:21	0.00	155	40	217*	26.0	4.0	27.1	4.6	2.00	1.98	50	30	0.0	0.0	43	0.590
13:24	0.00	155	40	217*	26.0	4.0	27.0	4.6	2.00	2.00	50	30	0.0	0.0	44	0.590
13:27	0.00	153	40	218*	26.0	4.0	27.0	4.7	2.00	1.99	50	30	0.0	0.0	43	0.590
13:30	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.97	50	30	0.0	0.0	44	0.590
13:33	0.00	155	40	216*	26.0	4.0	27.0	4.7	2.00	1.98	51	30	0.0	0.0	44	0.590
13:36	0.00	155	40	216*	26.0	4.0	26.9	4.7	2.00	1.97	51	30	0.0	0.0	43	0.590
13:39	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	1.98	51	30	0.0	0.0	43	0.590
13:42	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.00	50	30	0.0	0.0	44	0.590
13:45	0.00	155	40	217*	26.0	4.0	27.0	4.6	2.00	1.97	50	30	0.0	0.0	44	0.590
13:48	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.97	50	30	0.0	0.0	43	0.590
13:51	0.00	155	40	217*	26.0	4.0	27.1	4.9	2.00	1.99	50	30	0.0	0.0	44	0.590
13:54	0.00	155	40	217*	26.0	4.0	27.2	4.7	2.00	1.99	50	30	0.0	0.0	44	0.590
13:57	0.00	155	40	218*	26.0	4.0	27.2	4.7	2.00	2.00	51	30	0.0	0.0	43	0.590
14:00	0.00	155	40	218*	26.0	4.0	27.1	4.8	2.00	2.02	50	30	0.0	0.0	44	0.590
14:03	0.00	155	40	217*	26.0	4.0	27.3	4.8	2.00	2.03	50	30	0.0	0.0	44	0.590
14:06	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.98	50	30	0.0	0.0	44	0.590
14:09	0.00	155	40	216*	26.0	4.0	27.1	4.7	2.00	2.00	50	30	0.0	0.0	44	0.590
14:12	0.00	155	40	216*	26.0	4.0	27.2	4.7	2.00	2.04	50	30	0.0	0.0	43	0.590
14:15	0.00	155	40	218*	26.0	4.0	27.2	4.7	2.00	1.98	50	30	0.0	0.0	43	0.590
14:18	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.99	50	30	0.0	0.0	44	0.590
14:21	0.00	155	40	217*	26.0	4.0	27.1	4.8	2.00	2.00	50	30	0.0	0.0	43	0.590
14:24	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	2.04	50	30	0.0	0.0	43	0.590
14:27	0.00	155	40	215*	26.0	4.0	27.1	4.7	2.00	2.00	50	30	0.0	0.0	44	0.590
14:30	0.00	155	40	217*	26.0	4.0	26.8	4.8	2.00	1.97	51	30	0.0	0.0	44	0.590
14:33	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	2.01	79	30	0.0	0.0	43	0.590
14:36	0.00	155	40	218*	26.0	4.0	26.9	4.7	2.00	1.91	90	30	0.0	0.0	43	0.590
14:39	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	2.03	90	30	0.0	0.0	44	0.590
14:42	0.00	155	40	216*	26.0	4.0	26.9	4.7	2.00	1.97	50	30	0.0	0.0	43	0.590
14:45	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.00	50	30	0.0	0.0	43	0.590
14:48	0.00	155	40	217*	26.0	4.0	27.3	4.7	2.00	1.93	50	30	0.0	0.0	44	0.590
14:51	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	1.95	50	30	0.0	0.0	43	0.590
14:54	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	1.99	50	30	0.0	0.0	44	0.590
14:57	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	2.00	50	30	0.0	0.0	43	0.590
15:00	0.00	155	40	218*	26.0	4.0	27.0	4.7	2.00	2.01	51	30	0.0	0.0	44	0.590
15:03	0.00	155	40	216*	26.0	4.0	27.1	4.7	2.00	1.93	50	30	0.0	0.0	43	0.590
15:06	0.00	155	40	217*	26.0	4.0	27.2	4.7	2.00	1.94	50	30	0.0	0.0	43	0.590
15:09	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	2.00	50	30	0.0	0.0	43	0.590
15:12	0.00	155	40	215*	26.0	4.0	27.2	4.7	2.00	1.99	50	30	0.0	0.0	44	0.590
15:15	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.98	50	30	0.0	0.0	43	0.590
15:18	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	2.01	50	30	0.0	0.0	44	0.590
15:21	0.00	155	40	216*	26.0	4.0	27.3	4.8	2.00	1.99	79	30	0.0	0.0	44	0.590
15:24	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.97	50	30	0.0	0.0	43	0.590
15:27	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	2.00	50	30	0.0	0.0	44	0.590
15:30	0.00	155	40	217*	26.0	4.0	27.1	4.7	2.00	2.01	50	30	0.0	0.0	44	0.590
15:33	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.00	50	30	0.0	0.0	44	0.590
15:36	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	1.97	50	30	0.0	0.0	43	0.590
15:39	0.00	155	40	217*	26.0	4.0	26.9	4.8	2.00	2.00	50	30	0.0	0.0	44	0.590
15:42	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.98	50	30	0.0	0.0	44	0.590
15:45	0.00	155	40	217*	26.0	4.0	26.9	4.7	2.00	2.00	50	30	0.0	0.0	43	0.590
15:48	0.00	155	40	217*	26.0	4.0	27.3	4.6	2.00	1.99	50	30	0.0	0.0	44	0.590
15:51	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	2.05	51	30	0.0	0.0	43	0.590
15:54	0.00	155	40	216*	26.0	4.0	27.5	4.7	2.00	1.97	50	30	0.0	0.0	44	0.590
15:57	0.00	155	40	217*	26.0	4.0	27.0	4.8	2.00	2.00	50	30	0.0	0.0	44	0.590
16:00	0.00	155	40	217*	26.0	4.0	27.0	4.7	2.00	1.98	50	30	0.0	0.0	43	0.590

(Scheduled / % Trim / Actual)

Time	Position	Arc Current	Arc Voltage	Plasma Press	Plasma Argon	Shield Flow	Wire Feed Rate	Travel Rate	Rev Cur	Stand off
16:03	0.00	155	40 218* 26.0	4.0 27.2	4.7 12.00	1.98	30 0.0	30 0.0	0.0	43 0.590
16:06	0.00	155	40 217* 26.0	4.0 26.9	4.7 12.00	1.99	30 0.0	30 0.0	0.0	44 0.590
16:09	0.00	155	40 217* 26.0	4.0 27.4	4.7 12.00	1.99	30 0.0	30 0.0	0.0	43 0.590
16:12	0.00	155	40 216* 26.0	4.0 27.0	4.7 12.00	1.97	30 0.0	30 0.0	0.0	43 0.590
16:13	0.00	--->> OPERATOR TRANSITION TO TERMINATE SEQUENCE								
16:15	0.00	121	40 176* 22.0	4.0 22.9	4.4 12.00	2.02	15 0.0	19 0.0	0.0	44 0.590
16:18	0.00	156	40 85 22.0	4.0 18.9	3.6 12.00	2.02	0 0.0	0 0.0	0.0	43 0.590
16:21	0.00	0	40 0 22.0	4.0 0.0	3.0 12.00	2.00	0 0.0	0 0.0	0.0	6 0.590
0.00	0.00	===>> TERMINATION SEQUENCE COMPLETED								
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## Appendix E

### Inductively Coupled Plasma (ICP) Lab Results



Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
(504) 469-0333

March 01, 2010

Bhaskar Kura  
University of New Orleans  
2000 Lakeshore Drive  
New Orleans, LA 70148

RE: Project 20105404  
Project ID: Air Filters

Dear Bhaskar Kura:

Enclosed are the analytical results for sample(s) received by the laboratory on February 17, 2010. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "William R. Shackelford".

Randy Shackelford  
william.shackelford@pacelabs.com



**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full, without  
the written consent of Pace Analytical Services, Inc.



## Laboratory Certifications

Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
(504) 469-0333

---

**Project:** 20105404

**Client:** University of New Orleans

**Project ID:** Air Filters

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U.S. Dept. of Agriculture Foreign Soil Import S-47270  
Pennsylvania Dept. of Env Protection (NELAC) 68-04202  
Texas Commission on Env. Quality (NELAC) T104704405-08-TX  
Kansas Department of Health and Environment (NELAC) E-10266  
Florida Department of Health (NELAC) E87595  
Louisiana Dept. of Health and Hospitals (NELAC) LA080013  
Louisiana Dept. of Environmental Quality (NELAC/LELAP) 02006

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3/1/2010 14:07:50



### REPORT OF LABORATORY ANALYSIS

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## Sample Cross Reference

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Project:** 20105404

**Client:** University of New Orleans

**Project ID:** Air Filters

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
#1	20763479	Other	17-Feb-10 00:00	17-Feb-10 16:20
#2	20763480	Other	17-Feb-10 00:00	17-Feb-10 16:20
#3	20763481	Other	17-Feb-10 00:00	17-Feb-10 16:20
#4	20763482	Other	17-Feb-10 00:00	17-Feb-10 16:20
#6	20763483	Other	17-Feb-10 00:00	17-Feb-10 16:20
#8	20763484	Other	17-Feb-10 00:00	17-Feb-10 16:20
#9	20763485	Other	17-Feb-10 00:00	17-Feb-10 16:20
#11	20763486	Other	17-Feb-10 00:00	17-Feb-10 16:20
#14	20763487	Other	17-Feb-10 00:00	17-Feb-10 16:20
#15	20763488	Other	17-Feb-10 00:00	17-Feb-10 16:20
#16	20763489	Other	17-Feb-10 00:00	17-Feb-10 16:20
#17	20763490	Other	17-Feb-10 00:00	17-Feb-10 16:20
#18	20763491	Other	17-Feb-10 00:00	17-Feb-10 16:20
#19	20763492	Other	17-Feb-10 00:00	17-Feb-10 16:20
#20	20763493	Other	17-Feb-10 00:00	17-Feb-10 16:20



## Project Narrative

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

---

**Project:** 20105404

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**Sample Receipt Condition:**

All samples were received in accordance with EPA protocol.

**Holding Times:**

All holding times were met.

**Blanks:**

All blank results were below reporting limits.

**Laboratory Control Samples:**

All LCS recoveries were within QC limits.





## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #1

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763479

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	11.5		Total ug	0.500	0.0288	25-Feb-10 16:09	KJR	
Lead	EPA 6010	134361	1	1.86		Total ug	0.250	0.0529	25-Feb-10 16:09	KJR	
Manganese	EPA 6010	134361	1	7.95		Total ug	0.750	0.116	25-Feb-10 16:09	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #2

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763480

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	11.2		Total ug	0.500	0.0288	25-Feb-10 16:13	KJR	
Lead	EPA 6010	134361	1	1.01		Total ug	0.250	0.0529	25-Feb-10 16:13	KJR	
Manganese	EPA 6010	134361	1	7.70		Total ug	0.750	0.116	25-Feb-10 16:13	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #3

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763481

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	12.0		Total ug	0.500	0.0288	25-Feb-10 16:18	KJR	
Lead	EPA 6010	134361	1	1.96		Total ug	0.250	0.0529	25-Feb-10 16:18	KJR	
Manganese	EPA 6010	134361	1	5.05		Total ug	0.750	0.116	25-Feb-10 16:18	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #4

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763482

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	9.66		Total ug	0.500	0.0288	25-Feb-10 16:22	KJR	
Lead	EPA 6010	134361	1	2.09		Total ug	0.250	0.0529	25-Feb-10 16:22	KJR	
Manganese	EPA 6010	134361	1	4.91		Total ug	0.750	0.116	25-Feb-10 16:22	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #6

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763483

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	17.0		Total ug	0.500	0.0288	25-Feb-10 16:27	KJR	
Lead	EPA 6010	134361	1	1.17		Total ug	0.250	0.0529	25-Feb-10 16:27	KJR	
Manganese	EPA 6010	134361	1	6.88		Total ug	0.750	0.116	25-Feb-10 16:27	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #8

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763484

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	17.3		Total ug	0.500	0.0288	25-Feb-10 16:31	KJR	
Lead	EPA 6010	134361	1	9.13		Total ug	0.250	0.0529	25-Feb-10 16:31	KJR	
Manganese	EPA 6010	134361	1	8.90		Total ug	0.750	0.116	25-Feb-10 16:31	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #9

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763485

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	15.3		Total ug	0.500	0.0288	25-Feb-10 16:36	KJR	
Lead	EPA 6010	134361	1	5.00		Total ug	0.250	0.0529	25-Feb-10 16:36	KJR	
Manganese	EPA 6010	134361	1	7.06		Total ug	0.750	0.116	25-Feb-10 16:36	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #11

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763486

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	9.19		Total ug	0.500	0.0288	25-Feb-10 16:40	KJR	
Lead	EPA 6010	134361	1	1.14		Total ug	0.250	0.0529	25-Feb-10 16:40	KJR	
Manganese	EPA 6010	134361	1	6.29		Total ug	0.750	0.116	25-Feb-10 16:40	KJR	

3 parameter(s) reported





## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #14

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763487

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	17.8		Total ug	0.500	0.0288	25-Feb-10 16:54	KJR	
Lead	EPA 6010	134361	1	5.86		Total ug	0.250	0.0529	25-Feb-10 16:54	KJR	
Manganese	EPA 6010	134361	1	19.2		Total ug	0.750	0.116	25-Feb-10 16:54	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #15

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763488

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	13.9		Total ug	0.500	0.0288	25-Feb-10 16:58	KJR	
Lead	EPA 6010	134361	1	7.00		Total ug	0.250	0.0529	25-Feb-10 16:58	KJR	
Manganese	EPA 6010	134361	1	10.7		Total ug	0.750	0.116	25-Feb-10 16:58	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #16

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763489

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	14.2		Total ug	0.500	0.0288	25-Feb-10 17:03	KJR	
Lead	EPA 6010	134361	1	1.36		Total ug	0.250	0.0529	25-Feb-10 17:03	KJR	
Manganese	EPA 6010	134361	1	6.13		Total ug	0.750	0.116	25-Feb-10 17:03	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #17

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763490

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	11.9		Total ug	0.500	0.0288	25-Feb-10 18:07	KJR	
Lead	EPA 6010	134361	1	19.9		Total ug	0.250	0.0529	25-Feb-10 18:07	KJR	
Manganese	EPA 6010	134361	1	8.03		Total ug	0.750	0.116	25-Feb-10 18:07	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd. Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #18

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763491

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	9.38		Total ug	0.500	0.0288	25-Feb-10 18:11	KJR	
Lead	EPA 6010	134361	1	1.26		Total ug	0.250	0.0529	25-Feb-10 18:11	KJR	
Manganese	EPA 6010	134361	1	6.54		Total ug	0.750	0.116	25-Feb-10 18:11	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #19

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763492

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	10.9		Total ug	0.500	0.0288	25-Feb-10 18:16	KJR	
Lead	EPA 6010	134361	1	1.62		Total ug	0.250	0.0529	25-Feb-10 18:16	KJR	
Manganese	EPA 6010	134361	1	5.78		Total ug	0.750	0.116	25-Feb-10 18:16	KJR	

3 parameter(s) reported



## Sample Results

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

**Client:** University of New Orleans

**Client ID:** #20

**Project:** 20105404

**Project ID:** Air Filters

**Site:** None

**Lab ID:** 20763493

**Matrix:** Other

**%Moisture:** n/a

**Description:** None

**Collected:** 17-Feb-10

**Received:** 17-Feb-10

Analyte	Method	Batch	DF	Result	Qu	Reporting		MDL	Analysis		Limit
						Units	Limit				
Chromium	EPA 6010	134361	1	12.8		Total ug	0.500	0.0288	25-Feb-10 18:20	KJR	
Lead	EPA 6010	134361	1	0.850		Total ug	0.250	0.0529	25-Feb-10 18:20	KJR	
Manganese	EPA 6010	134361	1	5.91		Total ug	0.750	0.116	25-Feb-10 18:20	KJR	

3 parameter(s) reported



## Inorganics Quality Control

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

Project: 20105404

Parameter	Batch	Blank	Units	LCS Spike	LCS Found	LCS %Rec	MS Spike	Sample Found	MS Found	MSD Found	MS %Rec	MSD %Rec	RPD	QC Limits		Max	Qu
														LCS	MS/MSD	RPD	
Chromium	134361	0.0442 J	Total ug	50.0	53.2	106											68-128
Lead	134361	< 0.250	Total ug	50.0	52.2	104											72-125
Manganese	134361	< 0.750	Total ug	50.0	52.1	104											77-120

\* denotes recovery outside of QC limits.

ND denotes Not Detected at or above the adjusted reporting limit or PQL.

MS/MSD RPD is calculated via SW-846 rules on the basis of spiked sample concentrations rather than spike recoveries.

3/1/2010 14:08:24





## Definitions/Qualifiers

Pace Analytical Services, Inc.  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
(504) 469-0333

---

**Project:** 20105404

---

Value	Description
J	This estimated value for the analyte is below the adjusted reporting limit but above the instrument reporting limit.
U	The analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.
B	This analyte was detected in the method blank.
E	The sample concentration is above the linear calibrated range of the analysis.
ND	The analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.
MDL	The adjusted method detection limit.
LCS(D)	Laboratory Control Sample (Duplicate).
MS(D)	Matrix Spike (Duplicate).
DUP	Sample Duplicate.
RPD	Relative Percent Difference.





CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2  
1266303

Section A  
Required Client Information:  
Company: *Samel*  
Address: *Samel*  
Email To: *Samel*  
Phone: *Samel*  
Requested Due Date/TAT: *Samel*

Section B  
Required Project Information:  
Report To: *Samel*  
Copy To: *Samel*  
Purchase Order No.: *Samel*  
Project Name: *Samel*  
Project Number: *Samel*

Section C  
Invoice Information:  
Attention: *Samel*  
Company Name: *Samel*  
Address: *Samel*  
Pace Quote Reference: *Samel*  
Pace Project Manager: *Samel*  
Pace Profile #: *Samel*

REGULATORY AGENCY  
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER  
☐ UST ☐ RCRA ☐ OTHER

Site Location  
STATE: *Samel*

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE Drinking Water DW Water WT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Tissue TS Other OT	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP) (see valid codes to left)	MATRIX CODE (see valid codes to left)	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H <sub>2</sub> SO <sub>4</sub> HNO <sub>3</sub> HCl NaOH Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> Methanol Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N)	Temp In °C	Received on (Y/N)	Custody (Y/N)	Sealed Cooler (Y/N)	Samples Intact (Y/N)	
			COMPOSITE START	COMPOSITE END/GRAB													
1	18																
2	19																
3	20																
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	

ADDITIONAL COMMENTS: *Samel*

RELINQUISHED BY / AFFILIATION: *Samel* DATE: *2-17-10* TIME: *1620*

ACCEPTED BY / AFFILIATION: *Samel* DATE: *2-17-10* TIME: *1620*

SAMPLER NAME AND SIGNATURE: *Samel*

PRINT Name of SAMPLER: *Samel*

SIGNATURE of SAMPLER: *Samel*

DATE Signed (MM/DD/YY): *2-17-10*

ORIGINAL

\*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.



1000 Riverbend Blvd., Suite F  
St. Rose, LA 70087

Sample Condition Up

20105404 20-UNO



Project #: 30

Courier: ☐ Pace Courier ☐ Hackbarth ☐ Fed X ☐ UPS ☐ DHL ☐ USPS ☒ Customer ☐ Other

Custody Seal on Cooler/Box Present: [see COC]

Custody Seals Intact: ☐ Yes ☒ No

Thermometer Used: ☐ Therm Fisher IR 1  
☐ Therm Fisher IR 2  
☐ Therm Fisher IR 3

Type of Ice: Wet Blue ☒ None

Samples on Ice: [see COC]

Cooler Temperature: [see COC]

Temp should be above freezing to 6°C

Date and Initials of person examining contents: IN 2/19/10

Temp must be measured from Temperature blank when present

Comments:

Temperature Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	1
Chain of Custody Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2 → COC completed in lab
Chain of Custody Complete:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3 no time/date of collection
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	5
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8
Filtered vol. Rec. for Diss. tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	9
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10
All containers received within manufacture's precautionary and/or expiration dates.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11
All containers needing preservation have been checked (except VOA, coliform, & O&G).	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12
All containers preservation checked found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13 If No, was preservative added? <input type="checkbox"/> Yes <input type="checkbox"/> No If added record lot no.: HNO3 _____ H2SO4 _____
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	14
Headspace in VOA Vials (>8mm):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	14
Trip Blank Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	16
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	17
Pace Trip Blank Lot # (If purchased):	<u>N/A</u>	18

Client Notification/ Resolution:

Person Contacted: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

## 11.0 Vita

The author Ms. Katie Carr was born in 1980, in Metairie, Louisiana. She completed an undergraduate degree in Chemical Engineering from Louisiana Tech University, Ruston Louisiana in May 2003. She graduated from the University of New Orleans in May 2010 obtaining a Masters degree in Environmental Engineering.