Highlighted Features – Company #1

- Tooling checklist listed before work instructions to preempt operators & machinist to setup in advance.
- Sections isolated distinctively and color coded.
- Standard product information & description header on each page of the document.
- Critical product characteristics highlighted & noted.
- Images work well as a visual aid in conjunction with listed work instructions.
- Easy to fill out inspection record. Record captures important criteria for product verification & validation.
- Instructions are concise.

Product A Inspection Record

	Specification	Measurement	Tol	Min	Max	Actual	Pass/Fail
1	Engraving legible	Pass/Fail					
2	Shape/appearance	Pass/Fail					
3	Free of voids & blowholes	Pass/Fail					
4	Free of debris inside and out	Pass/Fail					
5	Free of burrs	Pass/Fail					
6	Proper linear cure	Pass/Fail					
7	Proper container label	Pass/Fail					
8	Dimension 22	Tolerance	+/- 2	20	24		
9	(3) flatness +/- 1.5mm	Pass/Fail					
10	Dimension 81.3	Tolerance	+/- 2	79.3	83.3		
11	Part bagged #XXXXX	Pass/Fail					
12	Correct color #ZZZZZ	Pass/Fail					
13	Non-Texture area present at zone G2 (on print)	Pass/Fail					
14	Good plastic fill at cores	Pass/Fail					

Visual Work Instruction – Product A

Customer				**Part Name**	Console		
ID #		**Mold #**		**VWI Rev**		**Page**	1
Simple #				**Assembly #**			

Machine Area Procedures

Tools needed:

☐ Standard Group ☐ Router w/ ¼ bit 8mm exposed and 1" long 7/16 button

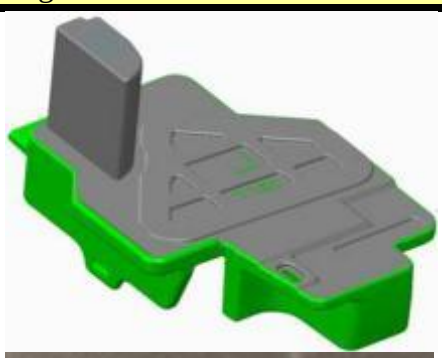
☐ Fixture #04113-1

Standard finish checklist:

- Correct I.D. clipboard on cleaned, correct, labeled container. Ensure old labels are removed.
- Trim entire parting line and inspect for defects, i.e. voids, blowholes, PL mismatch.
- Inspect part for cosmetic defects, i.e. D.I.R., warping, scratches, pitting, poor fill, F.M.
- Inspect part for signs of bad rotation or improper cure.
- Inform MO and/or leader if any defects are apparent.
- Flame entire part.
- Engrave per 7510-01 Engraving.

CRITICAL FINISHING ISSUES

- Areas in green are cosmetic.
- Core Pin openings must be trimmed and void free



Poor Trim Unacceptable

Poor Trim & Voids Unacceptable

Poor Trim & Voids Unacceptable

Visual Work Instruction – Product A

Customer				**Part Name**	Console		
ID #		**Mold #**		**VWI Rev**		**Page**	2
Simple #				**Assembly #**			

1. Place the part identification clipboard onto the container before packaging any product. Remove any old labels. Place labels onto the container before placing any product into it.
2. Trim, flame all cosmetic sides with a large torch, inspect, and engrave the part.

3. Place an air valve into the vent pipe hole to hold the part's shape.
4. The part must be flat to slight crown.
5. Allow the part to cool.
6. Route the protrusion with a ¼ bit 8mm exposed and a 1" long 7/16 button.

   Be sure to hold the router at an angle to prevent a miscut.

Visual Work Instruction – Product A

Customer				**Part Name**	Console		
ID #		**Mold #**		**VWI Rev**		**Page**	3
Simple #				**Assembly #**			

7. Clamp fixture #04113-1 onto the part, in order shown.

   Route the opening with a ¼ bit 8mm exposed and a 1" long 7/16 button.

8. Deburr, clean, flame, and inspect the part. Thoroughly remove any debris from the part.

PACKAGING INSTRUCTIONS

- **Place the part into a bag #XXXXX.**
- **Place (30) parts – (6) pieces per layer, (5) layers per contico, with cardboard divider #YYYYY between layers – into a contico and label for shipping. Pack as shown in picture.**

Product B Inspection Record

	Specification	Measurement	Tol	Min	Max	Actual	Pass/Fail
1	No evidence of bad rotation	Pass/Fail					
2	Proper cure (X-Link)	Pass/Fail					
3	Free of burrs, voids, and blowholes	Pass/Fail					
4	Parting line trim smooth- no over trim scrapes	Pass/Fail					
5	Appearance of cosmetic areas, shown in v.w.i. Very cosmetic in areas shown in green.	Pass/Fail					
6	Engraving legible	Pass/Fail					
7	(2) Molded Hole sizes. 8.0mm	Tolerance	+/.5	7.5	8.5		
8	C/L to C/L molded Holes.156.0mm	Tolerance	+/-1.0	155	157		
9	Rectangular section height. print (d4) 40.mm	Tolerance	+/-1.0	39	41		
10	Correct packaging-Each part in bag. #XXXXX	Pass/Fail					
11	Package label blue in color	Pass/Fail					
12	Vent pipe not through inside wall	Pass/Fail					
13	36mm hole in round end	Tolerance	+/- 0.8	35.2	36.8		
14	Correct part number marked with white marker	Pass/Fail					

Visual Work Instruction – Product B

Customer				**Part Name**	Duct		
ID #		**Mold #**		**VWI Rev**		**Page**	1
Simple #				**Assembly #**			

Machine Area Procedures

Tools needed:

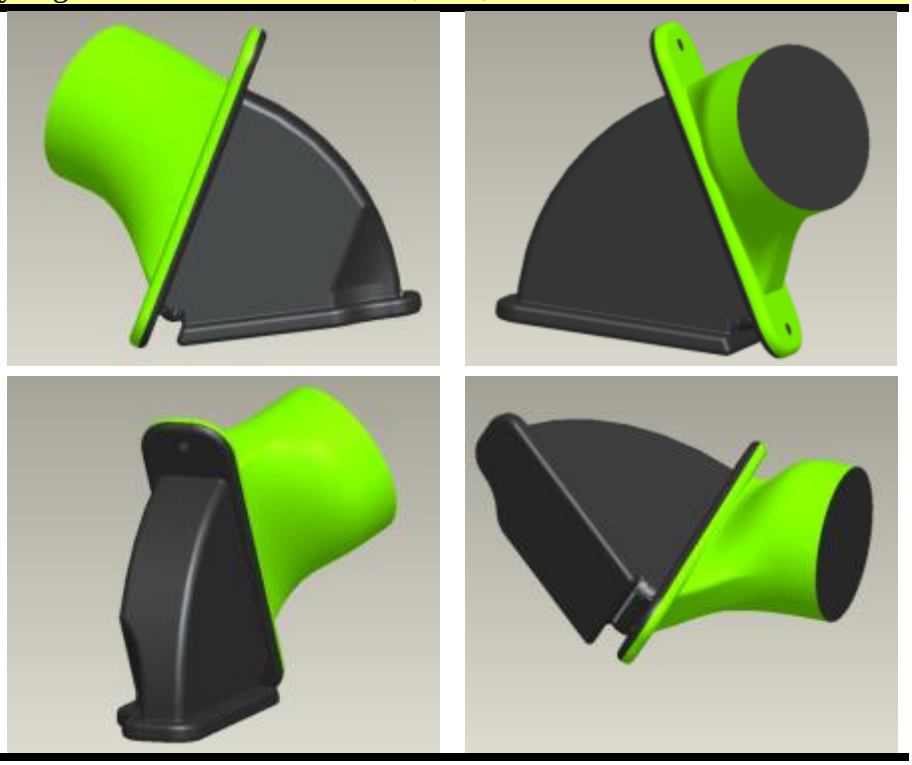
☐ Standard Group ☐ Drill w/ 1-7/16 Hole Saw ☐ Die Grinder w/ 3M pad
☐ Router w/ ¼ Straight bit set at 8.5mm and 7/16 button ☐ Holding Fixture #11058-1
☐ Drill Holding Fixture #11058-22

Standard finish checklist:

- Correct I.D. clipboard on cleaned, correct, labeled container. Ensure old labels are removed.
- Trim entire parting line and inspect for defects, i.e. voids, blowholes, PL mismatch.
- Inspect part for cosmetic defects, i.e. D.I.R., warping, scratches, pitting, poor fill, F.M.
- Inspect part for signs of bad rotation or improper cure.
- Inform MO and/or leader if any defects are apparent.
- Flame entire part and legibly engrave with finisher's initials, date, shot and machine.

CRITICAL FINISHING ISSUES

- Make sure Hole Saw is 1-7/16"
- Mark Customer #12345
- Cosmetic areas are shaded in Green. Parting line is very cosmetic, use care when trimming.



Visual Work Instruction – Product B							
Customer				**Part Name**	Duct		
ID #		**Mold #**		**VWI Rev**		**Page**	2
Simple #				**Assembly #**			

1. Before drilling, place part on Drill Holding Fixture #11058-22 to keep hole size correct.

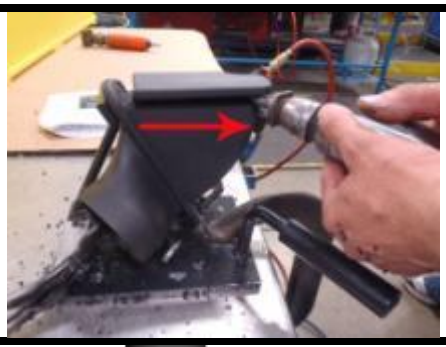
2. Use Drill w/ 1-7/16 Hole Saw to chase open vent pipe hole.

3. Clamp part into holding fixture #11058-1

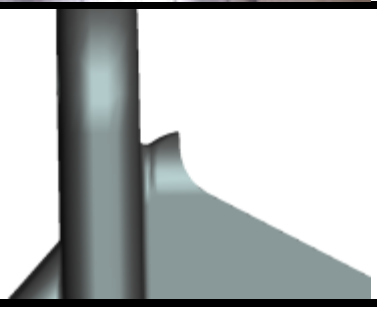
Visual Work Instruction – Product B

Customer				**Part Name**	Duct		
ID #		**Mold #**		**VWI Rev**		**Page**	3
Simple #				**Assembly #**			

4. Using a Router w/ ¼ Straight bit set at 8.5 mm and 7/16 long button, route along the trim stock on the other end. Route in direction shown and use flange as a guide on final cut as shown in second picture.



5. When finished correctly, a 2.5mm lip will be left as shown. OR if no lip is left, part is acceptable. The concern is that the lip is not too tall.



6. Deburr, clean, flame all cuts, and inspect part. Clean all debris off of and out of the part.

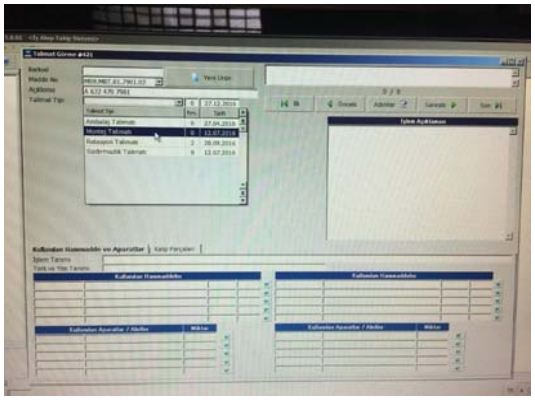
PACKAGING INSTRUCTIONS

- **Place part in #XXXXX Bag**
- **Place (36) parts, (4) layers of (9) parts with #YYYYY cardboard divider between layers in a #ZZZZZ box, tape closed and label for shipping.**

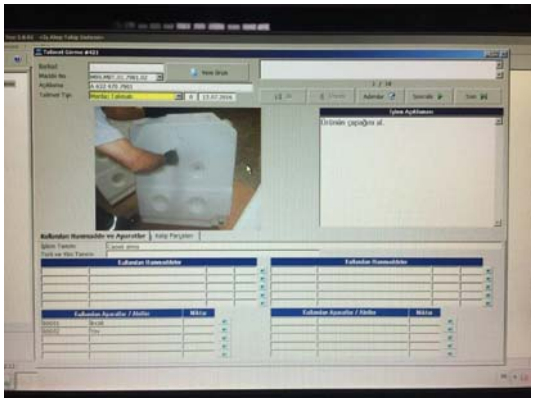
Highlighted Features – Company #2

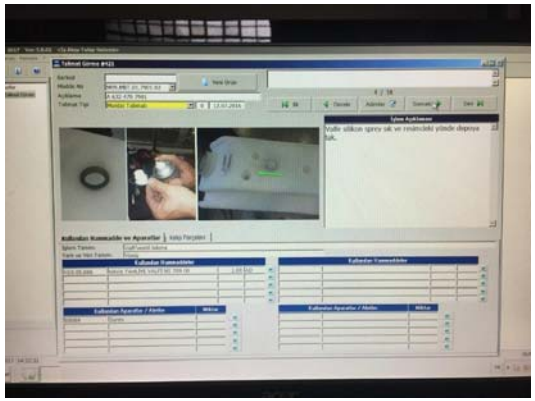
- Well-structured and organized part processing system.
- Parts are stationed by QC cell with individual barcodes to track each part throughout the process described.
- Work instructions embedded into ERP system to streamline product manufacturing.
- Images work well as a visual aid in conjunction with listed work instructions. Larger focus on visual instructions than written.
- Instructions are concise.

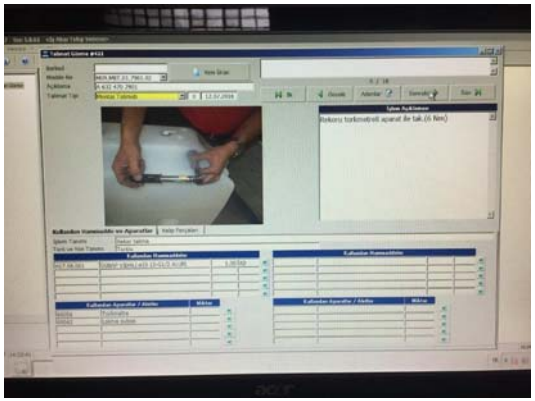
1.Read product barcode label by using laser scanner. Select assembly instruction on the computer screen of Arcflow ERP system.



2. Follow assembly stages of the product step by step.

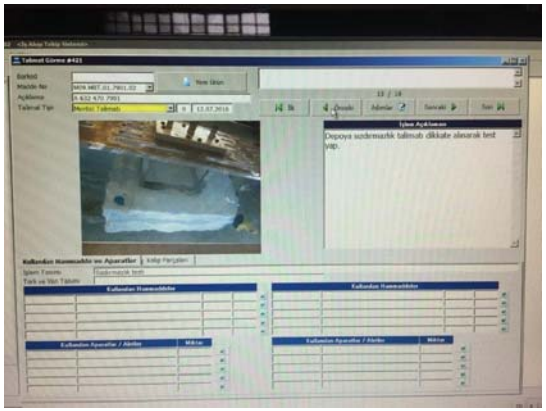


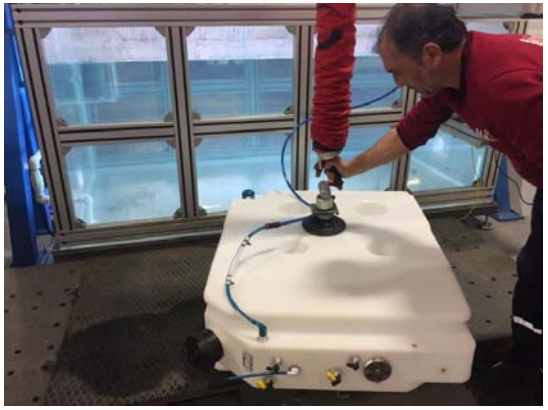




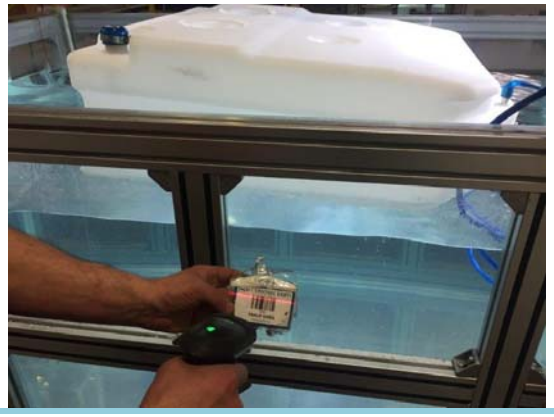
3. Cover all air outlets on the product.

Bring the product onto the pool using the vacuum lifter.





4. Scan the product barcode label again before diving it into the pool and then the barcode label of your personal identity card.

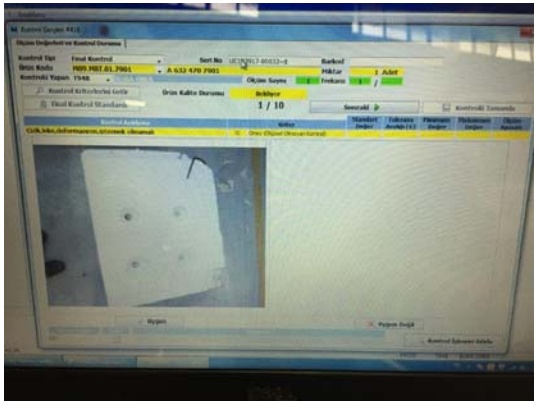


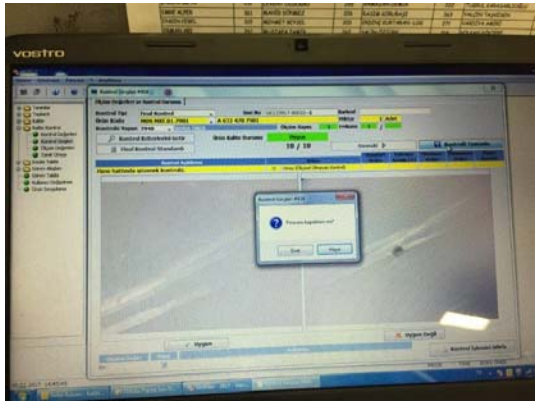
5. Push start button to pressurise the tank under water. If there is no bubble evolving within 18 seconds under 300mbar, push OK button and complete the test.

6. Barcode writer creates label automatically according to the test result. Stick leakproof label (OK) onto product.

7. Open final control window in Arcflow erp system. Scan the product barcode label by using laser scanner, if the product is leakfree.

8. Control steps appair on the screen. Follow control steps and press complete button.





Highlighted Features – Company #3

- Rotational molding parameters specified with molded hardware components listed.
- Tooling checklist listed before work instructions to preempt operators & machinist to setup in advance.
- Standard product image shown on mostly every page throughout the document.
- Standard product information & description header on each page of the document.
- Document name & revision level stated.
- Flow-chart to identify part processing steps throughout manufacturing cycle.
- Sections isolated distinctively.
- Images work well as a visual aid in conjunction with listed work instructions. Larger focus on visual instructions than written.
- Images captioned briefly.
- Instructions are concise.

solar PLASTICS

XXXXXX OP10

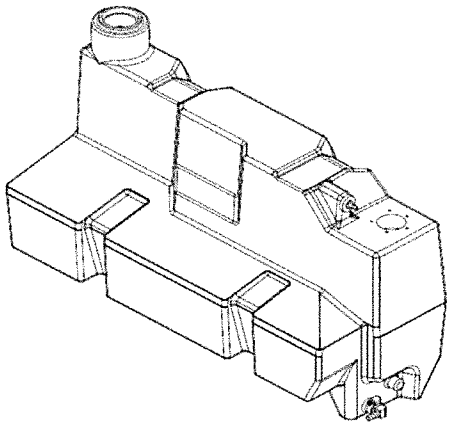
Description:	Assembly; Tank, Fuel	Rev.:	E	Doc. Version:	Release 11/23/16

Material

SS651444000	XLPE; Black, SL120	**6.75**lb

Inserts

SS707209000	Blind; #8-32, T-Nut	Qty: **5**

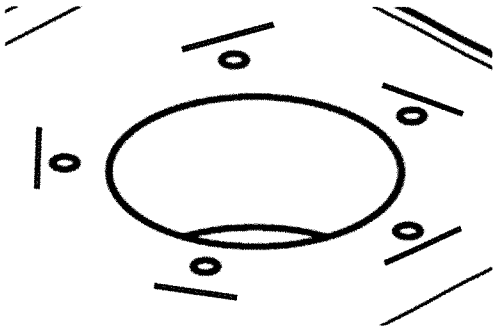


Processing

Machine	Time	Temp.	Speeds	Rev Time	Pre-Cool	Cooling
6	20	470	8/2	-	10 Delay + 10F	20F

Removal Temp: 130 ± 15°F

Orient T-Nuts to Avoid Drill Through



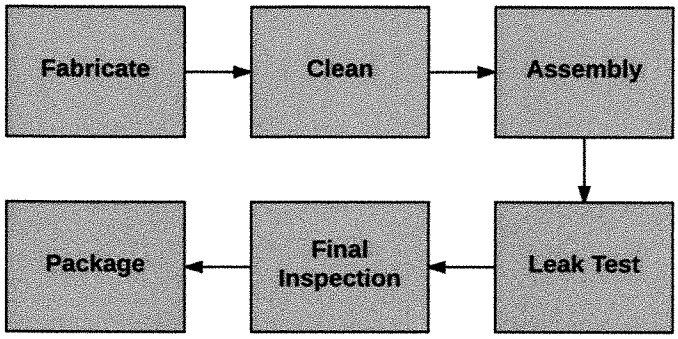
Long Edge Facing Toward Drill Point

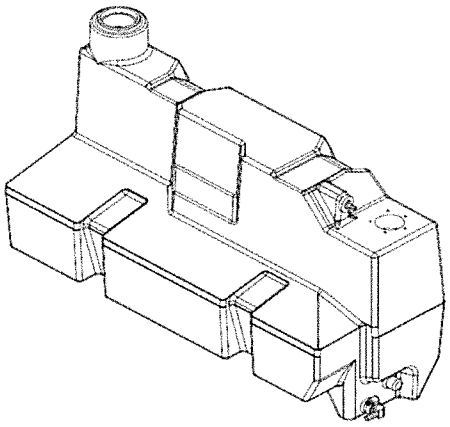
solar PLASTICS

XXXXXX OP30

Description:	Assembly; Tank, Fuel	Rev.:	E	Doc. Version:	Rev.A 11/29/16

Process Flow





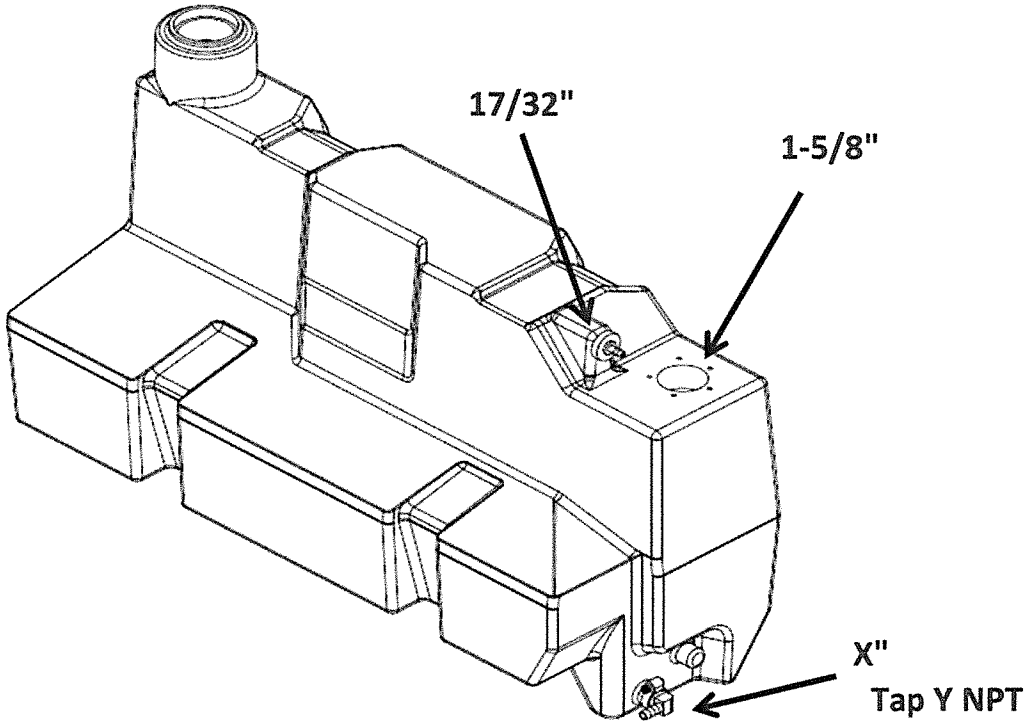
Fabricate

Required Equipment

1	-	Drill; Holesaw	**1-5/8"**	
2	-	Drill; Twist	**17/32"**	XXXXXX
3	-	Drill; Twist	**7/16"**	XXXXXX
4	-	Tap + Handle	**1/4 NPT**	
5		Thread Gauge	**1/4 NPT**	
6	-	Thread Sealant	**XXXXXX**	
7	-	Drill Guide	**#8-32, 5-Insert**	

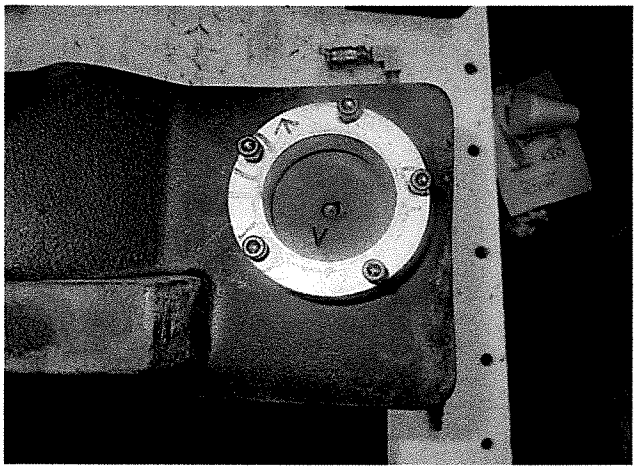
Description: Assembly; Tank, Fuel	Rev.: E	Doc. Version: Rev.A 11/29/16

Fabricate *Cont...*



Drilled / Tapped Hole Locations

1. Attach Drill Guide to **5-Insert Pattern** As Shown At Right
2. Drill Open Center to X
3. With Part Braced and On End, Drill X and **X** Holes



Drill Guide Orientation

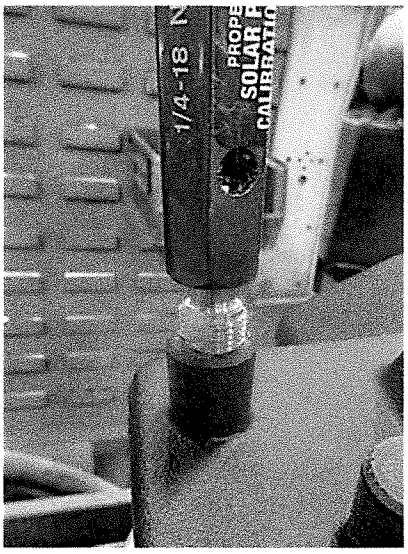
Description: Assembly; Tank, Fuel	Rev.: E	Doc. Version: Rev.A 11/29/16

Fabricate *Cont...*

4. Tap X" **Hole** to X **NPT**

5. Check Threads Using X Thread Gauge

- Threads **PASS** when Gauge is X to X



Thread Check with 40542 Thread Gauge

Cleaning

Tilt Part Upright to Flush Debris Out of X

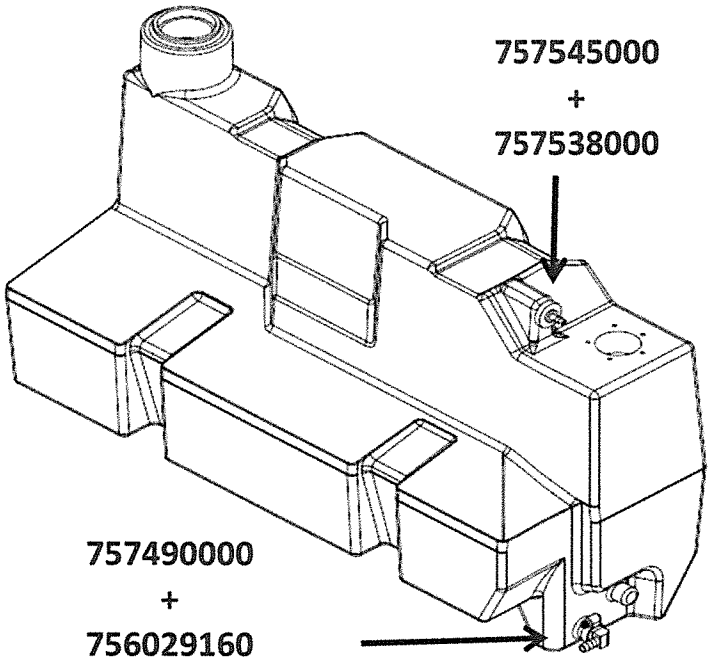
Vacuum Out Remaining Water, Place in Dryer

Description:	Assembly; Tank, Fuel	Rev.:	E	Doc. Version:	Rev.A 11/29/16

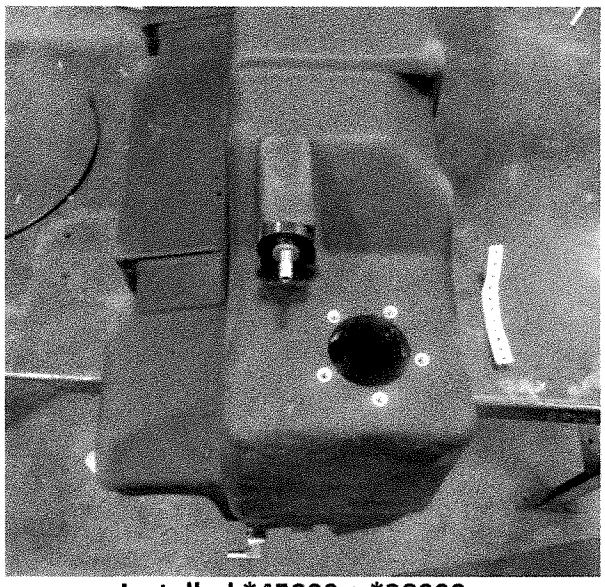
Assembly

SS#	Qty	Description
757545000	1	Grommet; Nitrile
757538000	1	Fitting; Straight Barb
757490000	1	Elbow; 1/4 NPT Thread
756029160	1	Clamp; Worm, M10-20

1. Wet ***45000** and ***38000** Before Pounding In with Rubber Mallet
2. Apply **Loctite** to ***490000** Elbow
3. **HAND TIGHTEN** ***490000** Elbow
   - **Required Orientation** As Shown Below
4. Tighten ***29160** Clamp



Component Locations



Installed *45000 + *38000

Required Orientation of *490000

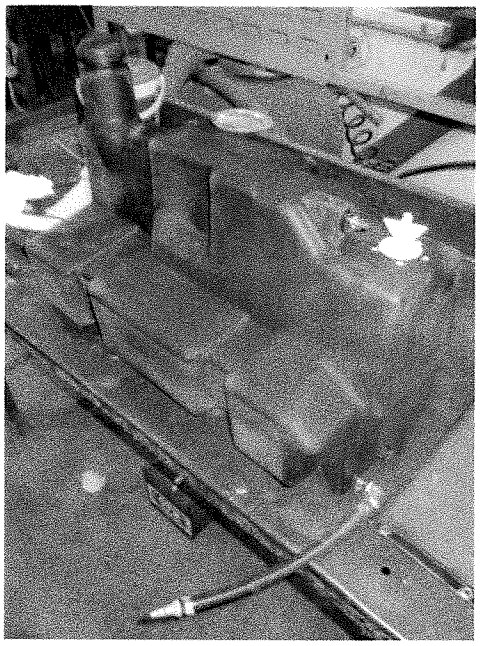
Description:	Assembly; Tank, Fuel	Rev.: E	Doc. Version: Rev.A 11/29/16

Leak Test

Required Equipment

1	-	Fuel Cap; Stant Thread
2	-	Expandable Plug; 1-5/8"
3	-	Hose + Air Coupler
4	-	Cap/Plug Size 1

Leak Test : **3.0psi** for **2.0min**



Leak Test Setup

Final Inspection

Part-Specific Requirements

1. Orientation of ***490000**

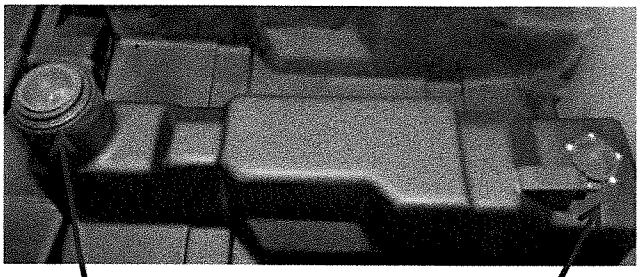
Packaging

SS#	Qty	Description
756167000	1	T-18 Cap Plug
757208000	1	T-18X Cap Plug

Plug Threaded Opening and 1-5/8 Hole

Configuration

16 per standard Shipping Box
See Next Page for Detailed Packing

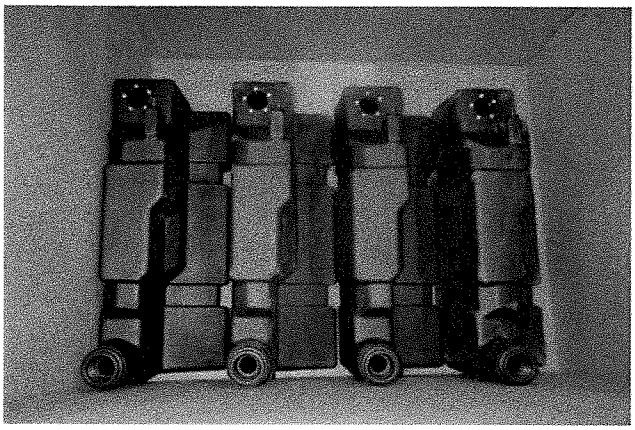


T-18X **T-18**

Description: Assembly; Tank, Fuel	Rev.: E	Doc. Version: Rev.A 11/29/16

Packaging *Cont...*

16pcs. Per Standard Box



First Layer (4pcs.)

Second Layer - 4pcs. Inverted (8 Total)

4pcs. Upright Along Side (12 Total)

Top Layer - 4pcs. (16 Total)

Highlighted Features – Company #4

- Coversheet details all prerequisite information & documents for product manufacturing.
- Hyperlinks to other pertinent documents for processing.
- Rotational molding parameters specified.
- Images work well as a visual aid in conjunction with listed work instructions. Larger focus on visual instructions than written. Multiple images to capture one instruction.
- Forewarning at footnote location of each page of the document. Helps alleviate obsolete instructions.
- Document name & revision level stated.
- Revision log to ascertain latest instructions are described.
- Instructions are concise.
- Effective use of cooling fixtures.

	MANUFACTURING WORK INSTRUCTIONS		Revision:
PELICAN	MWI03-06	14390-900 [redacted]	4
		ROTOCAST	Release Date: 09/16/14

Release and Revision Date History Log			
Rev.	**Description**	**Date**	**By**
4	Update the setting on the leak tester in 5.2.6	09/16/14	DL

List Doc Approval Status List Doc Release History

1.0 SAFETY

Any work conducted as described in this procedure is subject to Pelican safety policies and procedures. Full documentation for these policies and procedures can be found on the **Pelican Environmental Health & Safety website**.

1.1 ADDITIONAL MANDATORY PPE

The following table provides information on the additional mandatory PPE requirements for this procedure.

PPE	REQUIRED USAGE

2.0 APPLICABLE DOCUMENTS

Description	Description
Manufacturing Work Order	QS5 Quality Standard- Roto Molded Product
Applicable Prints	MSI10-07 Pressure Gage set up and use
Bill of Materials (BOM)	
Routing	

3.0 MATERIALS

Qty.	Description
1	Materials stated in this procedure and/or per Manufacturing Work Order and/or BOM

4.0 EQUIPMENT/TOOLS

Qty.	Description	Qty.	Description
2	# 7550879 cooling fixture	1set	#7550729 front and back cooling fixtures
1	Pressure gage leak test machine	1	#7551161 Bow tolerance check fixture
1set	"Hot Part" and "Cool Part" signs	1set	Fixture #7550115 set of air nozzles

5.0 PROCEDURES

- The [redacted] mold must be run on a straight arm. It will not cook properly on an offset arm due to the dynamics of the oven.
- The first run will be scrap, though the T-nuts will still have to be put into place to protect the hot shots.
- The first part molded will be cut in half immediately after molding to check the cure. Once the cycle is set, continue production as normal.

Below is a production report to be referenced as a starting point.

Rotation = **8/2** oven temp = **540**

HARDIGG™

ROTO-CAST PRODUCTION REPORT

Week Ending _____ Machine No. 11 Shift ____ Date 2013 Foreman _____

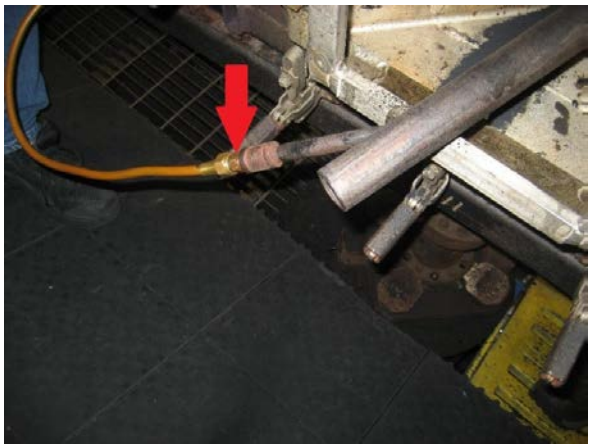
WORK ORDER NO.	PART DESCRIPTION	NO OF CAVS.	ARM NO.	PCS. MADE	CHARGE IN GRAMS	ROTATION RPM	OVEN TEMP	CYCLE TIME	COOLING CYCLE TIME					No. of Cycles	MATERIAL TYPE
									FIRST COOLER		SECOND COOLER				
									DELAY	AIR	AIR	WATER	AIR		
30-14390-900	[redacted]	1			3800gms	8/2	540	16	10	–	16	–	–		462 BLK

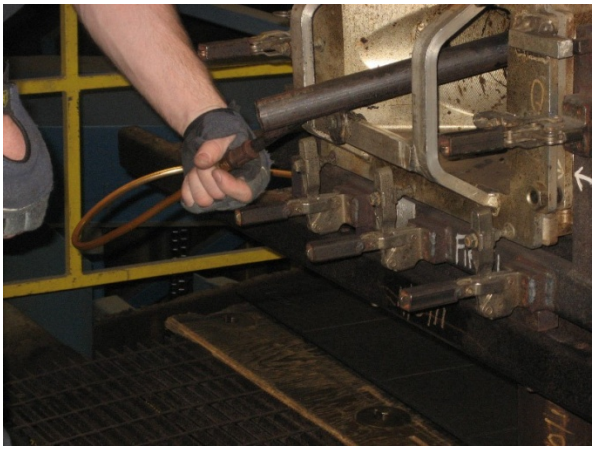
NOTES (VERY IMPORTANT)

ROTO CREW

QRFRM #52
Revised 4/5/99

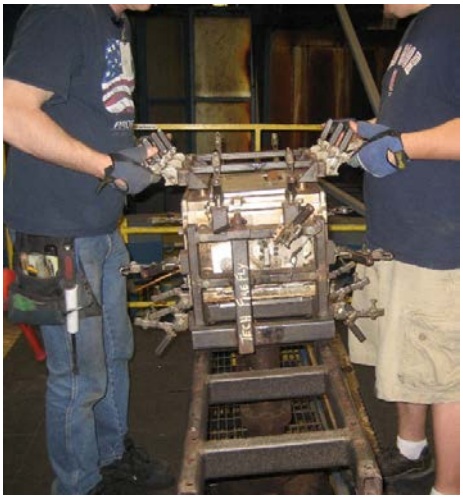
5.1 MOLDING



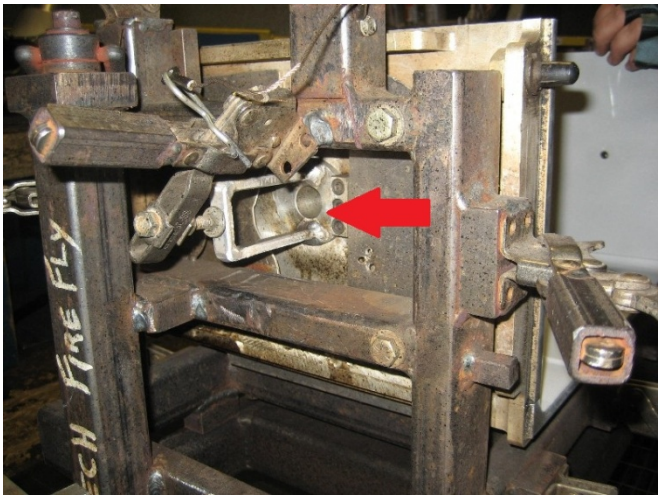


5.1.1 Disconnect the vortex from the mold.

5.1.2 Remove the front and rear covers and place them onto the cover table.



5.1.3 Remove the top section and place it onto the cover table.



5.1.4 Remove the plug from the side of the mold.

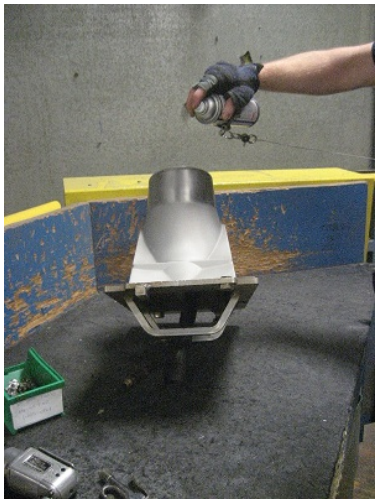
5.1.5 Remove the T handle from the side of the mold.

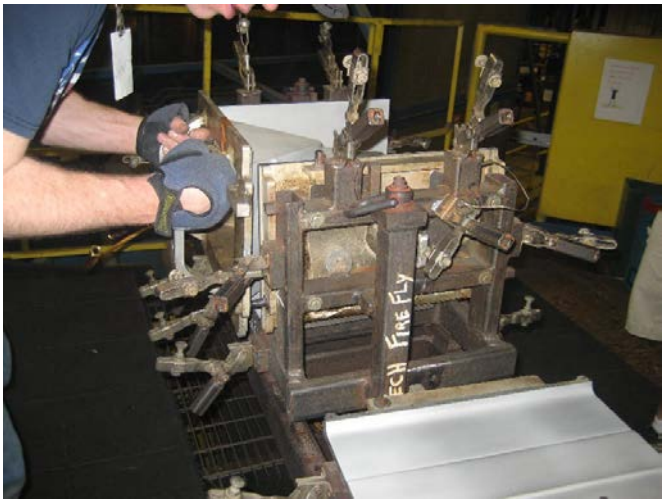
5.1.6 Remove the molding from the mold.

5.1.7 Spray the plug with Stoner and insert it back into the side of the mold.

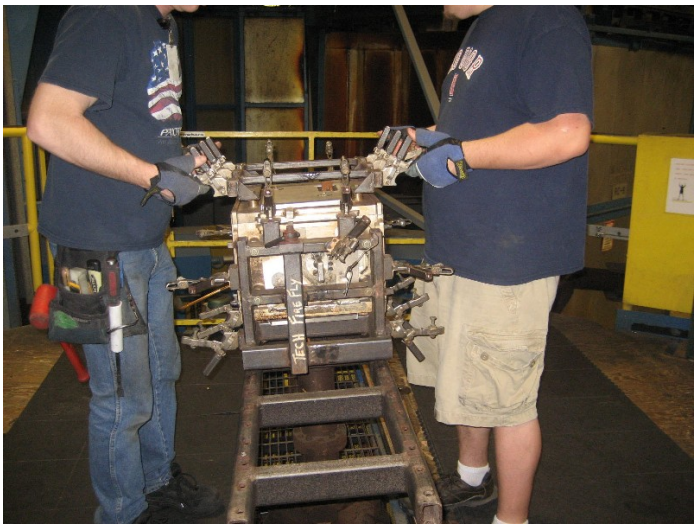
5.1.8 Replace the T handle back into the side of the mold.

5.1.9 Install all of the T-nuts in the mold according to the print.





5.1.10 Spray the front cover with Stoner and install it back onto the mold.



5.1.11 Install the top section back onto the mold.

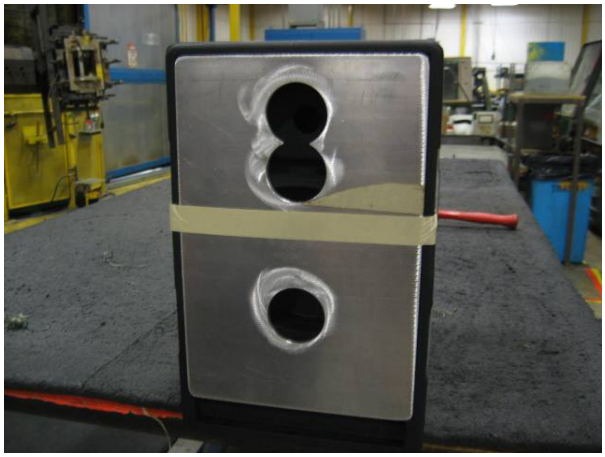
5.1.12 Pour the charge into the mold and distribute evenly.

5.1.13 Spray the back cover with Stoner and install it back onto the mold.

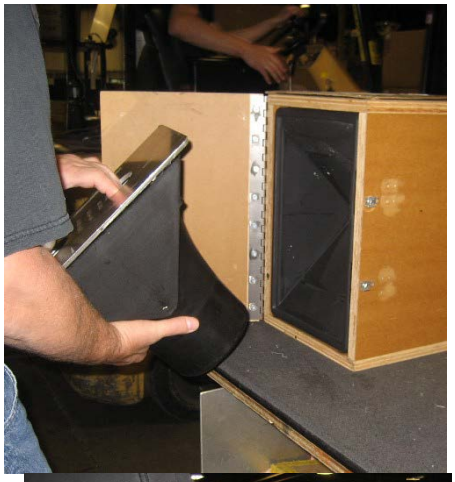
5.1.14 Reattach the Vortex.

5.2 COOLING

5.2.1 Trim the parting lines on the warm molding.

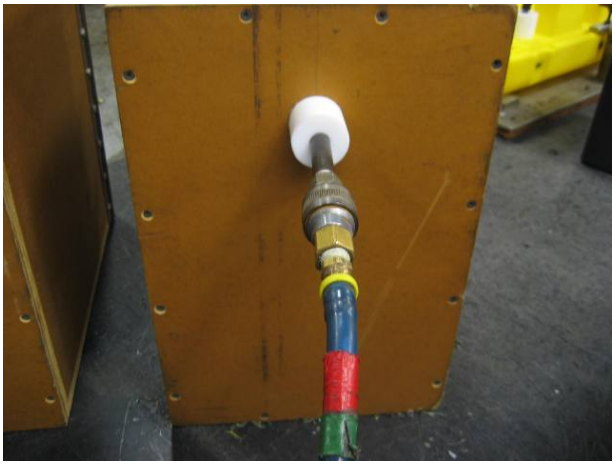


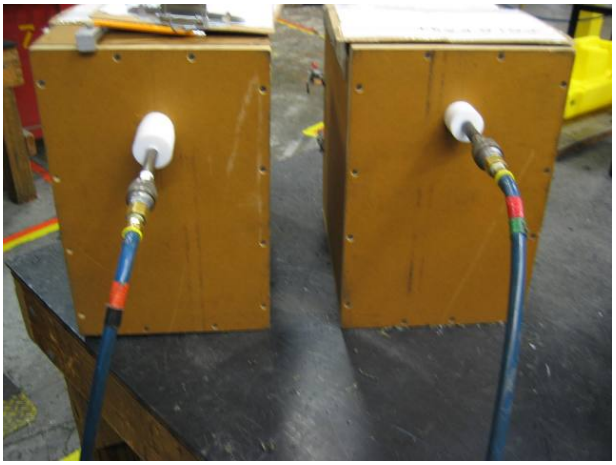
5.2.2 Place the back cooling fixture #7550729 into the back of the molding and tape in place.



5.2.3 Place the molding into the cooling fixture **#7550879** with the front facing outwards then place the front cooling fixture **#7550729** into place in the molding. Close and latch the fixture.

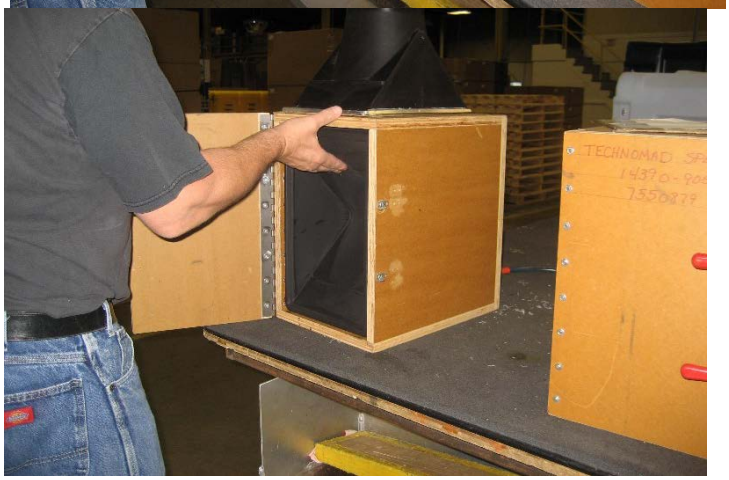
5.2.4 Place the “HOT PART” sign on top of the cooling fixture. **NOTE:** Because the [redacted] has to cool for 2 cycles there are 2 cooling fixtures in use. The “COOL PART” sign is placed onto the cooling fixture during the second cycle and the “HOT PART” sign is placed onto the cooling fixture when a hot molding is placed into it.





5.2.5 Place the air nozzle that is connected to the leak tester through the back of the cooling fixture and into the back of the molding.

5.2.6 Slowly turn the valve on the leak tester to the "OPEN" position until 0.50 psi is reached. Leave the valve in the open position to allow the air pressure to remain at approximately 0.50 psi for two (2**)** cooling cycles.



5.2.7 After the molding has cooled for 2 cycles, remove the air nozzle and remove the molding from the fixture.

6.0 INSPECTION/TEST

6.1 Test and inspect per applicable print, manufacturing work order, routing and BOM.

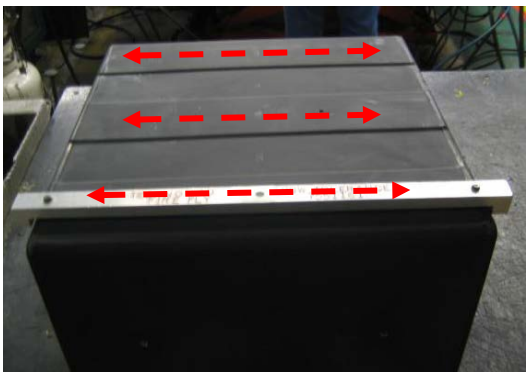
6.2 Refer to QS5 "Quality Standards for Rotational Molded Product" for applicable inspection/test.

6.2.1 Remove the diaphragm and check the cure.

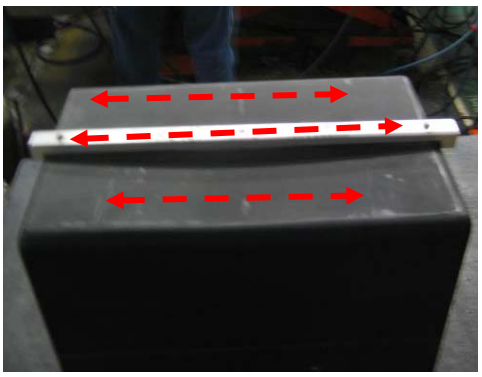
6.3 Use fixture # 7551161 to check the bow tolerance of the molded part.

- The tolerance is a maximum of 1/8" for both the inward and outward bow.
- The fixture is used to check all four (4) sides for both the inward and outward bow.

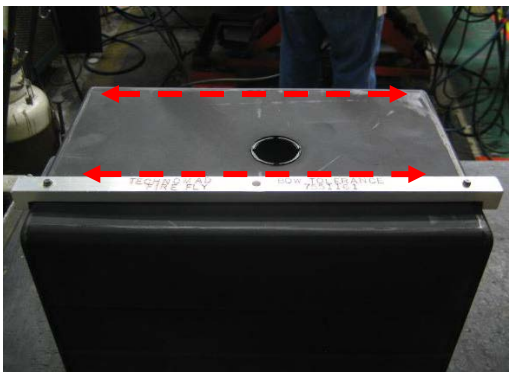
● Place the fixture in multiple areas of the sides as shown below.



SIDES



TOP



BOTTOM

6.3.1 INWARD BOW CHECK

Place the fixture stamped side up on the part. The center post should touch the part and the fixture should rock from side to side.

6.3.2 OUTWARD BOW CHECK

Place the fixture stamped side down on the part. The end post should touch the part and the fixture should not rock.

	MANUFACTURING WORK INSTRUCTIONS		Revision:
PELICAN	MWI03-110	13886-400 TANK	1
		ROTOCAST	Release Date: 11/11/15

Release and Revision Date History Log			
Rev.	**Description**	**Date**	**By**
1	Initial Release	11/11/15	DL

List Doc Approval Status List Doc Release History

1.0 SAFETY

Any work conducted as described in this procedure is subject to Pelican safety policies and procedures. Full documentation for these policies and procedures can be found on the **Pelican Environmental Health & Safety website**.

1.1 ADDITIONAL MANDATORY PPE

The following table provides information on the additional mandatory PPE requirements for this procedure.

PPE	REQUIRED USAGE

2.0 APPLICABLE DOCUMENTS

Description	Description
Manufacturing Work Order	QS5 Quality Standard- Roto Molded Product
Applicable Prints	
Bill of Materials (BOM)	
Routing	

3.0 MATERIALS

Materials stated in this procedure and/or per Manufacturing Work Order and/or BOM

4.0 EQUIPMENT/TOOLS

Qty.	Description	Qty.	Description
	Basic Rotocast tool set up		

5.0 PROCEDURES

5.1 MOLDING

5.1.1. Below is a production report to be referenced as a starting point.

Rotation = **6/1** Oven temp = **535** Cycle = **25**

HARDIGG™

ROTO-CAST PRODUCTION REPORT

Week Ending_____ Machine No. _____ Shift ____ Date _____ Foreman _____

WORK ORDER NO.	PART DESCRIPTION	NO OF CAVS.	ARM NO.	PCS. MADE	CHARGE IN GRAMS	ROTATION RPM	OVEN TEMP	CYCLE TIME	COOLING CYCLE TIME: FIRST COOLER DELAY	FIRST COOLER AIR	SECOND COOLER AIR	SECOND COOLER WATER	SECOND COOLER AIR	No. of Cycles	MATERIAL TYPE
	13886-400					6/1	535	25	2	—	20	3	2		GRN 237

[redacted]

NOTES (VERY IMPORTANT)

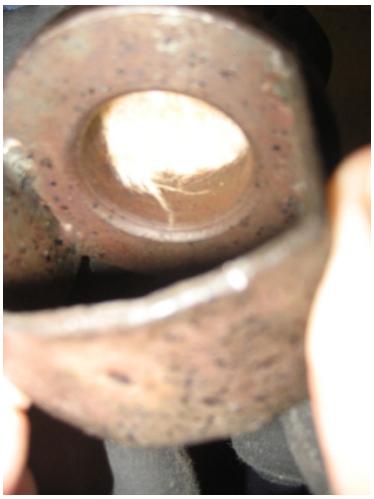
ROTO CREW

5.1.2 Remove the mold cover.

5.1.3 Wipe the parting line with 420 and then load required powder.

5.1.4 Place the cover onto the can and start bolts by hand and then tighten each bolt starting from the bottom of the cover and moving upwards.

5.1.5 Pack vent tube and install the vent with the hook and utility wire.

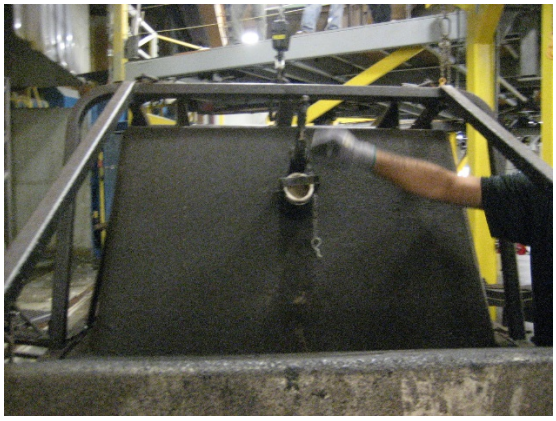

5.1.6 Remove the two plugs (one on each side of the cover) and wipe with 420. Fill the plug installation holes with insulation and install the plugs.


5.1.7 NOTE: After first molding, if part was sticking, apply TRA 420 to a clean rag and wipe the inside walls of the mold.

5.2 DE-MOLDING


5.2.1 Remove the bolts from the cover of the mold. Lift the cover and molding off/out of the can.


5.2.2 Lower the cover with the molding down to the lower level of roto 10 and place it onto a pallet.

5.2.3 Remove the plugs from both sides of the cover and remove the vent tube. Carry the plugs and vent tube up to the roto 10 deck to be seviced to reinstall when cover is placed back onto the roto10 deck.


5.2.4 Lift the cover off and place it back onto the roto 10 deck.

6.0 INSPECTION/TEST

6.1 Test and inspect per applicable print, manufacturing work order, routing and BOM.
6.2 Refer to QS5 "Quality Standards for Rotational Molded Product" for applicable inspection/test.
6.3 Cure inside is a rough cure. If there is no loose powder then the part is acceptable.
6.4 Check porosity at parting line. Any visible porosity should not go through the part.
6.5 Part should be flat or have an inward bow. **No** outward bow is allowed.

Highlighted Features – Company #5

- Purpose & intended user of document stated clearly.
- Tooling & equipment checklist listed before work instructions to preempt operators & machinist to setup in advance.
- Table of contents included for easier navigation throughout the document.
- Revision log to ascertain latest instructions are described.
- Critical instructions are noted separately from main instructions body.
- Images work well as a visual aid in conjunction with listed work instructions. Larger focus on visual instructions than written.
- Inspection chart captures important criteria for product verification & validation. Specifies extent of defects permissible.
- Well organized & detailed inspection report document.
- References other pertinent documents.

Foaming Instructions: Left Door

Left Door

I. Overview:

A. The procedure defines the detailed work instructions for foaming the Left Door.

II. Scope:

A. This procedure applies to any operator carrying out the foaming operations for the Left Door.

III. Revision Log:

Revision	Date	Revision By	Description
A	8/5/15	J. Blaha	New part; Procedure written
B	1/25/16	J Blaha	Added foam information for foaming by oven 13
C	2/22/16	J Blaha	Removed 30# gun info
D	2/25/16	J Blaha	Added DOW PN per ICN 02.25.16A
E	3/1/16	J Blaha	Added bag PN and to save bag for final packaging.
F	3/17/16	J Blaha	Added only 9 doors can fit in Gaylord. Added "Overview," "Scope," "Table of Contents," operator writes initials on part after foaming.

IV. Equipment:

A. Hoist
B. Leer Left Door foaming fixture
C. Scraper
D. Chemical "840"
E. Cordless drill: 3/4" drill bit
F. Cordless drill: 52 drill bit
G. DOW Voracor Side A CE 108 Isocyanate (PN: 200008)
H. DOW Voracor Side B CR 1107 Polyol (PN: 200007)
I. 80# foaming gun
J. 1ft Teflon tube
K. Vent tubes

V. Table of Contents

VI. Procedure:

A. Preparing the Left Door for Foaming

1. Locate foaming fixture for the Left Door.

2. Use a scraper to remove excess flash from the foaming fixture.
   NOTE: The surface of the foaming fixture should be smooth and free of debris.

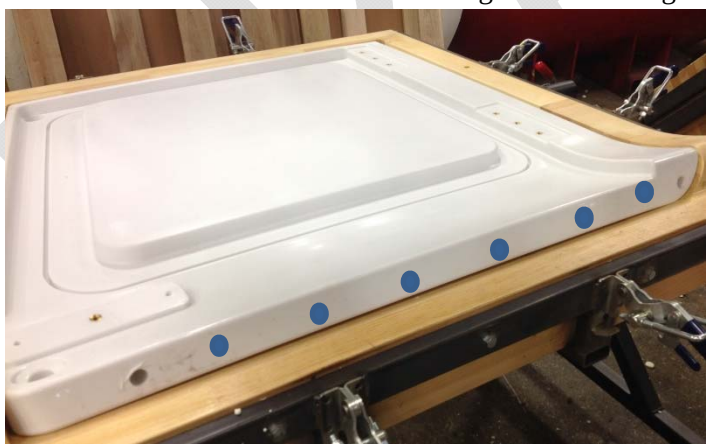
3. Obtain the Left Door from the Gaylord from the oven.

4. Remove the plastic bag (PN: BEL2453).
   NOTE: Save this bag as it will be used in the final packaging of the door.

5. Use a ¾" drill bit to drill out the 2 vent holes on the bottom of the door.

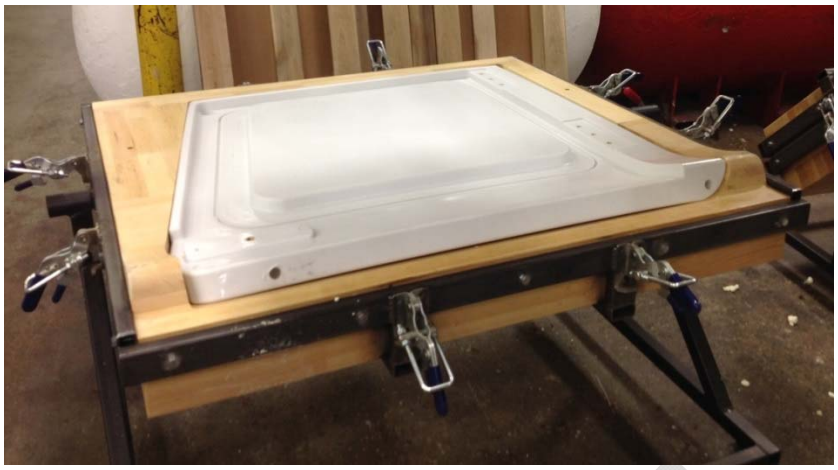
6. Trim the flash off of the 2 vent holes located in the bottom of the door.

7. Use a 52 drill bit to drill 6 vent holes along the bottom edge of the door.



8. Spray all holes with chemical "840."

9. Place the Left Door, face down, inside the foaming fixture.



10. Use a metal rod to poke through the vent holes to ensure the holes are not plugged.

11. Use the hoist to lower the top half of the foaming fixture onto the bottom fixture.

12. Clamp all clamps.

13. Use the lever on the side of the fixture to lift up the bottom part of the foaming.

14. Insert the vent tube in the left side vent hole.
    NOTE: Vent tube MUST be free from obstructions. If needed, use a rubber mallet and a wire rod to help to remove any foaming.

NOTE: *Do NOT* Spray chemical "840" on the inside of the vent tube. If the chemical gets inside the panel, delamination may occur.

15. Cover the vent tube with a plastic bag to avoid foam shooting out onto the floor.

B. Foaming the Left Door

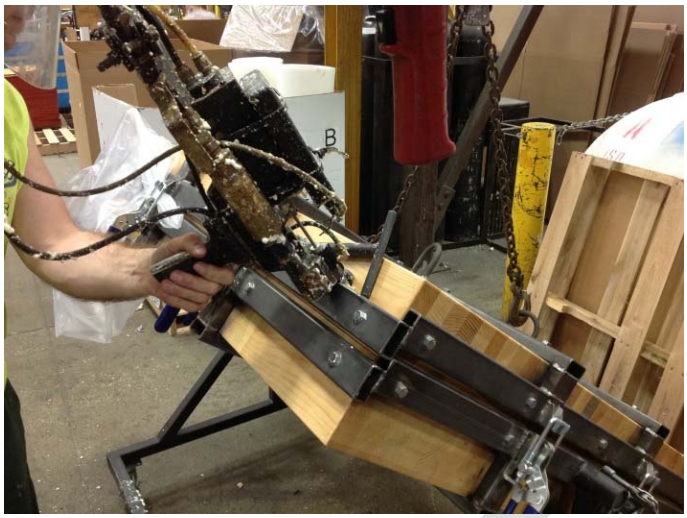
NOTE: Foaming shot times may vary by day.
NOTE: These parameters are determined at the discretion of the foam tech.

1. Set up to use the 80# foam gun with DOW foam.
   NOTE: Connect a 1ft Teflon tube to the gun to ensure the foam will reach the front of the Leer Door.

   NOTE: *Do NOT* Spray chemical "840" on the inside of the tube. If the chemical gets inside the panel, delamination may occur.

2. On the right side of the foaming fixture/ Door, insert the foaming gun all the way into the vent hole.

3. Fill the Left Door with the foam with 3.5 second shot time.



4. Once all foam has been inserted into the door, remove foaming gun and watch the vent hole for the foam to rise to the top of the hole.

5. Once the foam has risen to the top of the vent hole, insert and firmly hold the steel plug in the hole until the foam the left side vent tube stops oozing.

6. After the vent stops oozing foam, use the hoist to lower the foaming fixture back onto the ground.

7. Allow the foam to "cure" for a *minimum* of 30 minutes.

C. Removing the Left Door From the Foam Fixture

1. Use the lever on the side of the fixture to lay the foam fixture flat.

2. Move the hoist clamps to rung opposite of each other on the foaming fixture.

3. Undo all clamps on the foaming fixture.

4. Remove the steel plug from the bottom right side (inserted in section III.B.5).

5. Remove the vent tube on the left hand side (inserted in section III.A.14).

6. Use the hoist to remove the top of the foaming fixture.
   NOTE: The top of the mold should be lifted up evenly, with the Leer door remaining the bottom of the foaming fixture.

7. Use a black marker to write your initials by the date code near the inserts for the hinge on the door.

8. Replace the plastic bag (PN: BEL2453) on the door.

9. Place the Door in a Gaylord for Foaming Secondary operations.
   NOTE: Only 9 doors (standing up) will fit in a Gaylord. Do not put any more than 9 doors in a Gaylord or damage to the part may occur.

Foaming Secondary Instructions:

Left Door

I. Overview

A. This procedure defines the detailed secondary work instructions for the Left Door (PN: 1241002).

II. Scope

A. This procedure applies to any operator carrying out the secondary procedure for the Left Door.

III. Revision Log:

Revision	Date	Revision By	Description
A	8/17/15	J. Blaha	New part; Procedure written
B	2/5/16	J Blaha	Update quality specs per: Rev 3 (25-Sep-2015)
C	2/23/16	J Blaha	Updated packaging per ICN 10.28.15
D	2/24/16	J Blaha	Clarified to patch holes only along parting lines, not foaming vent holes
E	2/25/16	J Blaha	Added 2 white plugs (CAB2684) to procedure; missing info from initial run. Added plugs and handle check fixture to FIP.
F	3/17/16	J Blaha	Added bag PN and replace if necessary for final packaging. Added pics for packaging and unacceptable flash and contamination/porosity. Added Operators initials by date code.
G	6/7/16	J Blaha	Changed to paint pen to identify defects, instead of blue tape (doesn't stick well). Changed checking gasket channel with straight edge to using the Gasket Channel Flatness Fixture. Changed Gaylord from PN: Gregaylordbx to PN: 760012 per ICN 5.25.16.

IV. Equipment:

A. Gaylord box (PN: 760012)
B. Bubble Wrap (PN: Polbubblewrap)
C. Knife
D. Trimming Tool
E. Water
F. Mr. Clean
G. Sponge
H. Cool temperature patcher
I. Air hose
J. Straight edge
K. Panel Gasket Channel Check Fixture
L. (2) Heyco 2684 White Plug (PN: CAB2684)
M. 36 x 42 Skid

V. Table of Contents

VI. Procedure:

A. Trimming and Inserting Plugs in the Left Door

NOTE: Use paint pen to identify defects. *Do not* use a permanent marker to identify foam voids or other defects. The marker is time-consuming to remove and if left long enough on the part will permanently leach into the plastic.

1. Place bubble wrap on the table top to prevent any scratches on the Door while trimming.

2. Obtain a Left Door from the Gaylord from foaming.

3. Remove the bag (PN: BEL2453) from the Door.
   NOTE: Save this bag as it will be used in the final packaging of the door.

4. Use a trimmer/knife to remove excess flash from the Door.
   NOTE: All surfaces of the door should be smooth.

5. Use a trimmer/knife to remove exposed foam from the Door.
   NOTE: There should be no foam exposed to the outside of the door.

6. Patch any holes along the parting lines using poly with a cool temperature patcher to avoid leaving burn marks on the door.
   NOTE: All patched surfaces should be smooth.

   NOTE: The foaming vent holes on the bottom of the door do not need to be patched; only holes along the parting lines.

7. Attempt to buff out any scratches/gouges/scuffs on the front of the door that can be seen from less than 2 feet away.

8. Use Mr. Clean/water mix and a sponge to thoroughly clean the door.

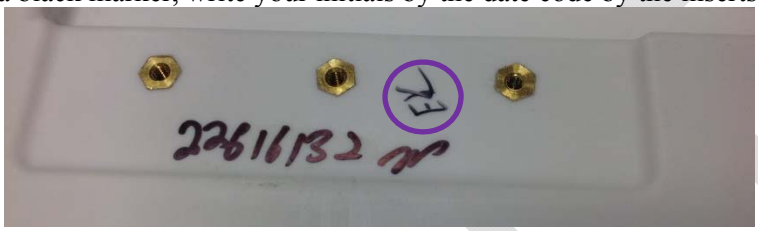
9. Use the air hose to blow out any debris from grooves.

10. Verify the door conforms to the contamination/porosity specification as defined in section VI.B.
    NOTE: Porosity may become more apparent if the Door was wiped down with a dirty rag.
    NOTE: If porosity exists, attempt to buff out with a sander.

11. In the vent hole on the bottom right side of the door, insert one Heyco 2684 White Plug (PN: CAB2684).

12. In the vent hole on the bottom left side of the door, insert one Heyco 2684 White Plug (PN: CAB2684).

13. Using a black marker, write your initials by the date code by the inserts for the hinge on the door.



B. Performing the Final Inspection

NOTE: Inspect all items 100% unless otherwise noted.

1. Verify the door has no dirt or finger prints.

2. Verify the door is the color white.

3. Ensure all excess foam has been removed from the door.

4. Verify all flash has been removed on the entire Panel.

5. Use the table below to verify the door conforms to the specifications.
   NOTE: A surface includes the front and hinge side of the part and the outer sides.

   NOTE: B surface includes the top and back of the door.

   NOTE: C surface includes the bottom of the door.

Defect Definition		A surface	B surface	C surface
Contamination-Bleed	Foreign material embedded into plastic that has fuzzy edges can be caused by material deeply embedded in wall or by pigment bleed	1/8"; ≤ 5 per sq. ft.	3/16"; ≤ 10 per sq. ft.	Allowed
Contamination-Speck	Foreign material embedded into plastic that has clearly defined edges	1/16"; ≤ 5 per sq. ft.	1/8" "; ≤ 10 per sq. ft.	Allowed
Debris	Foreign material that is not attached to part.	Minimal	Minimal	Allowed
Dents	Localized depressions that do not represent surface profile	Minor	Slight	Allowed
Dirt or fingerprints	Surface blemishes caused by foreign matter applied to part	Minor	Slight	Allowed
Gouges and Scratch Marks	Marks on parts that have depth and width. Can be felt with a fingernail	Minor	Slight	Allowed
Holes	Hole in seam line greater than 1/16 inch.	Not Allowed		
Insert filled with Plastic	Plastic breeched insert, caused by poor tape or insert not properly installed in mold.	Not Allowed		
Kiss off warping	Depression caused by bridging between a core and the roof top surface or when the plastic cools without air and forms around the core.	Minor	N/A	N/A
Missing Insert	Insert that was pulled out of the part or not placed in mold to begin with.	Not Allowed		
Pin Hole	Hole in seam line less than 1/16 inch.	3 per Linear foot on the seam line		
Porosity	Surface pitting not in seam line.	Minor	Slight	Allowed
Insert spacing	Spacing between inserts-see drawing for specifications	±0.10" per inch	±0.10" per inch	±0.10" per inch
Repairs	Repairs done to scratches/ gouges, holes, and other blemishes.	Minor	Slight	Allowed
Scuffs	Scratch on surfaces that do not have perceptible depth and width. Cannot be felt with finger nail.	Minor	Slight	Allowed
Surface Profile	?	Minor or a measurement		
Uneven Color or Swirling	Blemishes that are streaks or swirls that are not caused by uneven flaming and that do not affect surface texture.	Minor	Slight	Allowed
Uneven Flash trimming	Excess flashing that exceeds surface profile or a cut into the surface profile	0.03"	0.06"	Allowed
Exposed Foam	Foam that is seeping through hole or other opening in plastic	Not Allowed	Not Allowed	Minor-vent holes
Foam stains	Excess foam that has left a residue on the outside of part	Not Allowed	Not Allowed	Obvious
Foam voids	Voids left unfilled by foam in cavity	¼" void depth on one cavity		
Foam Delamination	When foam and plastic are not bonded	0 Foam Delam	¼"	¼"
Minor Defect	Defect not detectable at a distance of 2 feet looking at part from viewing angles			
Slight Defect	Defect not detectable at a distance of 4 feet looking at part from viewing angles			
Obvious Defect	Defect not detectable at a distance of 6 feet looking at part from viewing angles			

6. Verify there is zero foam delamination on surface A.
   NOTE: Delamination is when the plastic detaches from the foam, creating a bubble between the two surfaces. This can be detected when you press on the part and feel a void between the plastic and the foam.

   NOTE: A surface includes the front and hinge side of the part and the outer sides.

7. Verify there is no more than ¼" delamination present on Surfaces B and C.
   NOTE: Delamination is when the plastic detaches from the foam, creating a bubble between the two surfaces. This can be detected when you press on the part and feel a void between the plastic and the foam.

   NOTE: B surface includes the top and back of the door.

   NOTE: C surface includes the bottom of the door.

8. Verify the door conforms to the contamination/porosity specification.
   NOTE: A surface (top and sides): specks- ≤ 1/16" & ≤ 5 specks per sq. ft.; porosity- not detectable at a distance of 2 feet looking at part from viewing angles.

   NOTE: B surface (bell and back): specks- ≤ 1/8" & 10 specks per sq. ft.; porosity- not detectable at a distance of 4 feet looking at part from viewing angles.

   NOTE: C surface (bottom): Allowed as long as it does not disrupt the function of the door.

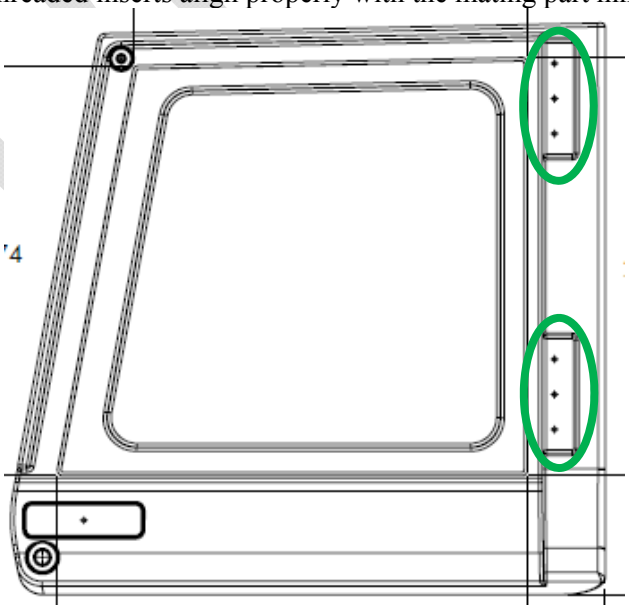
   NOTE: Porosity may become more apparent if the door was wiped down with a dirty rag.

9. Verify the flatness of the hinge area on the door is a maximum of 1/8" (0.125").
   NOTE: Use a straight edge and a drill bit as a feeler gauge.

10. Verify the hinge area to the gasket area has a difference of no more than 1/16" (0.06").
    NOTE: Use a straight edge and a drill bit as a feeler gauge.

11. Verify the flatness of the gasket area on the door is a maximum of 1/8" (0.120").
    NOTE: Use the large Panel Gasket Channel Check Fixture and a drill bit as a feeler gauge.

12. Verify the 2 sets of threaded inserts align properly with the mating part hinges.



13. Verify there are 2 white plug caps in the vent holes on the both the right and left side on the bottom of the door.

14. Use the metal door handle to check the fit/alignment of the handles to the door.
    NOTE: Check once per shift.

15. Record results on the Door FIP form.

C. Packaging the Left Door

1. Place a clean and empty Gaylord (PN: 760012) on a 36 x 42 skid.

2. Replace the plastic bag (PN: BEL2453) over the Door.
   NOTE: Replace the bag if there are many holes present.

3. Place the door in Gaylord (PN: 760012) for shipping.
   NOTE: 9 doors will fit in 1 Gaylord.

4. Cover the 1st, 3rd, 5th, 7th and 9th door with bubble wrap (PN: Polbubblewrap) on both sides of the door to prevent the doors from scratching each other.
   NOTE: A total of 12 feet of bubble wrap can be used in each Gaylord.

5. Place bubble wrap (PN: Polbubblewrap) along both sides of the Gaylord so the sides of the doors are protected.
   NOTE: Place half of bubble wrap along the side of the Gaylord, the other half will lay on top of the doors.
   NOTE: A total 12 feet of bubble wrap can be used in each Gaylord.

6. Use parts of an empty cardboard box to create a top to help keep the doors clean.

7. Report finished Gaylord in EPICOR, reporting the exact number of Left Doors the Gaylord contains.

8. Print a label and place on the Gaylord.
   NOTE: Stamp your Inspector ID number on the label, signifying the contents of the Gaylord match the Part Number and Quantity on the label.

VIII. Attachments

A. 1241002 FIP

IX. References

A. Quality Specification- 9 25 15

Wall Thickness Inspection

Customer Name: [redacted] Inc
Customer Part #: [redacted]
Part Description: [redacted] Door

Created by:C Schaetzer

Instructions: Write minimum wall thickness for each area in chart below once per shift.

Date														
Shift														
Inspector														
Item		**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**	**Inspection Result**
	Cavity #													
1	.187 mln													
2	.187 mln													
3	.187 mln													
4	.187 mln													
5	.187 mln													
6	.187 mln													
7	.187 mln													
8	.187 mln													
9	.187 mln													
10	.187 mln													
11	.187 mln													
12	.187 mln													
13	.187 mln													
14	.187 mln													

Final Inspection Procedure

Customer Name: [redacted],Inc
Customer Part #: [redacted]
Part Description: [redacted] Left Hand Door

Instructions: 1 part per shift must be inspected and recorded. 100% inspection: every part is checked / one part per shift is recorded

			Date															
			Shift															
			Inspector															
	Characteristic	Specification	Inspection Method	Inspec. Freq.	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result	Inspection Result
1	Appearance	No dirt or finger prints	Visual	100%														
2	Color	Record actual	Color sample/ visual	100%														
3	Foam	All excess foam is removed	Visual	100%														
4	Flash	All excess flash is removed	Visual	100%														
5	Appearance (Top and Outer Sides)	Must conform to Level A surface	Visual Surface Quality Specification	100%														
6	Appearance (Bell and Back)	Must conform to Level B surface	Visual Surface Quality Specification	100%														
7	Appearance (Bottom)	Must conform to level C surface	Visual Surface Quality Specification	100%														
8	Delamination	0(zero) Foam Delamination on A surface. ¼" on B and C Surface	Straight Edge	100%														
9	Porosity A Surface	specks- ≤ 1/16" & ≤ 5 specks per sq. ft.; porosity- not detectable at a distance of 2 feet looking at part from viewing angles	Visual Surface Quality Specification	100%														
10	Porosity B Surface	≤ 1/8" & 10 specks per sq. ft.; porosity- not detectable at a distance of 4 feet looking at part from viewing angles	Visual Surface Quality Specification	100%														
11	Porosity C Surface	Does not interfere with Function of Panel	Visual Surface Quality Specification	100%														
12	Flatness (dwg. zone D2)	Of hinge area .125" max	Gage/ table	100%														
13	Parallel (dwg zone D2)	Of hinge area .06" to A(gasket area)	Gage/ table	100%														

14	Flatness of gasket contact area(zone A8, page 3)	0.120" max	Gage/ table	100%												
15	Threaded Inserts	Mating-part hinge holes must align with threaded inserts	Visual	100%												
16	Vent hole plugs	2 x CAB2684 present	Visual	100%												
17	Door Handle	Handle check fixture aligns properly in recessed areas on the front of the door	Metal Handle Check Fixture	1/shift												

Rev.	Date	Revised By	Description
A	11/11/14	Chad Schaetzer	New Part Number
B	2/18/16	P. Zaczyk	Revised based on door dwg submitted 5/18/15--> item 5 added "back"; item 6(changed to "bottom" only). Revised based on dwg rev 1 2/12/16 M miller-->item 8 and item 9 describes new print areas and tolerances.; Item 10 - print contradicts itself on all points except gasket area to be flat within .120"(+-.06"); revised based on quality spec Document Rev Level: 3 (25-Sep-2015)--> no delam on A surface; delam 1/4" max on b and C surface; rev A item 9 became rev B item 11.
C	2/23/2016	J Blaha	Removed "8 Ferrules aligned properly" (this part does not contain ferrules). Added to check alignment of inserts with hinge
D	2/25/16	J Blaha	Added 2 CAB2684 plugs and checking the door handle fit
E	3/15/2016	J Blaha	Added flash and porosity specs

LEFT HAND DOOR

WEIGHT: 23 # TOTAL (2 different materials)
MOLD NUMBER: LEER1241002
COLOR JERR9354158 Untreated White: 17.25#
JERR9354ADH158 Treated White: 5.75#
INSERTS: (6) 1/4"-20 BRASS HEX (MAS1020614)
(1) 5/16”-18 BRASS HEX (MAS1020615)
WALL THICKNESS REFERENCE: .187”
Settings:
PRODUCTION:

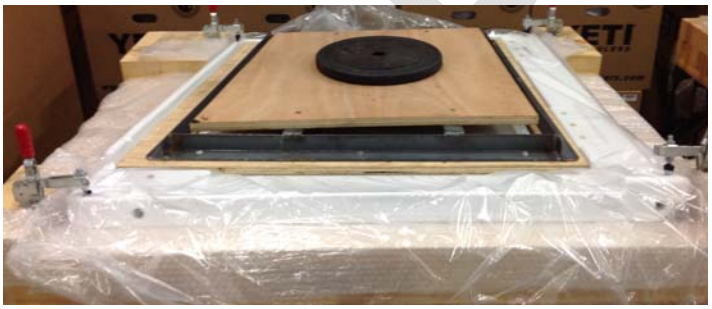
- Different material suppliers have us listing the material by A or B and not part number.

TRIMMING OPERATIONS:

- Use paint pen to identify defects. *Do not* use a permanent marker to identify defects. The marker is time-consuming to remove and if left long enough on the part will permanently leach into the plastic.
- Trim seamlines, watching for holes. Be careful to not inadvertently scratch or gouge the part.
- Date code in marker by inserts for hinge on door.

UNACCEPTABLE CONTAMINATION/POROSITY

- Put door in bag BEL2453 to prevent against scrapes and gouges. This bag will follow the part all the way to packaging operations.
- Place in cooling fixture for one round. Make sure the door is in the bag before putting it in the cooling fixture.



UNACCEPTABLE FLASH

- Part needs to be foam filled.

Revision:	Date:	Revision By:	Description:
A	08.04.15	T. Brill	New
B	8.12.15	T Mentink	Updated with new Jerico Material
C	2/26/16	J Blaha	Added date code location, use of BEL2453. Removed need to upkeep date wheel.
D	3/15/16	J Blaha	Added pictures of unacceptable flash, contamination/porosity
E	6/6/16	J Blaha	Changed to paint pen to identify defects, instead of blue tape (doesn't stick well).
F	9/2/16	J Blaha	Changed "Secondary" heading to "Trimming Operations" to clarify Trimmer's responsibility

Highlighted Features – Company #6

- Rotational molding parameters specified with product bill of materials listed.
- Coversheet details all prerequisite information & documents for product manufacturing.
- Tooling & equipment checklist listed before work instructions to preempt operators & machinist to setup in advance.
- Images work well as a visual aid in conjunction with listed work instructions. Larger focus on visual instructions than written. Multiple images to capture one instruction.
- Subsection for inspection checks within each instruction.
- Instructions are concise.
- Instructions document template remains consistent for processing of different parts. Template captures all necessary stages of manufacturing.

PRODUCT SPECIFICATION SHEET

ROTATIONAL MOLDING INC.

Date:

Customer & Part Specifications:

Customer: [redacted]
Part Name: **Sulphate Return Tank Config. A**
RMI Part No: **02B02120**
Customer Part No:
Drawing No:
Wall Thkns: Inch
Finished Wt: **700.0** Lbs.

Material Specifications:

Shot Weight: **700.00** Lbs.
Material / Color: **LLDPE / Natural**
Mixture: Grams / Lbs
Dry Blend (Vendor):
Pigment (Number & Vendor):
Compounded (Vendor):
RMI Pigment I.D. No: **02-600155**

Bill of Materials:

	Qty	Description	Part Number	Vendor
1				
2		This Part has two		
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Tooling Mold Info:

Tooling Mold Vendor:
Aluminum [x]
Fabricated Steel / S.S.T. [ ]
Single Cavity [x]
Double Cavity [ ]
Multiple Parts [ ]
Qty Molds Supplied: **1**
I.D. on Mold:
Additional Parts:

Primary Production Specifications:

Machine Used: **370**
Part Loading/Arm: **1**
# of Operators: **2**
Load/Unload Time: **60** min
Oven Cycle Time: **58** min
Oven Temperature: **600** F
Cooling Cycle Time: [ ] air [ ] water [ ] air
Arm Type:
Standard Arm [ ]
Offset Arm [x]
Single Frame [ ]
Rotation Ratio:
Major (Arm) **8**
Minor (Plate) **2**
Mold Release Used: Yes [x] No [ ]
Cooling Jig Used: Yes [ ] No [x]
Q.C. Inspection at Machine: Yes [ ] No [x]

Secondary Production Specifications:

	Labor Time in Minutes
Trimming	**20**
Hand Routing / Drilling	**10**
CNC Machining	
Assembly	**30**
Cleaning	**45**
Flaming	
Material Handling	
Finished Goods Handling	
Leak Test	**60**
Taping Off Holes	**10**

Packaging
Boxing:
Bagging:
Other: **Pallet**

Foaming:
Density (Lbs)
Amt. (sec.)
Time (mins.)

Packaging:

Pallet (Qty / Pallet): **3**
Box (Qty / Box):
Other (Explain):

Note: **Secondary procedure labor times are based on two employees per part.**

Molding Specification Sheet

[redacted]

02B02120

Sulphate Return Tank Config. A

Shot Wt. (LBS)	Color	Material	Melt
700.00	Natural	LLDPE	3
		Pigment	g/lb
		02-600155	

Machine		Cyc. T	Temp	Mjr/Mnr	Arm Type		Load
370		58	600	8/2	Offset		1
Air	Water	Air	Water	Air	Water	Air	Water

Picture of molded part

Hardware & Graphics

Qty.	Description	Part #

Apply mold release.

Instructions

Check

Secondary Specification Sheet

[redacted] | 02B02120

Sulphate Return Tank Config. A

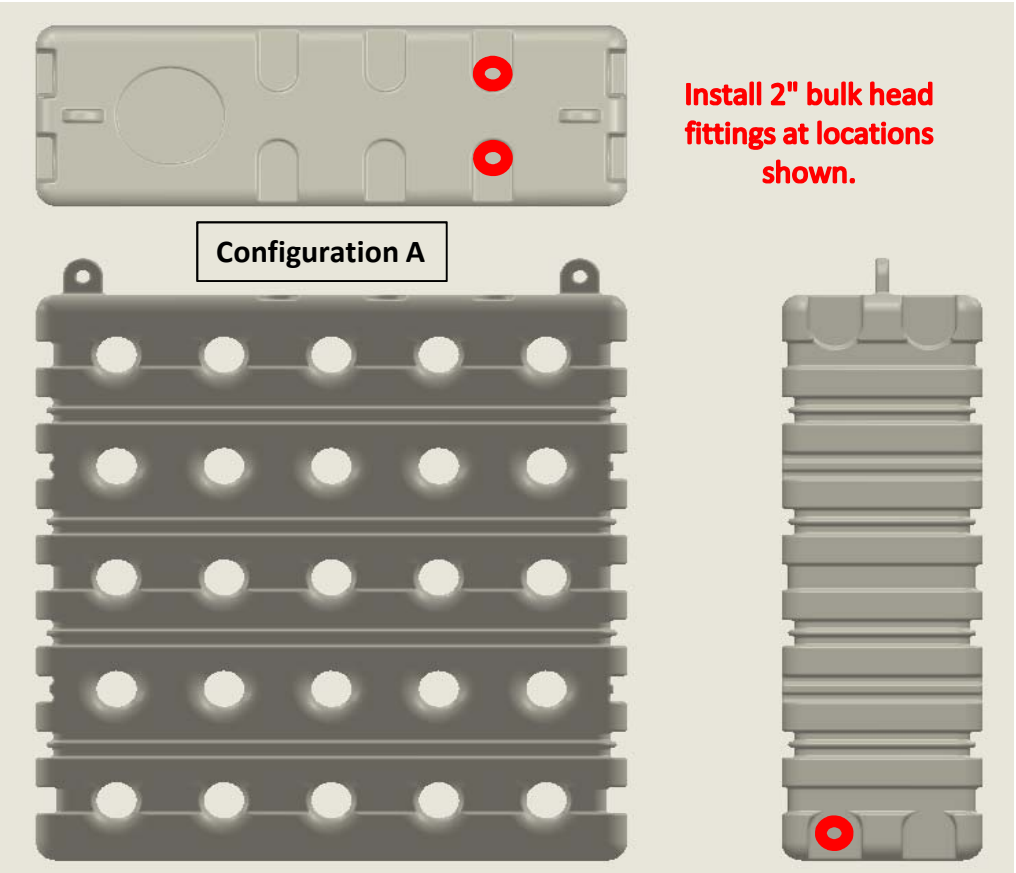
Trim	20
Leak Test	60
Route	10
CNC	
Clean	45.00
Flame	
Assembly	30.00
Special Packaging	

Picture of molded part

Picture of finished part

Instructions

Trim and deflash



Ensure proper fitting installation. Make sure there are no shavings between the gasket and the tank.

Perform leak test *after* fitting installation.

Clean tank thoroughly inside and out.

Check

Check for leaks especially around fitting areas.

Quality Control

[redacted]

02B02120

Sulphate Return Tank Config. A

Shot Wt. (LBS)	Color	Material	Melt	Wall Thickness	Trim	Clean	Leak T.	Route		
700.00	Natural	LLDPE	3		20	45	60	10		
		Pigment	g/lb		CNC	Flame	Asmby	Spc Pckg		
		02-600155					30			

Notes

Make sure tanks do not contain any shavings from trimming and routing.

Make sure tanks are leak free.

Shrink wrap parts individually.

Note: Images do not include fittings.

PRODUCT SPECIFICATION SHEET

ROTATIONAL MOLDING INC.

Date: **5/20/2014**

Customer & Part Specifications:

Customer: [redacted]
Part Name: **7' Bench Spa**
RMI Part No: **see Note 1**
Customer Part No:
Drawing No:
Wall Thkns: **1/4** Inch
Finished Wt: Lbs.

Material Specifications:

Shot Weight: **300.00** Lbs.
Material / Color: **As ordered**
Mixture: **N/A** Grams / Lbs
Dry Blend (Vendor):
Pigment (Number & Vendor):
Compounded (Vendor):
RMI Pigment I.D. No:

Bill of Materials:

	Qty	Description	Part Number	Vendor
1	**300 Lbs**	**Material as ordered**		
2	**8**	[redacted] **7' Panel Door**	**see Note 2**	
3	**1**	[redacted] **Filter Lid**	**see Note 3**	
4				
5				
6				
7		**Note 1: 7' Bench Spa Cinnabar 02-L40060**		
8		**7' Bench Spa Dk-Twilight 02-L40061**		
9		**7' Bench Spa Sahara 02-L40062**		
10				
11		**Note 2: 7' Panel Door Cinnabar 02-L40200**		
12		**7' Panel Door Dk-Twilight 02-L40210**		
13		**7' Panel Door Sahara 02-L40220**		
14				
15		**Note 3: Filter Lid Sahara 02-L40230**		
16		**Filter Lid Dk-Twilight 02-L40231**		
17		**Filter Lid Cinnabar 02-L40232**		
18				
19				
20				

Tooling Mold Info:

Tooling Mold Vendor:
Aluminum [x]
Fabricated Steel / S.S.T. [ ]
Single Cavity [x]
Double Cavity [ ]
Multiple Parts [ ]
Qty Molds Supplied: **1**
I.D. on Mold:
Additional Parts:

Primary Production Specifications:

Machine Used: **370**
Part Loading/Arm: **1**
# of Operators: **2**
Load/Unload Time: **27** min
Oven Cycle Time: **27** min
Oven Temperature: **610** F
Cooling Cycle Time: **18** air, **8** water, **3** air
Arm Type:
Standard Arm [ ]
Offset Arm [x]
Single Frame [ ]
Rotation Ratio:
Major (Arm) **7**
Minor (Plate) **2**
Reverse **10**
Mold Release Used: Yes [x] No [ ]
Cooling Jig Used: Yes [ ] No [x]
Q.C. Inspection at Machine: Yes [x] No [ ]

Secondary Production Specifications:

Labor Time in Minutes

Trimming	**10**
Hand Routing / Drilling	**10**
CNC Machining	
Assembly	
Cleaning	**3**
Flaming	**3**
Material Handling	
Finished Goods Handling	
Leak Test	
Taping Off Holes	

Packaging
Boxing:
Bagging:
Other:
Foaming:
Density (Lbs)
Amt. (sec.)
Time (mins.)

Packaging:

Pallet (Qty / Pallet):
Box (Qty / Box):
Other (Explain):
Note:

Molding Specification Sheet

[redacted]

see Note 1

7' Bench Spa

5/20/2014

Shot Wt. (LBS)	Color	Material	Melt
300.00	As ordered	LL	
		Pigment	g/lb

Machine		Cyc. T	Temp	Mjr/Mnr	Arm Type		Load
370		27	610	7/2	Offset		1
Air	Water	Air	Water	Air	Water	Air	Water
18	8	3					

Pic of mold

Hardware & Graphics

Qty.	Description	Part #

Instructions

This mold must be ran with a Venturi connected to it blowing into the filter bucket.

Make sure air is flowing through the venturi.

Note 1: 7' Bench Spa Cinnabar 02-L40060

7' Bench Spa Dk-Twilight 02-L40061

7' Bench Spa Sahara 02-L40062

Instructions

1. **Check for stains and discoloration.**
2. **Check for blow holes and pin holes.**
3. **Check filter bucket for proper wall thickness.**

Secondary Specification Sheet

[redacted]

see Note 1

7' Bench Spa

5/20/2014

Trim	X
Leak Test	
Route	X
CNC	
Clean	X
Flame	X
Assembly	
Special Packaging	

Picture of finished part

Instructions

1. Deflash

2. Cut out panel door using an air router

3. Clean and flame

4. Write serial number on spa using an engraver on panel cut out lip.

Example:

12 06 07 - D 2

Year Month Day Day Night Part Number

Ejemplo:

12 06 07 - D 2

Año Mes Dia Dia o Noche # Parte

5. Spa must be inspected by Q.C. before packaging.

6. After Q.C. inspection, wrap with plastic stretch wrap.

Check

1. Check for stains and discoloration.
2. Check for blow holes and pin holes.
3. Check filter bucket for proper wall thickness.

Quality Control

[redacted]

see Note 1

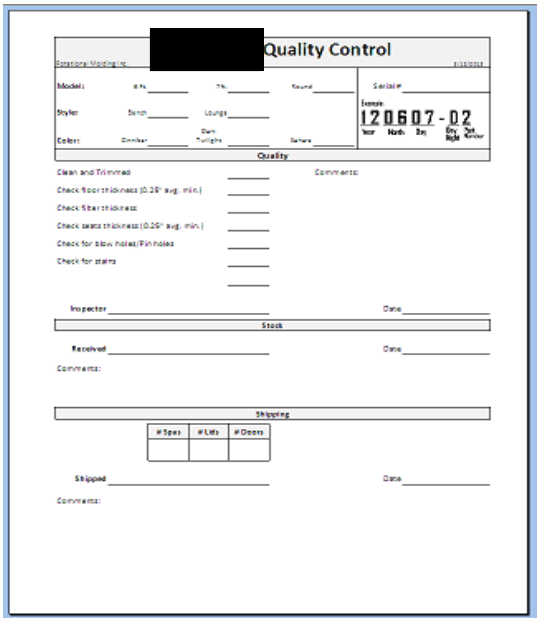
7' Bench Spa

5/20/2014

Shot Wt.	Color	Material	Melt	Wall Thickness	Trim	Clean	Leak T.	Route		
300.00	As ordered	LL		1/4	X	X		X		
		Pigment	g/lb		CNC	Flame	Asmby	Spc Pckg		
						X				

Notes

1. Use Q.C. inspection form.



[redacted] Quality Control

Model: ____ Serial #: ____

Style: Bench ____ Lounge ____

Color: Slimline ____ Dark Twilight ____ Sahara ____

Item#: 120607-02 (Year Month Day Qty Spot Right Mirror)

Quality

Clean and Trimmed ____ Comments:

Check floor thickness (0.25" avg. min.) ____

Check liner thickness ____

Check seats thickness (0.25" avg. min.) ____

Check for blow holes/Pin holes ____

Check for stains ____

Inspector ____ Date ____

Stock

Received ____ Date ____

Comments:

Shipping

# Spas	# Lifts	# Doors

Shipped ____ Date ____

Comments:

Molding Specification Sheet

[redacted]

[redacted]

Tank 970244

8/14/2012

Shot Wt.	Color	Material	Melt	Machine		Cyc. T	Temp	Mjr/Mnr	Arm Type		Load
7	Dark Blue	LL	5	190		16	500	8:2	Straight		2
		Pigment	g/lb	Air	Water	Air	Water	Air	Water	Air	Water
		x2699	1:1	12	3	1					

Hardware & Graphics

Qty.	Description	Part #
12	Ins Hex Blind Brass 10-24 3/8 X 1/2	02-557100

Inserts can be **BRASS, ALUMINUM** or **STAINLESS STEEL.** 10-24 treads and be a minimum of 1/4 inch deep.

Instruction

Ins Hex Blind Brass 10-24 3/8 X 1/2

Secondary Specification Sheet

[redacted]

02-S90100

[redacted] **Tank 970244**

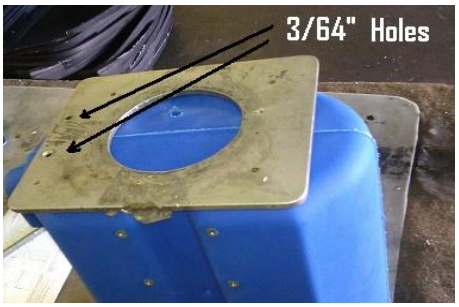
10/11/2012

Trim	X
Leak Test	X
Route	X
CNC	
Clean	X
Flame	X
Assembly	
Special Packaging	

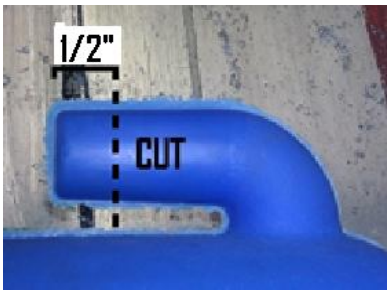
Instruction

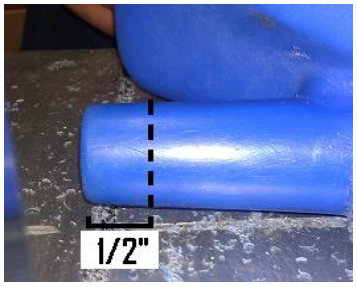
1. Leak test

2. Use trimming fixture to route large hole and drill two 3/64" holes.

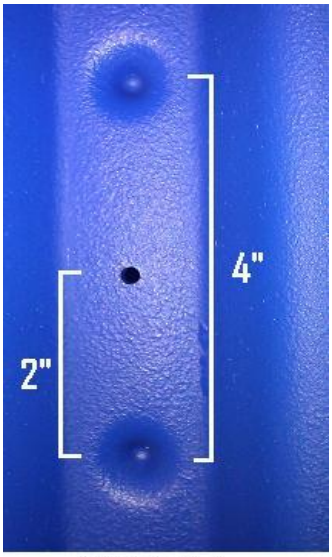


3. Using a bandsaw, cut 1/2" off both spouts.





4. Drill a 0.168" hole between the two dents.



0.165" Hole

5. Repeat STEP 4 for the other side.

Check

1. No leaks

2. Check for 1 drilled hole on each sides and 2 drilled holes on top.

3. Check spouts for uniform wall thickness.

Quality Control

[redacted]

[redacted]

Tank 970244

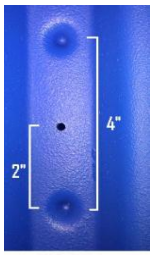
10/11/2012

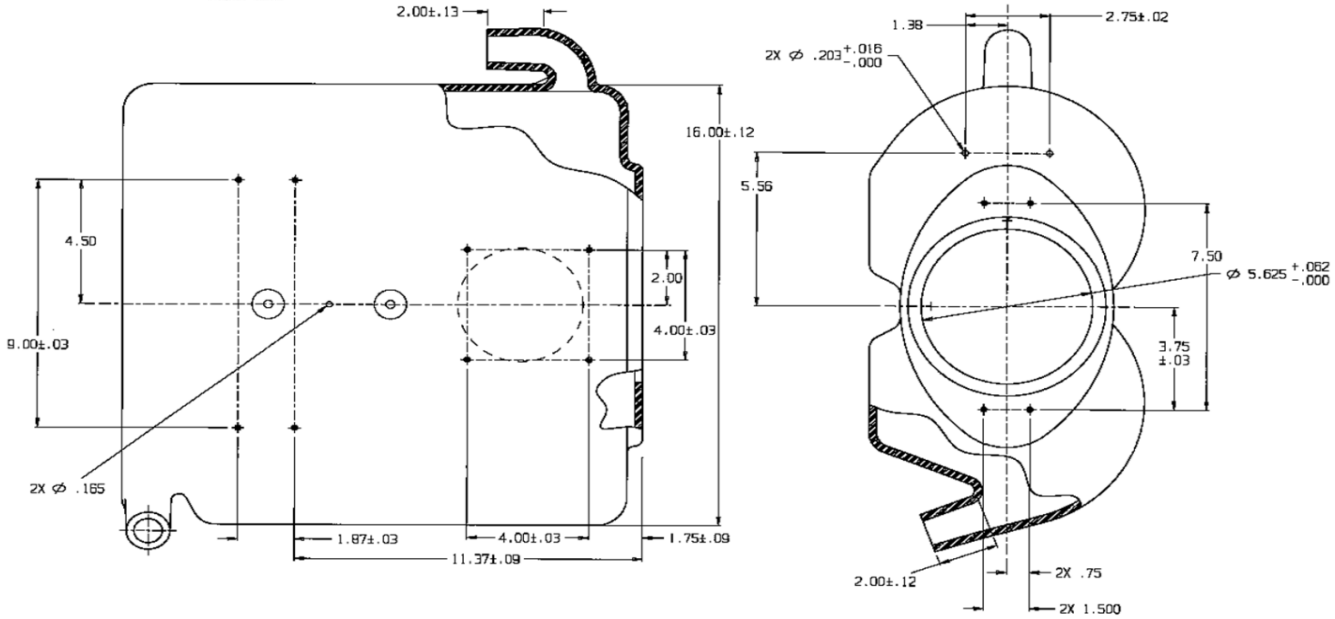
Shot Wt.	Color	Material	Melt	Wall Thickness	Trim	Clean	Leak T.	Route	
7	Dark Blue	LL	5	1/4	X	X	X	X	
		Pigment	g/lb		CNC	Flame	Asmby	Spc Pckg	
		x2699	1:1	min.		X			

Notes

1. No leaks
2. Check for 1 drilled hole on each sides and 2 drilled holes on top.
3. Check spouts for uniform wall thickness.

Side Hole





Highlighted Features – Company #7

- Rotational molding parameters specified with product bill of materials listed.
- Document revision level stated.
- Coversheet details all prerequisite information & documents for product manufacturing.
- Emphasizes key characteristics to process job – does not include extraneous information

Manufacturing Routing

		Part Number:					
		Description:					
Plastics Division		Customer:					
By:		First Issue		Last Revision		Rev #	

Mold Information

Mold	Mold Weight		Mold Type	Parts/Mold	Arm Set-up	Molds Per Arm	No. of Molds
		lbs.					

Machine Parameters

Oven Time (min.)			Oven Temp (deg.)			Rotation			Air	PSI	Cooling Parameters (min)		
1st	2nd	3rd	1st	2nd	3rd	Arm	Plate	Rev			1st Stage	2nd Stage	Water

Material Information

Weight		Resin	Color	Colorant #	Mix Method	Mix Ratio			
						Colorant Qty		Base Resin	
	lbs.						gms.		lbs.

Quality Information

Wall Thickness		Classification			Fixtures		QC %	Spray	Mold Release
		A	B	C	Production	Finishing			
	in.								

Bill of Materials

#	P/N	Description	Qty	#	P/N	Description	Qty
1				6			
2				7			
3				8			
4				9			
5				10			

Production

1		4	
2		5	
3		6	

Secondary/Packaging

1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

Highlighted Features – Company #8

- Document name & revision level stated.
- Part molding characteristics stated.
- Images work well as a visual aid in conjunction with listed work instructions.
- Instructions in large font and capitalized.
- Instructions are concise.

CUSTOMER:

File Name:SOTARE1/4L/R

Document Name:3-406-007/8

Documents Included-
-Process Set-Up sheet
Revision-0
Revision Date-

CUSTOMER NAME:

PART NUMBER: 3-406-007 LEFT/ 3-406-008
RIGHT SOTARE 1/4 LINER

Rotational Molding Through Finishing

Revision #0 Revision
Date 11/11/16

Pour powder into mold.

-Powder weight: 5.5LBS

-Powder color: #199 BLACK

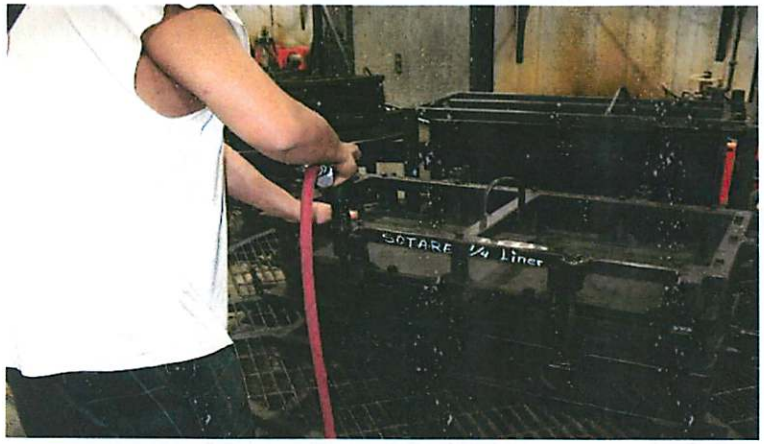
Lower top of mold onto bottom of mold.

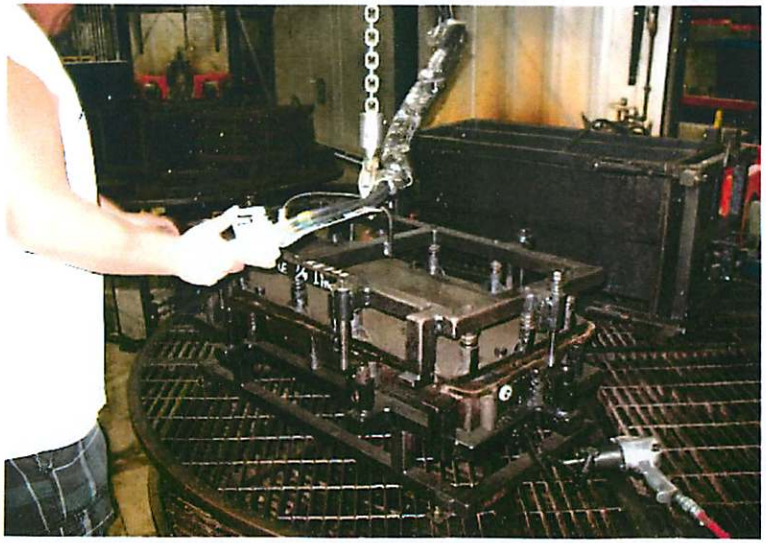
Tighten all bolts surrounding the mold.

Mold will rotate for the specified amount of time on the Process Setup sheet. It will arrive back at the platform when complete.

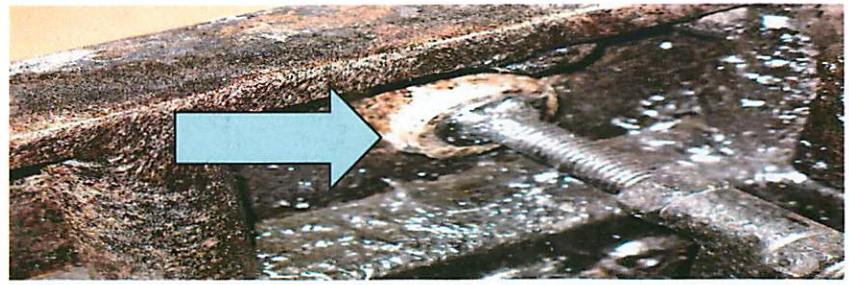
Unscrew all bolts surrounding the mold.

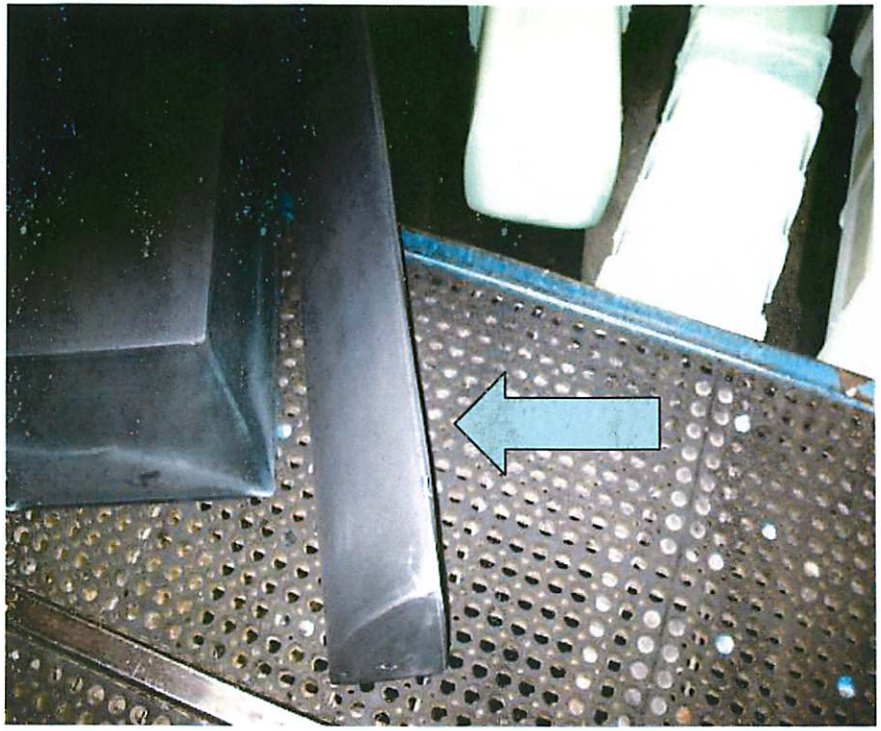
Lift the top of the mold from the bottom of the mold.





TO MAKE RIGHT SIDE LINERS REMOVE VENT AND PLACE PLUG ON OPPOSITE SIDE OF MOLD. VENT IS NOW ON OPPOSITE SIDE.





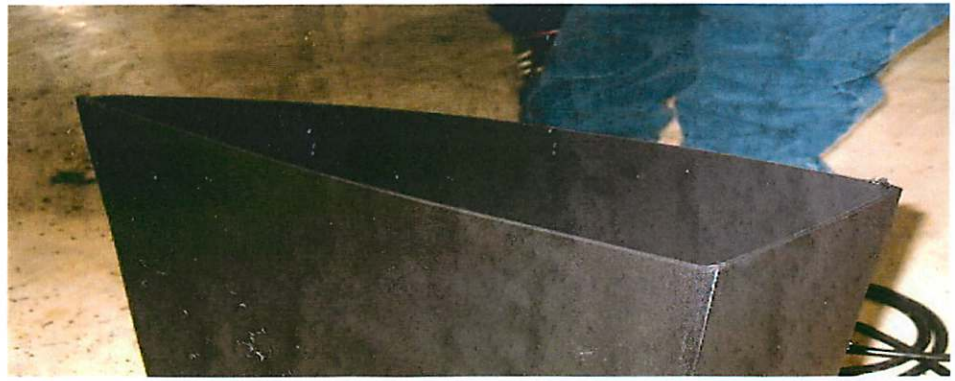
Pull the unit from the mold and give to machine line.

Scrape the parting line and stack in a bin to be sent to finishing department.

BLOW PART OFF WITH AIR GUN. FLAME PART COMPLETELY.

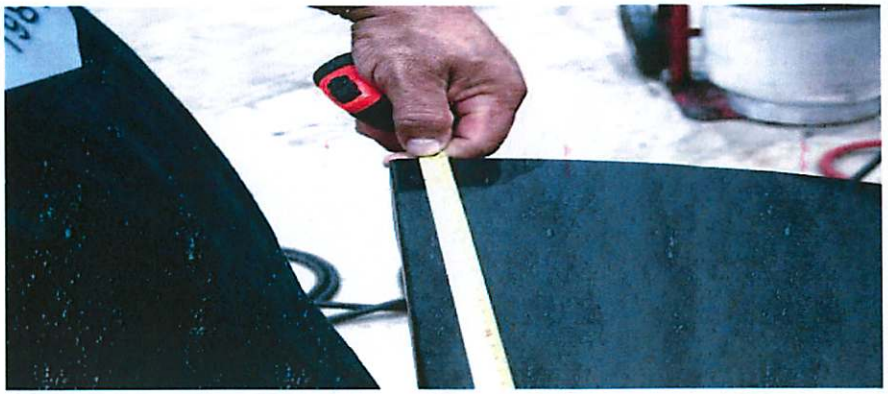
SET ROUTER UP WITH 2" L-BRACKET. PART MUST BE 31" IN LENGTH WHEN FINISHED. 1-1/2" TO ROUTER BIT FROM L-BRACKET.

BELOW IS FINISHED ROUTER CUT ON PART.



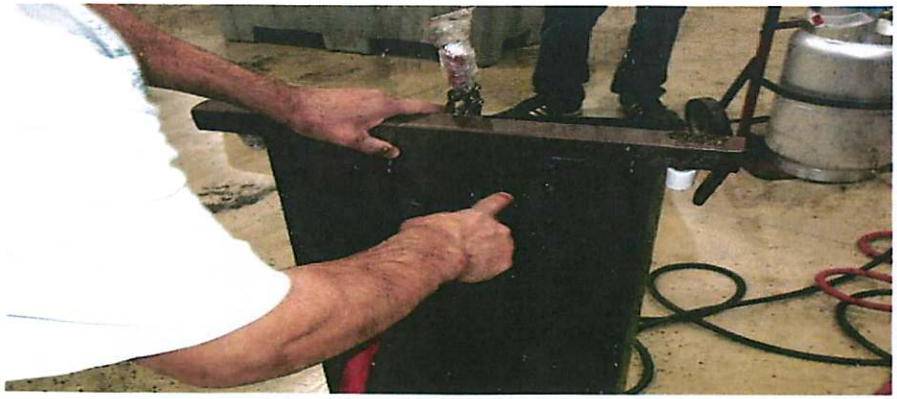
USING SUREFORM SCRAPER AND RED DEVIL SCRAPER,TRIM PART FOR EVEN FINISH.

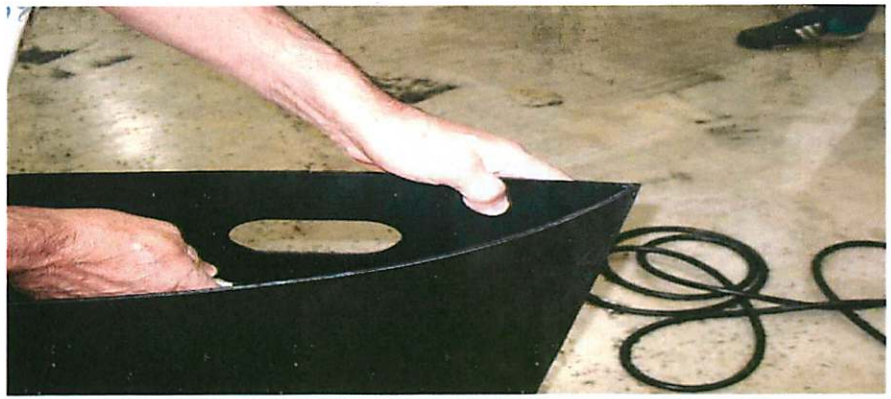
PLACE FIXTURE TO ROUTE HANDLE AREA ON FLAT SIDE OF PART.



MAKE SURE TO CHECK PART FOR SIZE. PART MUST MEASURE 31" IN LENGTH WHEN FINISHED.

TRIM HANDLE AREA WHEN FINISHED WITH ROUTING CUT.





STACK PARTS ON 48X40 WOOD PALLET AND STRETCH WRAP TO SKID. NUMBER OF PARTS PER SKID DETERMINED BY ORDER SIZE.

PLACE LABEL ON SKID WITH DATE,QUANITY,PO NUMBER,PART NUMBER,PART DESCRIPTION,CUSTOMER NAME AND EMPLOYEE SIGNATURE. BOTH RIGHT AND LEFT PART NUMBERS ARE LISTED ON EACH INDIVIDUAL LABEL.

Highlighted Features – Company #9

- Rotational molding parameters specified.
- Instructions document template remains consistent for processing of different parts. Template captures all necessary stages of manufacturing.
- Tooling checklist listed before work instructions to preempt operators & machinist to setup in advance.
- Images work well as a visual aid in conjunction with listed work instructions. Larger focus on visual instructions than written.
- English/Spanish translation
- Standard product information & description header on each page of the document.
- Document name & revision level stated.
- Revision log to ascertain latest instructions are described.
- Critical instructions are noted separately from main instructions body.
- Instructions are concise.

PRODUCT CHARACTERISTICS	
CUSTOMER	ABC
P/N	602-105
REVISION	E
PART NAME	Tank; vacuum 5 gallon
MATERIAL	LD
DYE	Y- DC-60-309-009 / G- DC-80-309
COLOR	ABC yellow/ Gray DC-80-309
PART WEIGHT	11.5 lbs
FIXTURES	2013-050

APPROX IRT PARAMETERS (MACHINE 4 ONLY)	
OVEN TEMP (°F)	620° - 650°
MINIMUM TEMP (°F)	390°
THERMAL INDEX (°F)	290°
IRT COOLER (°F)	
OVEN TIME (MIN)	17
FERRY MACHINE APROX PARAMETERS	
OVEN TEMP (°F)	500° - 560°
OVEN TIME (MIN)	15 - 17
COOLING TIME (MIN)	18

INSPECTION REQUIREMENTS

BEFORE MOLDING	AFTER MOLDING
Degrease inserts prior to use (if applicable) Clean parting line; all leftover material to be removed Check mold surface for damage Clean vent tube(s) Check that correct shot weight and color are used Check that mold is closed properly and completely	Check part for material containation, scratches, or blemishes Check parting line for excessive flash Check parting line for blowholes Check part for warpage, especially on flat surfaces Check that part is cured properly If part is acceptable, mark with appropriate shift/shot/day numbers
Desengrase los inserts antes de usarlos (si la pieza lleva tuercas) Limpie los bordes del molde; remuevba todo el material sobrante del molde. Revise que la superficie del molde no tenga daños. Limpie los tubos de ventilacion. Asegurese que esta usando el peso y el color correcto. Asegurese que el molde esta cerrado completamente.	Revise que la pieza no tenga contaminacion, rayones o golpes. Revise que las orillas no esten demasiado gruesas. Revise que las orillas no tengan huecos. Revise que la pieza no este doblada, especialmente en las areas planas. Asegurese que la pieza esta cocinada completamente. Marque la pieza con el apropiado numero de turno/vuelta/dia.

#	English	Spanish	
1	Check that the correct shot weight of 11.5 lbs. is being used.	Verifique que el peso que esta usando es 11.5 libras.	
2	Verify that we used 100 lbs of LD in the high intesity mixer to blend the powder..	Asegurese que esta usando el metodo correcto para mezclar el polvo y el color	
3	For machine #4, check that the IRT parameters are set correctly	Para la maquina #4 asegurese que los parametros IRT han sido programados correctamente.	
4	After removing the part from the mold place the sockets in the bottom of the part.	Despues de sacar la pieza del molde coloque los sockets a la base de la pieza.	
5	Verify the graphic location with marks in the mold. Check the quality of the graphic.	Asegurese que los graficos estan buenos y en la posicion correcta segun las marcas en el molde.	
6	Check that the wall thickness is 0.300 or greater	Asegurese que el grosor de las paredes es 0.300 o mas	
7	Rout a 1 inch hole on top of the part, to check if the part is properly cured inside.	Corte un hoyo de 1 pulgada en sima de la pieza, para comprobar si la pieza se cura adecuadamente dentro.	
8	All accepted parts should be marked with the inspector number and released to the 5 axis department.	Todas las partes aprovadas deben ser marcadas con el numero del inspector y enviadas al departamento de 5 axis.	

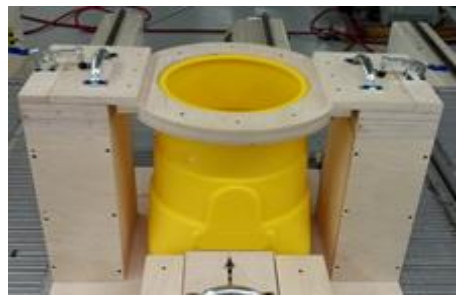
5 AXIS INSTRUCTIONS

PART NAME:	ABC	PART NUMBER	602-105

Tool Used: 1/4 Onsrud

1 Place the part into the 5axis fixture as shown.

2 Put the top fixture in the part as shown to make sure the part is sitting in place. Clamp the part when it is in place to start the 5 axis program.



3 Check the opening with the ABC checking fixture CF-602-105 as shown in pic 1. The ID should be 10.70. Make sure the lip is even all around the part as shown in pic 2.

1

2

4 Using a 1/8 radius cutter with a 1/2" bearing, make the radius on the lip as shown during the 5 axis cycle.

MACHINNING INSTRUCTIONS

PART NAME:	ABC	PART NUMBER	602-105

#	English	Spanish	
	Tools: #10 Drill 13/64 Drill 2.250" Hole saw 2.062" Hole saw		
1	Place the DJ-2013-050 on the part as shown.	Coloque la guia DJ-2013-050 en la pieza como se muestra.	
2	Drill the 6x holes with a #10 drill bit as shown. Use pins to hold the DJ in place.	Haga los 6 hoyos con una broca #10 como se muestra. Use pines para mantener la guia de corte en su lugar.	 
3	Drill 5x holes to the front of the part with a 13/64 drill bit as shown. Put pins as you drill to hold the DJ in place.	Taladre 5 hoyos al frente de la pieza con una broca 13/64 como se muestra. Ponga pines cuando hace los huecos para mantener la guia en su lugar.	 
4	Drill 5x holes to the back of the part with a 13/64 drill bit as shown. Put pins as you drill to hold the DJ.	Taladre 5 hoyos por detras de la pieza con una broca 13/64 como se muestra. Ponga pines cuando hace los huecos para mantener la guia en su lugar.	

5	Drill one hole with a 1/2" dril bit as shown.	Haga un hoyo con una broca de 1/2" como se muestra.	
6	Make the front hole using a 2.250 +/- .015 hole saw as shown.	Haga el hoyo del frente con una cortadora de 2.250 +/- .015 como se muestra.	
7	Make the back hole using a 2.062 +/- .015 hole saw as shown.	Haga el hoyo de atras con una cortadora de 2.062 +/- .015 como se muestra.	
8	Scrape the part and clean with type wash.	Pula la pieza y limpiela con Type wash.	
9	Inspect the part before putting the part in a 197 carton	Empaque una pieza en una caja 197.	
10	NOTE: Use labels provided by the office on all boxes we send out. If you dont have the labels, see the office manager.	NOTA: Utilice etiquetas proporcionadas por la oficina, en todas las cajas que enviamos. Si usted no tiene, vea el manger de la officina.	

Rev	Date	Changes	Initial
A	1/14/2014	Created	AL
B	7/2/2014	Changed the part weight from 12.0 lbs to 11.5 lbs.	GC
C	6/30/2015	Changed the revision of the part from C to E.	GC
D	4/23/2016	Updated photo for step 8 to more recent one	JT
E	5/14/2016	ADDED GRAY COLOR TO QIR	JT