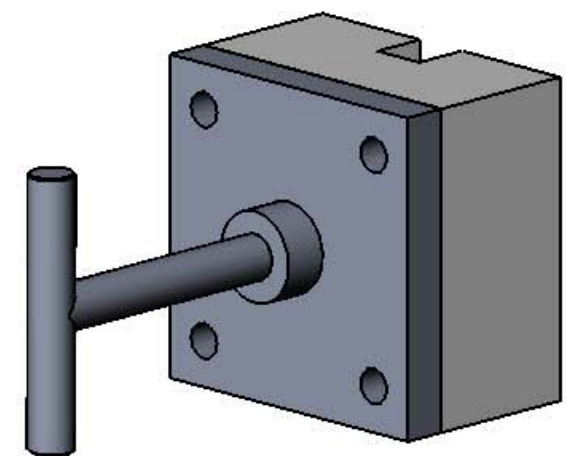
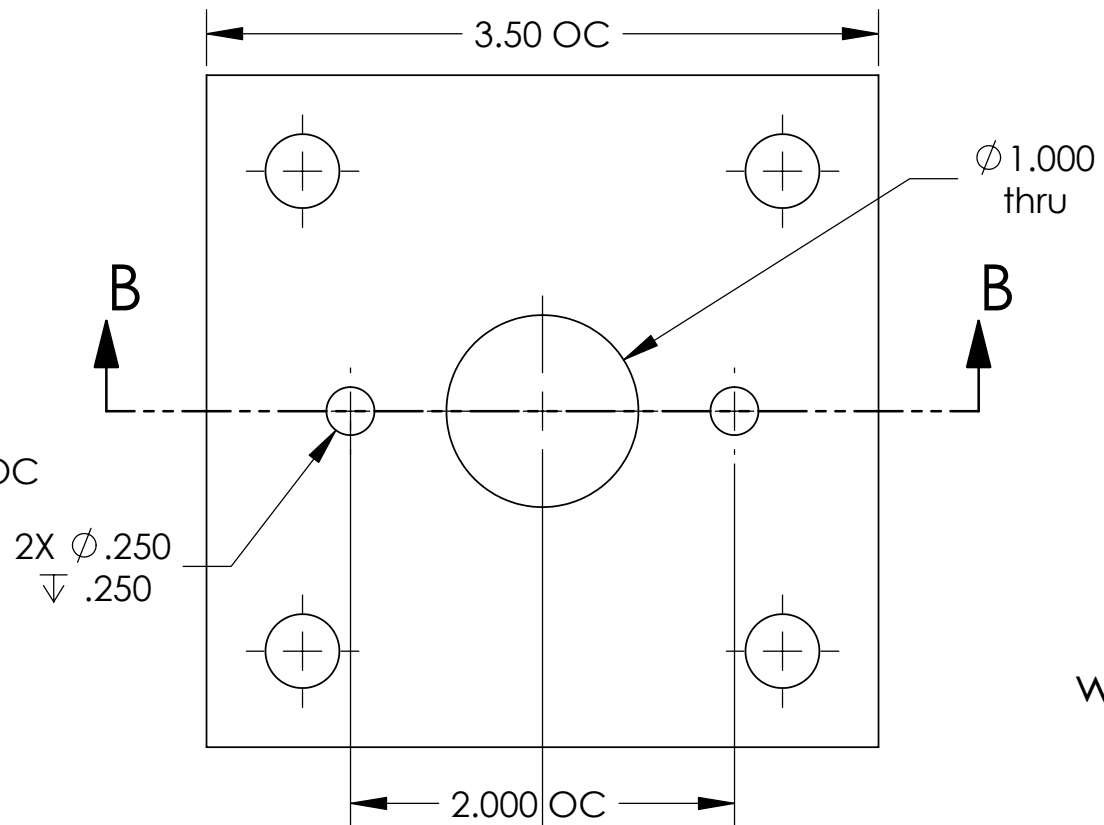
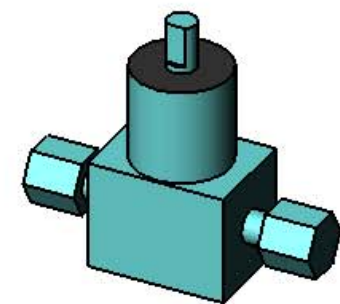
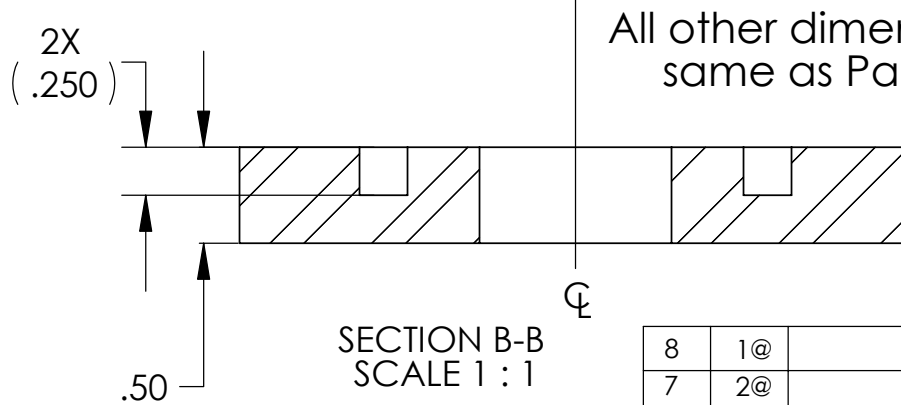
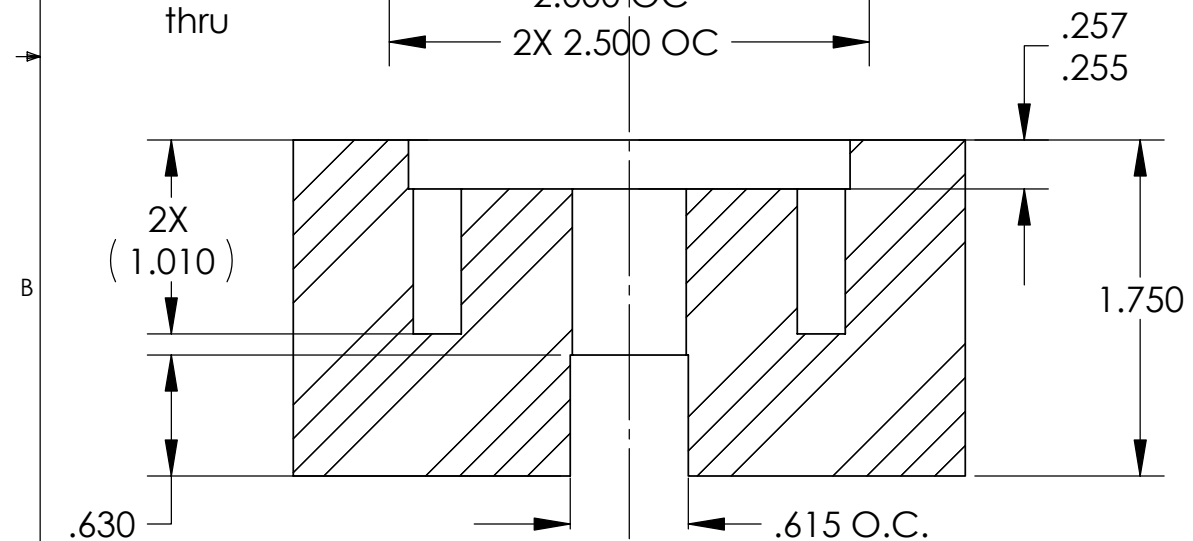




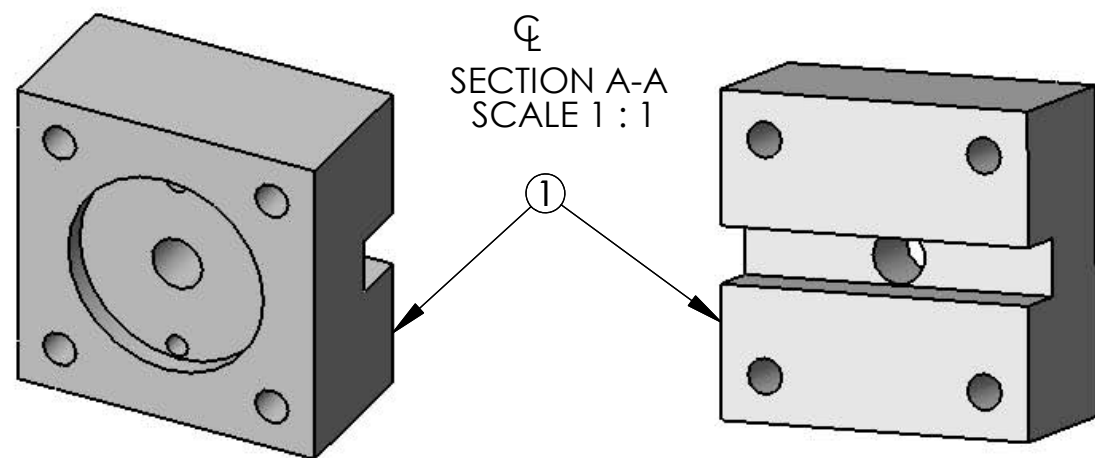
Valve Assembly
(Configurations A and B
w/long and short T-handle)



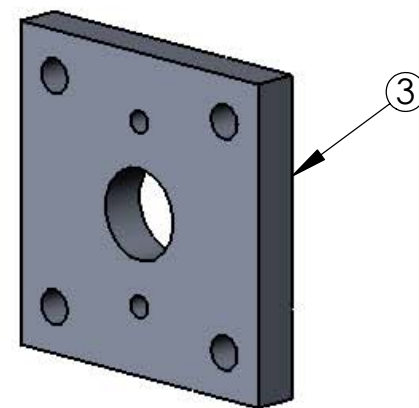
Swagelok SS-41S1 Valve
for 1/16" tubing with .053 bore



All other dimensions
same as Part 1



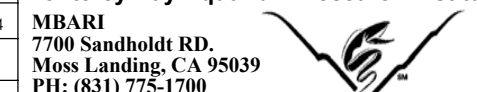
SECTION A-A
SCALE 1 : 1

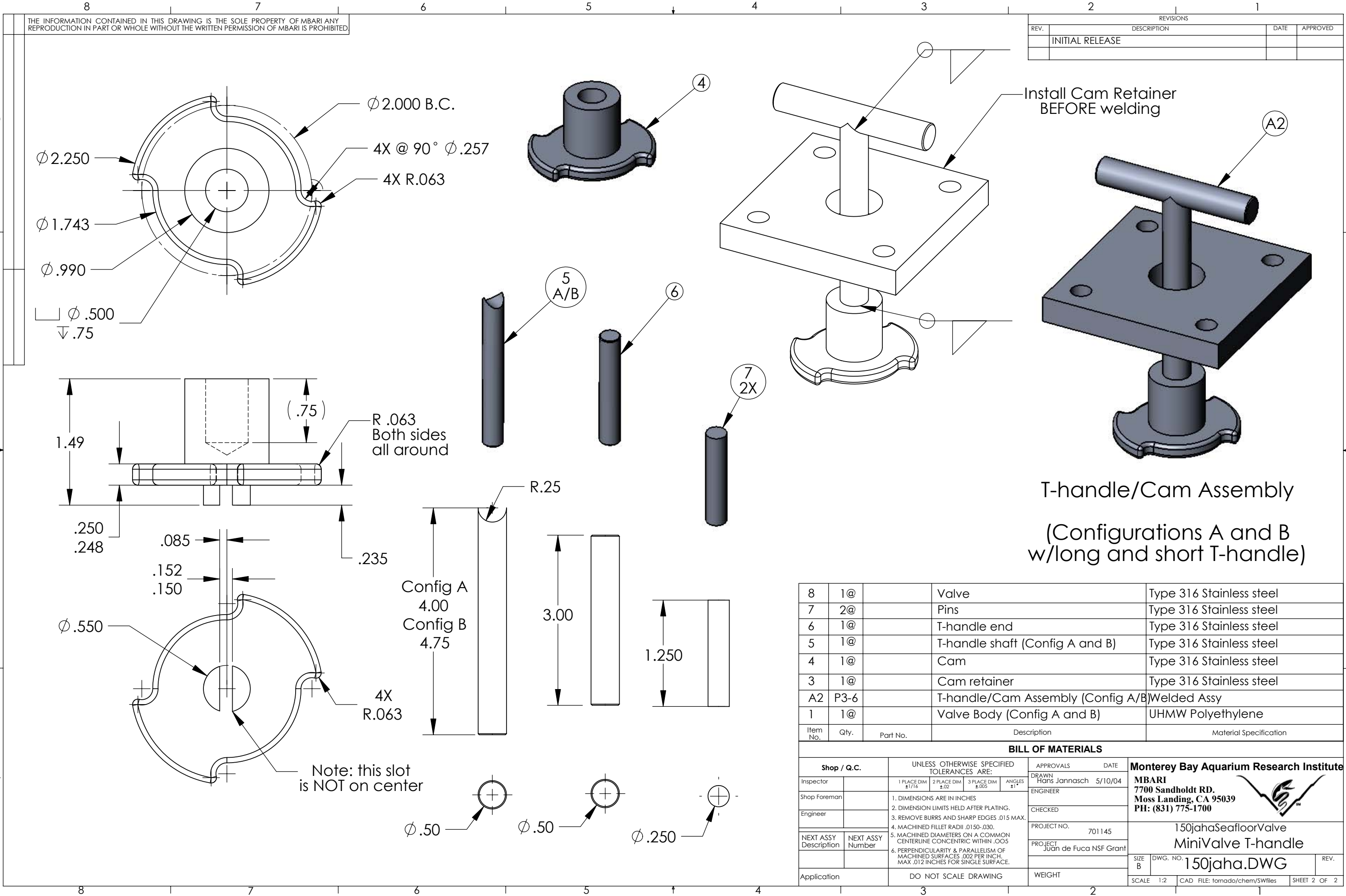


③

8	1@		Valve	Type 316 Stainless steel
7	2@		Pins	Type 316 Stainless steel
6	1@		T-handle end	Type 316 Stainless steel
5	1@		T-handle shaft (Config A and B)	Type 316 Stainless steel
4	1@		Cam	Type 316 Stainless steel
3	1@		Cam retainer	Type 316 Stainless steel
A2	P3-6		T-handle/Cam Assembly (Config A/B)	Welded Assy
1	1@		Valve Body (Config A and B)	UHMW Polyethylene
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS

Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquarium Research Institute			
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch	5/10/04		MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700 				
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH- MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER							
Engineer						CHECKED							
NEXT ASSY Description	NEXT ASSY Number					PROJECT NO.		701145					
						PROJECT		Juan de Fuca NSF Grant					
Application		DO NOT SCALE DRAWING				WEIGHT		SIZE B DWG. NO. 150jaha.DWG		REV.			
								SCALE 1:2 CAD FILE: tomado/chem/SWfiles		SHEET 1 OF 2			



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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	INITIAL RELEASE		

8	1@		Valve	Type 316 Stainless steel
7	2@		Pins	Type 316 Stainless steel
6	1@		T-handle end	Type 316 Stainless steel
5	1@		T-handle shaft (Config A and B)	Type 316 Stainless steel
4	1@		Cam	Type 316 Stainless steel
3	1@		Cam retainer	Type 316 Stainless steel
A2	P3-6		T-handle/Cam Assembly (Config A/B)	Welded Assy
1	1@		Valve Body (Config A and B)	UHMW Polyethylene
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS			
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02
Shop Foreman		3 PLACE DIM ±.005	ANGLES ±1°
Engineer		1. DIMENSIONS ARE IN INCHES	
		2. DIMENSION LIMITS HELD AFTER PLATING.	
		3. REMOVE BURRS AND SHARP EDGES .015 MAX.	
		4. MACHINED FILLET RADII .0150-.030.	
NEXT ASSY Description	NEXT ASSY Number	5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	
		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.	
Application		DO NOT SCALE DRAWING	
		WEIGHT	
		SCALE 1:2	CAD FILE: tornado/chem/SWfiles

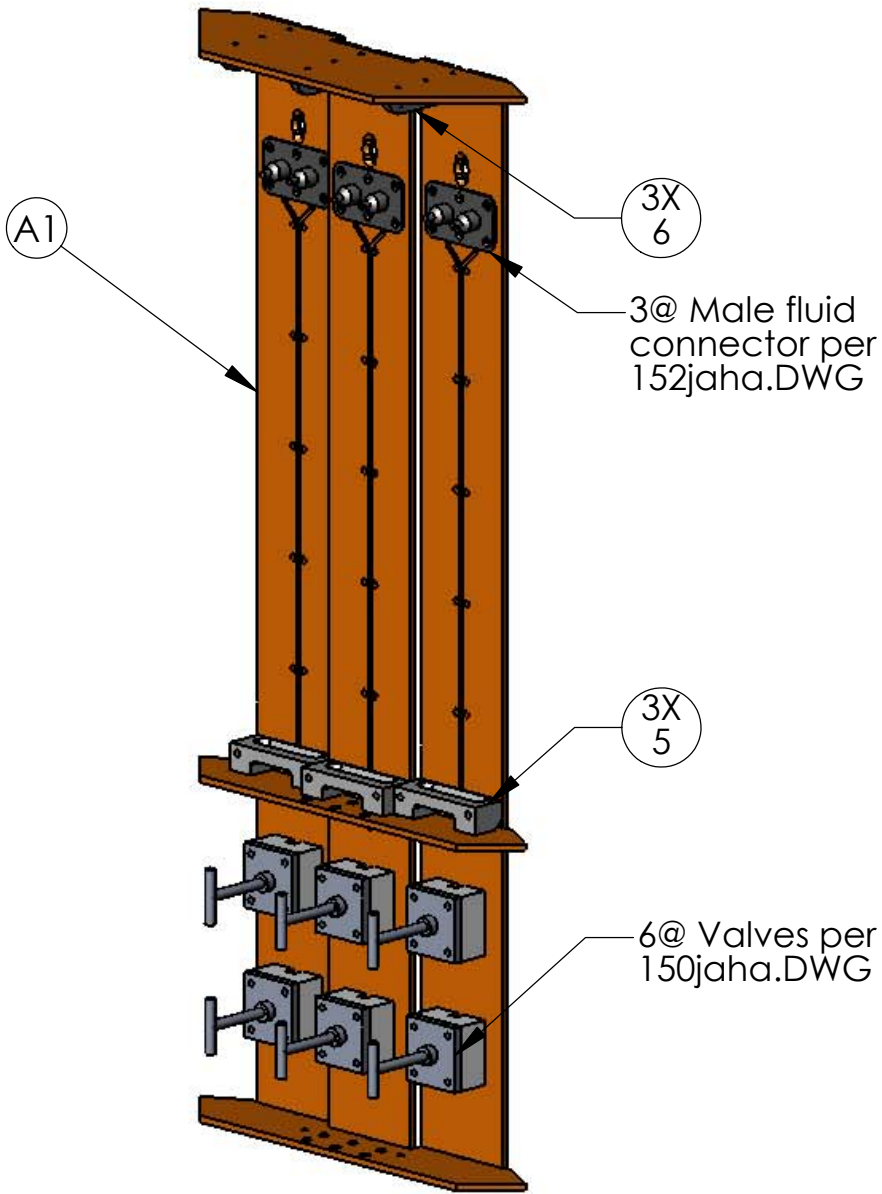
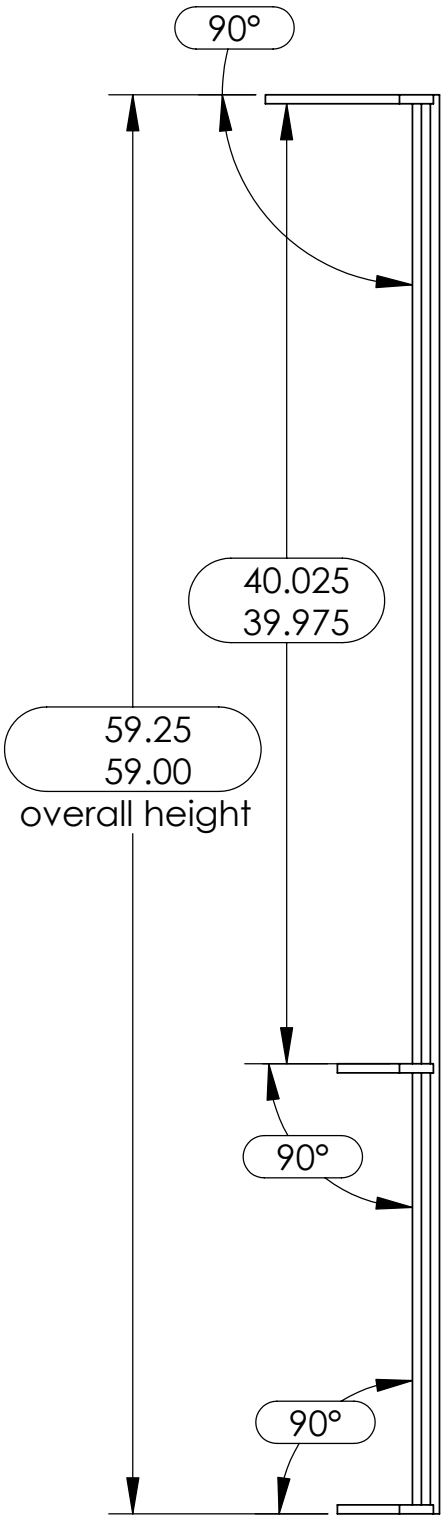
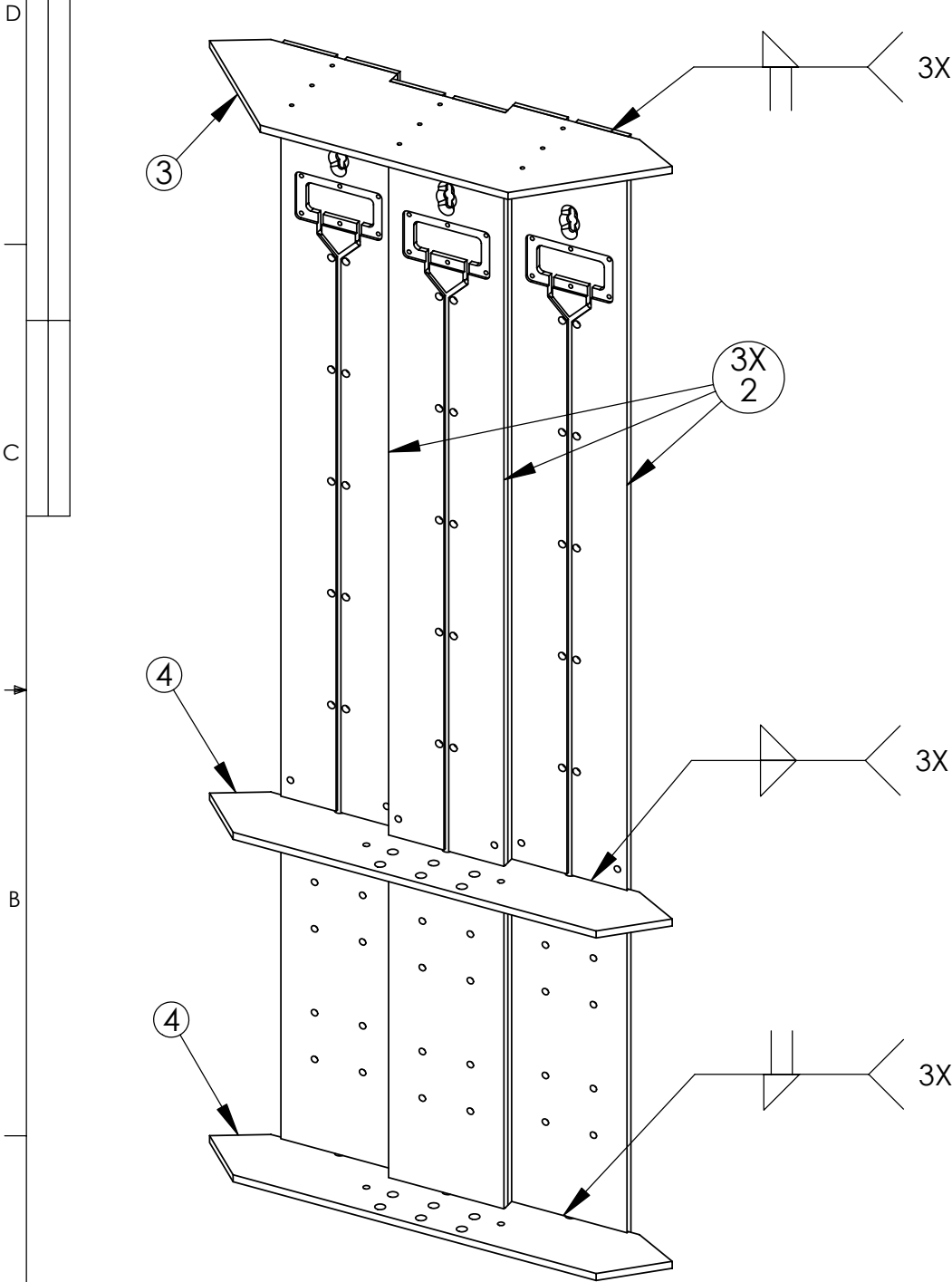
APPROVALS		DATE	Monterey Bay Aquarium Research Institute MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700
DRAWN		5/10/04	
Hans Jannasch			
ENGINEER			
CHECKED			150jahaSeafloorValve MiniValve T-handle
PROJECT NO.		701145	
PROJECT		Juan de Fuca NSF Grant	
SIZE B		DWG. NO.	150jaha.DWG
		REV.	

SHEET 2 OF 2	
--------------	--

8 7 6 5 4 3 2 1

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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

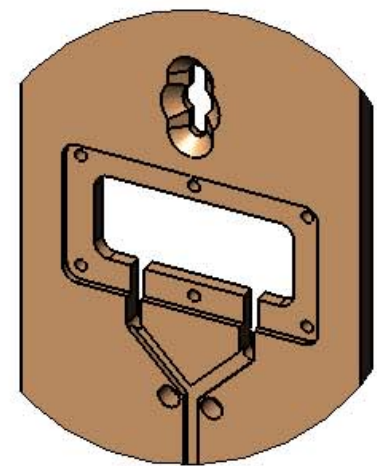
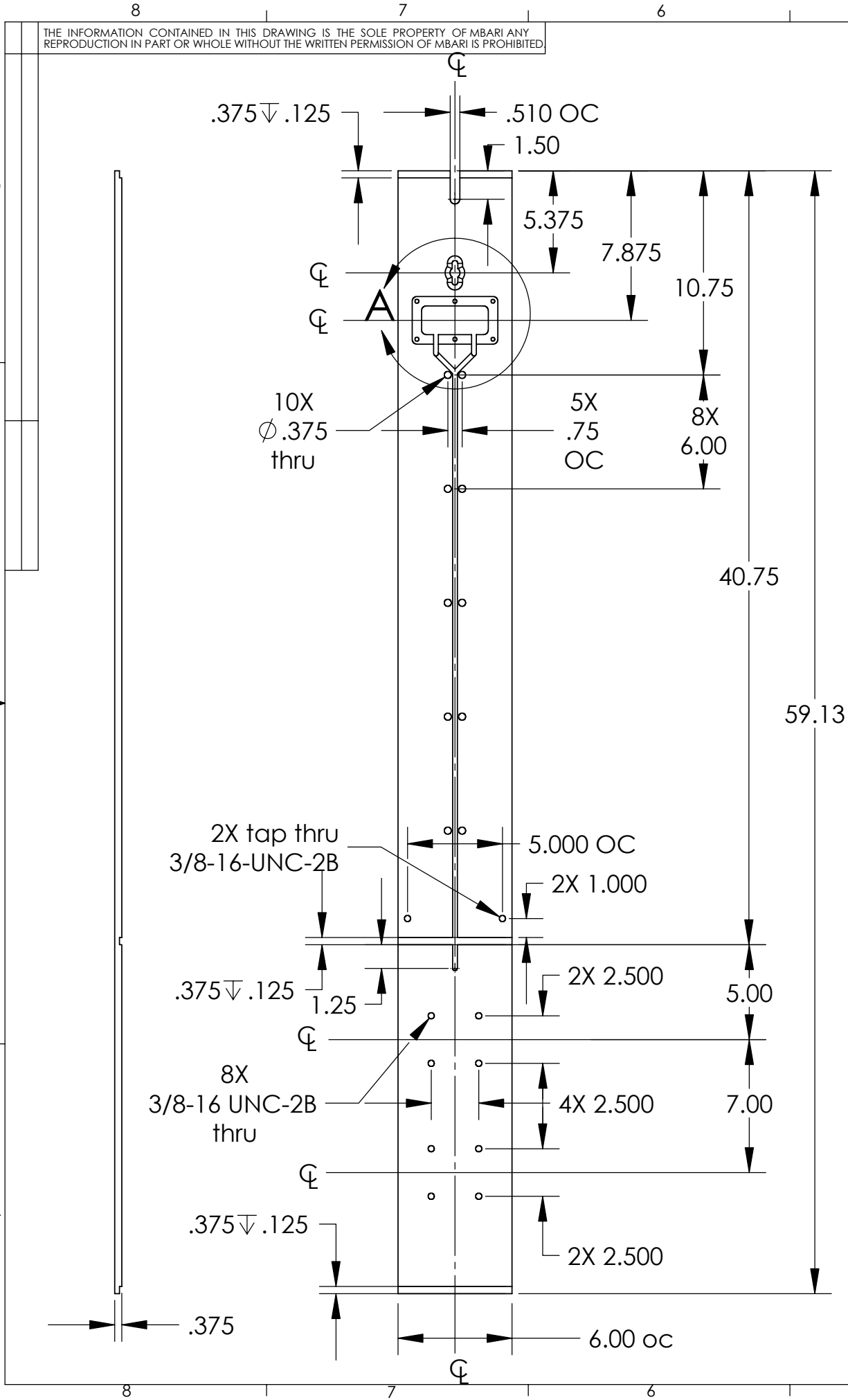


Welding notes:
7: Keep guide slots at top frame mount clear
8: Keep grooves at middle frame mounts clear
9: Clamp frame mounts to keep parallel and perpendicular to back plates.

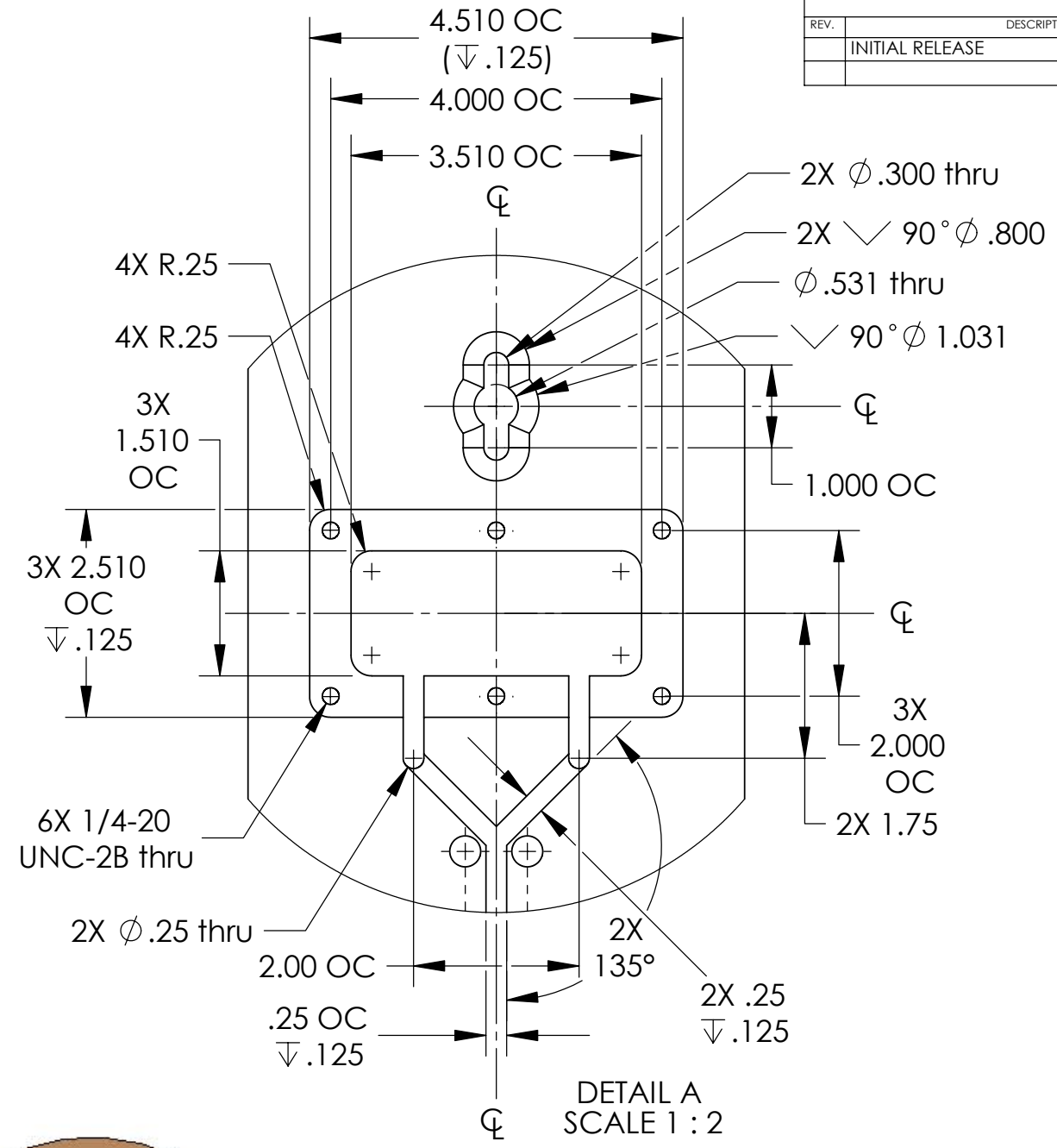
6	3@		Top guide	UHMW Polyethylene
5	3@		Bottom receiver	UHMW Polyethylene
4	2@		Mid/Bot. Frame mount	ASTM-A36 Steel
3	1@		Top frame mount	ASTM-A36 Steel
2	3@		Back plates	ASTM-A36 Steel
A1	1@		OsmoSampler Frame	Welded Assy
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS

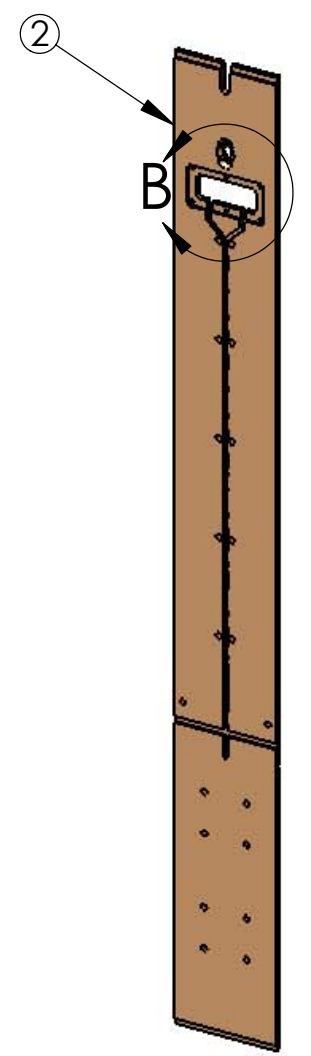
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquarium Research Institute	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN	Hans Jannasch	5/17/04		MBARI	
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER				7700 Sandholdt RD.	
Engineer						CHECKED				Moss Landing, CA 95039	
NEXT ASSY Description	NEXT ASSY Number					PROJECT NO.	701445			PH: (831) 775-1700	
						PROJECT	Juan de Fuca NSF Grant			151jahaSeafloorFrame	
Application		DO NOT SCALE DRAWING				WEIGHT				CORK OsmoSample Frame	
						SIZE	B			DWG. NO.	151jaha.DWG
						SCALE	1:16			CAD FILE: tornado/chem/SWfiles	
										SHEET 1 OF 4	



DETAIL B
SCALE 1 : 3



DETAIL A
SCALE 1 : 2



6	3@		Top guide	UHMW Polyethylene
5	3@		Bottom receiver	UHMW Polyethylene
4	2@		Mid/Bot. Frame mount	ASTM-A36 Steel
3	1@		Top frame mount	ASTM-A36 Steel
2	3@		Back plates	ASTM-A36 Steel
A1	1@		OsmoSampler Frame	Welded Assy
Item No.	Qty.	Part No.	Description	Material Specification

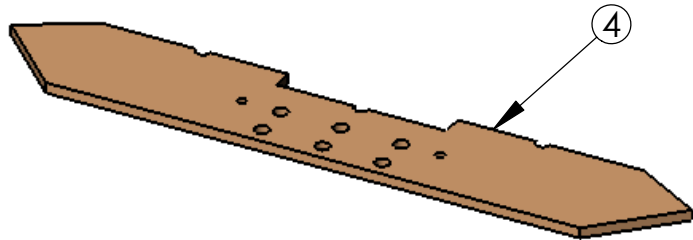
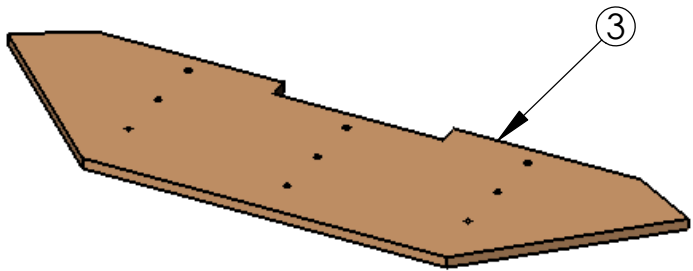
BILL OF MATERIALS						
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS	DATE
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch 5/17/04
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER
Engineer						CHECKED
NEXT ASSY Description	NEXT ASSY Number					PROJECT NO. 701445
		PROJECT Juan de Fuca NSF Grant				Monterey Bay Aquarium Research Institute MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700 
Application		DO NOT SCALE DRAWING		WEIGHT	151jahaSeafloorFrame CORK OsmoSample Frame	
					SIZE B	
				DWG. NO. 151jaha.DWG		REV.
				SCALE 1:16		CAD FILE: tornado/chem/SWfiles
						SHEET 2 OF 4

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

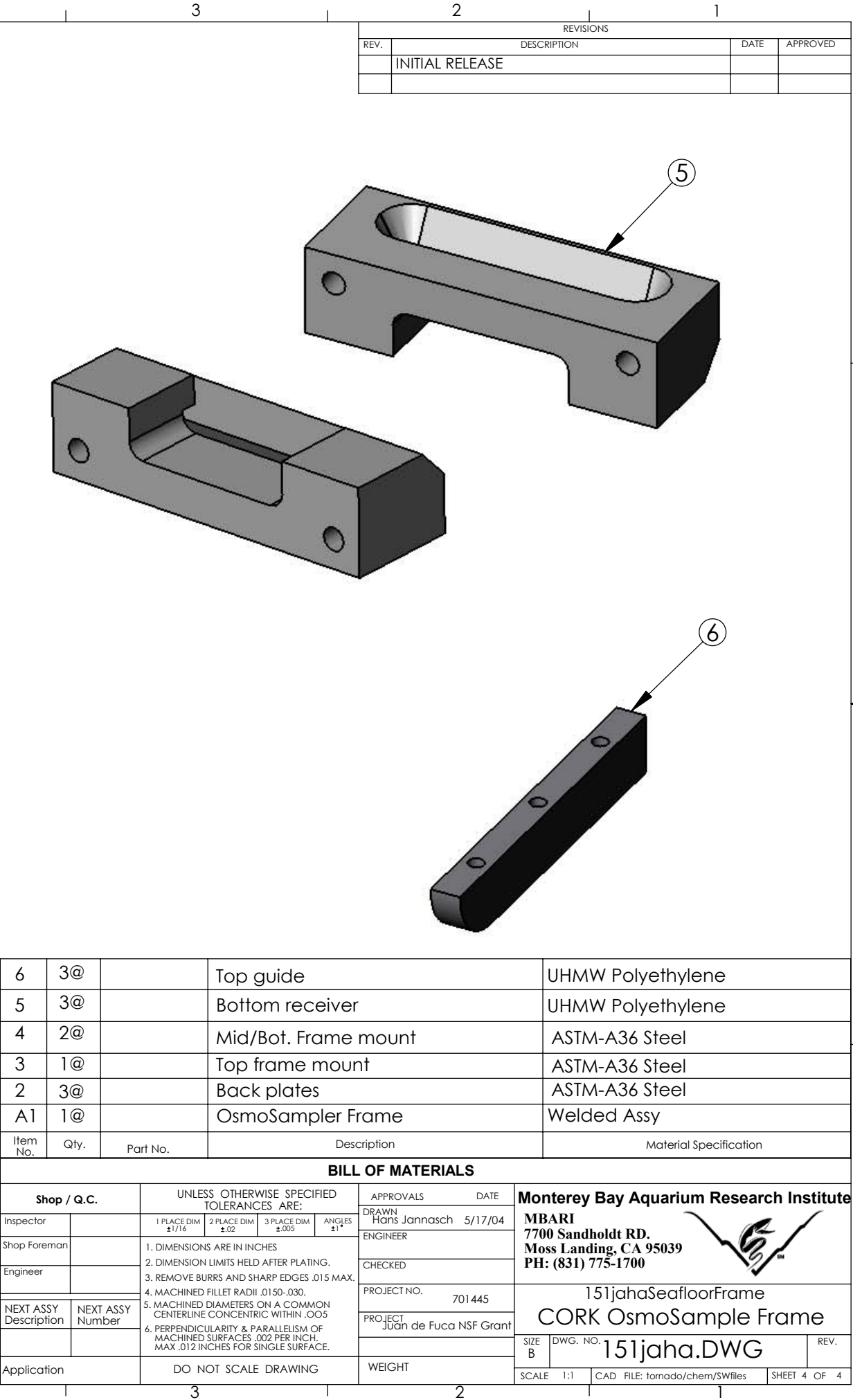
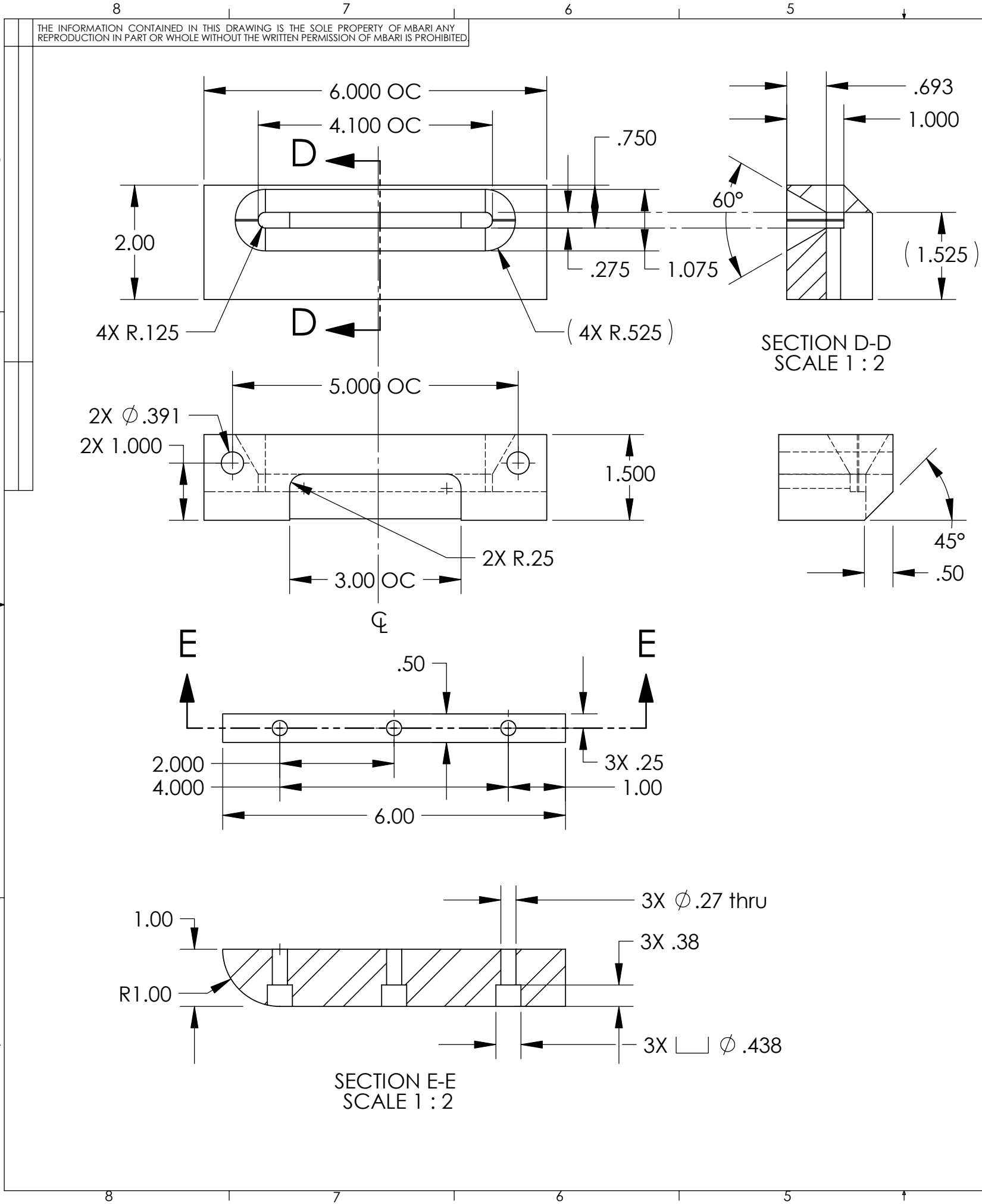
Monterey Bay Aquarium Research Institute
MBARI
7700 Sandholdt RD.
Moss Landing, CA 95039
PH: (831) 775-1700



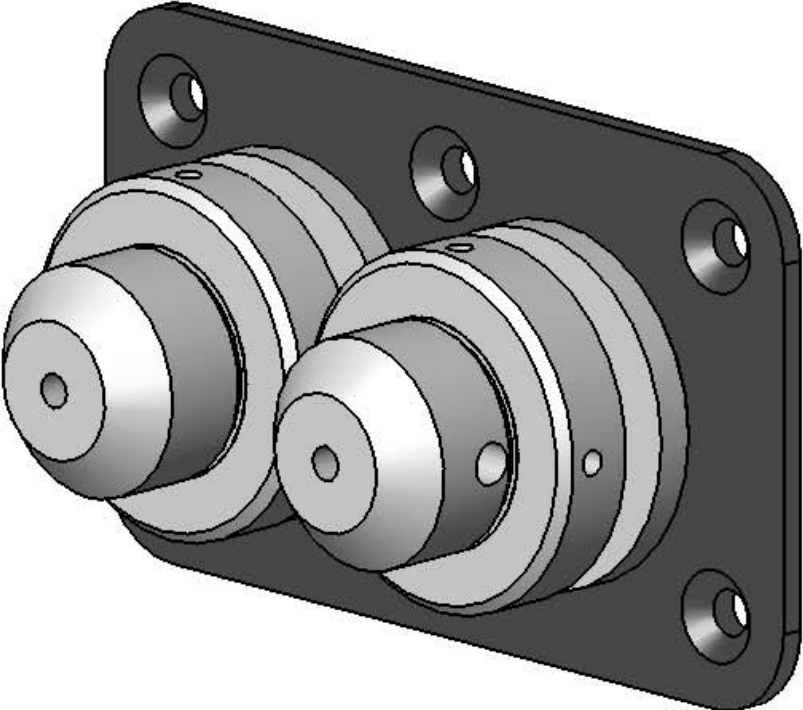
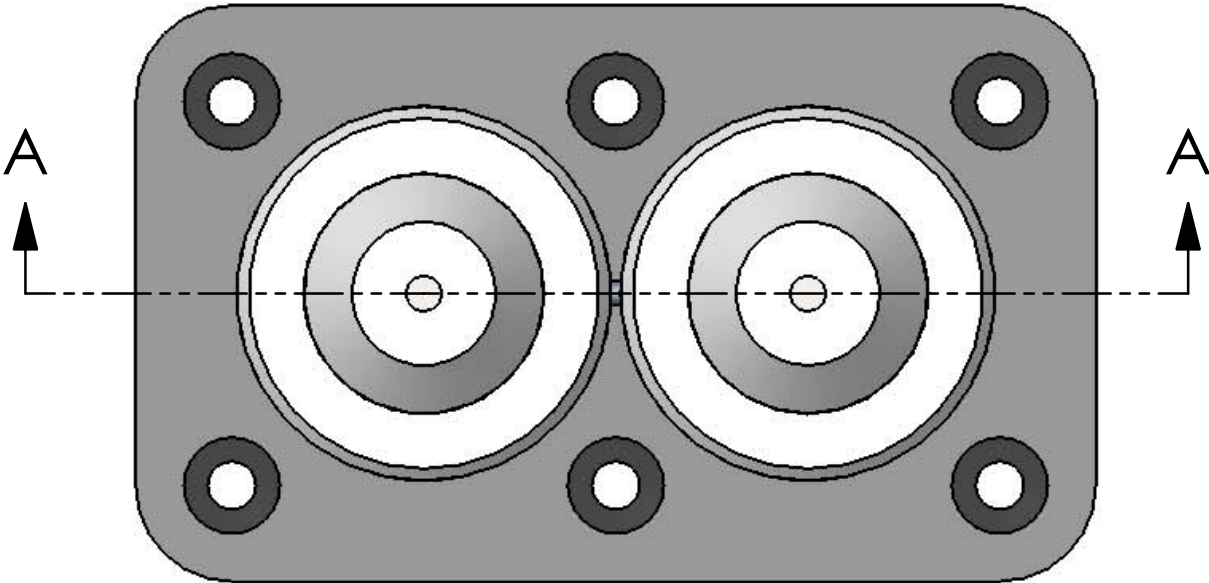
151jahaSeafloorFrame
CORK OsmoSample Frame



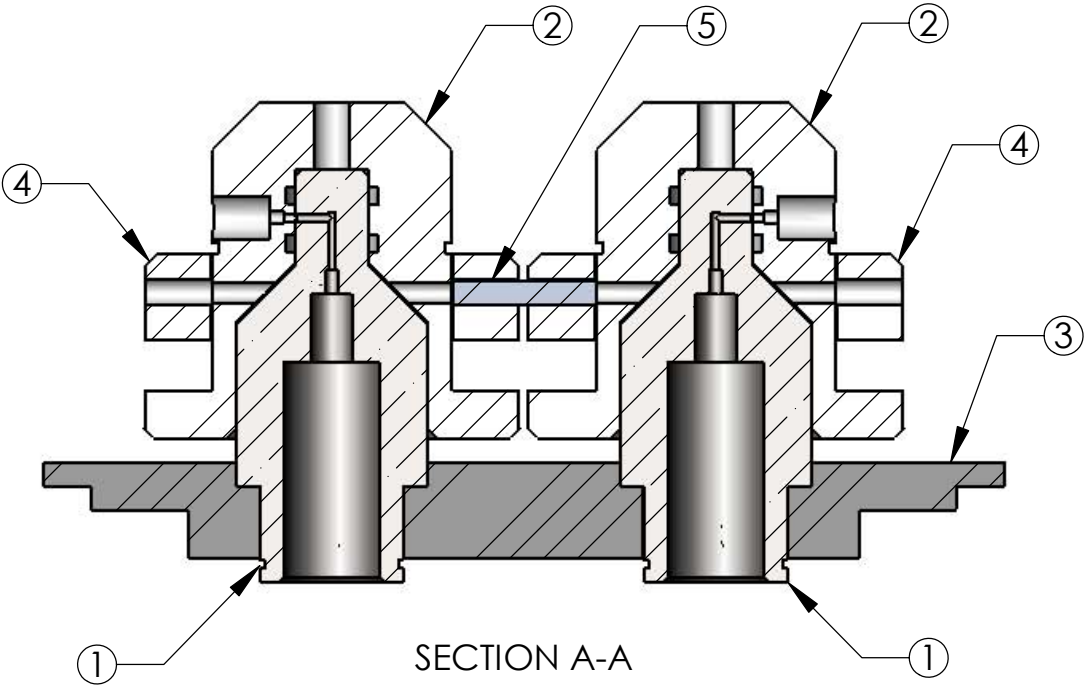
BILL OF MATERIALS									
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS DATE		Monterey Bay Aquarium Research Institute MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700 	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch 5/17/04			
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER			
Engineer						CHECKED			
NEXT ASSY Description		NEXT ASSY Number		PROJECT NO.		701445		151jahaSeafloorFrame	
				PROJECT		Juan de Fuca NSF Grant		CORK OsmoSample Frame	
								151jaha.DWG	
Application		DO NOT SCALE DRAWING				WEIGHT		SIZE B DWG. NO. 151jaha.DWG REV.	
								SCALE 1:4 CAD FILE: tornado/chem/SWfiles SHEET 3 OF 4	



REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		



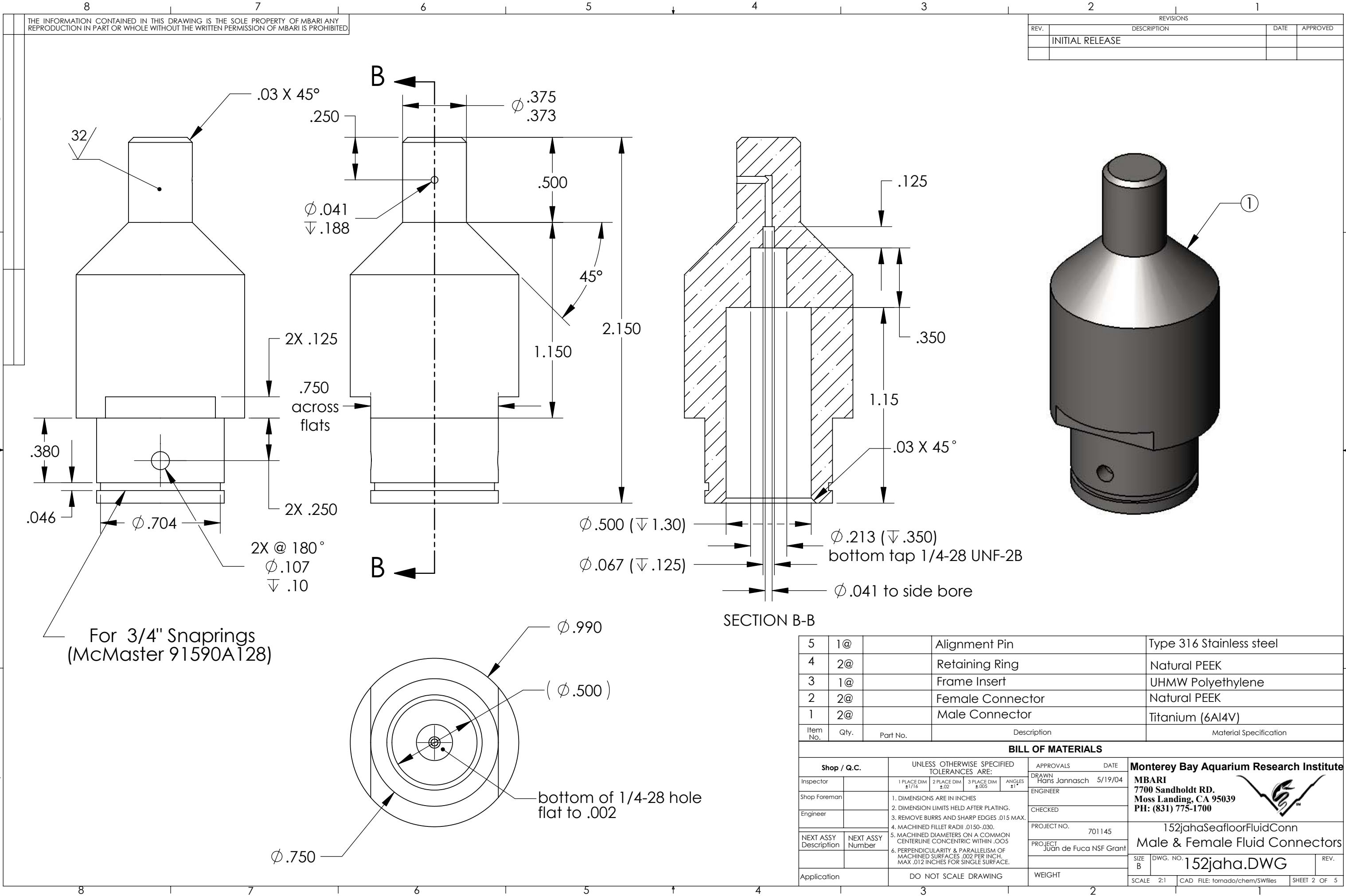
Mated Assembly
Seafloor OsmoSampler Fluid Connectors



- Requires:
- 4X -O12 Silicone O-rings (McMaster 9396K17)
 - 2X 3/4" Snaprings (McMaster 91590A128)
 - 2X 1-1/4" Snaprings (McMaster 91590A137)
 - 10X 8-32 X 3/8" set screws (McMaster 90251A193)
 - 6X 1/4-20 x 3/4" flathead (McMaster 91500A540)

5	1@		Alignment Pin	Type 316 Stainless steel
4	2@		Retaining Ring	Natural PEEK
3	1@		Frame Insert	UHMW Polyethylene
2	2@		Female Connector	Natural PEEK
1	2@		Male Connector	Titanium (6Al4V)
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS											
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquarium Research Institute	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch		5/19/04			
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER				 MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700	
Engineer						CHECKED					
						PROJECT NO.		701145			
NEXT ASSY Description						NEXT ASSY Number		PROJECT Juan de Fuca NSF Grant			
Application		DO NOT SCALE DRAWING				WEIGHT				152jahaSeafloorFluidConn	
						SIZE B		DWG. NO.		152jaha.DWG	
						SCALE 1:1		CAD FILE: tornado/chem/SWfiles		SHEET 1 OF 5	



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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

5	1@		Alignment Pin	Type 316 Stainless steel
4	2@		Retaining Ring	Natural PEEK
3	1@		Frame Insert	UHMW Polyethylene
2	2@		Female Connector	Natural PEEK
1	2@		Male Connector	Titanium (6Al4V)
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS			
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02
Shop Foreman		3 PLACE DIM ±.005	ANGLES ±1°
Engineer		1. DIMENSIONS ARE IN INCHES	
		2. DIMENSION LIMITS HELD AFTER PLATING.	
		3. REMOVE BURRS AND SHARP EDGES .015 MAX.	
		4. MACHINED FILLET RADII .0150-.030.	
NEXT ASSY Description	NEXT ASSY Number	5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	
		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.	
Application		DO NOT SCALE DRAWING	
		WEIGHT	

APPROVALS

DATE

5/19/04

Hans Jannasch

ENGINEER

CHECKED

PROJECT NO.

701145

PROJECT

Juan de Fuca NSF Grant

SIZE

B

DWG. NO.

152jaha.DWG

REV.

Monterey Bay Aquarium Research Institute

MBARI

7700 Sandholdt RD.

Moss Landing, CA 95039

PH: (831) 775-1700

152jahaSeafloorFluidConn

Male & Female Fluid Connectors

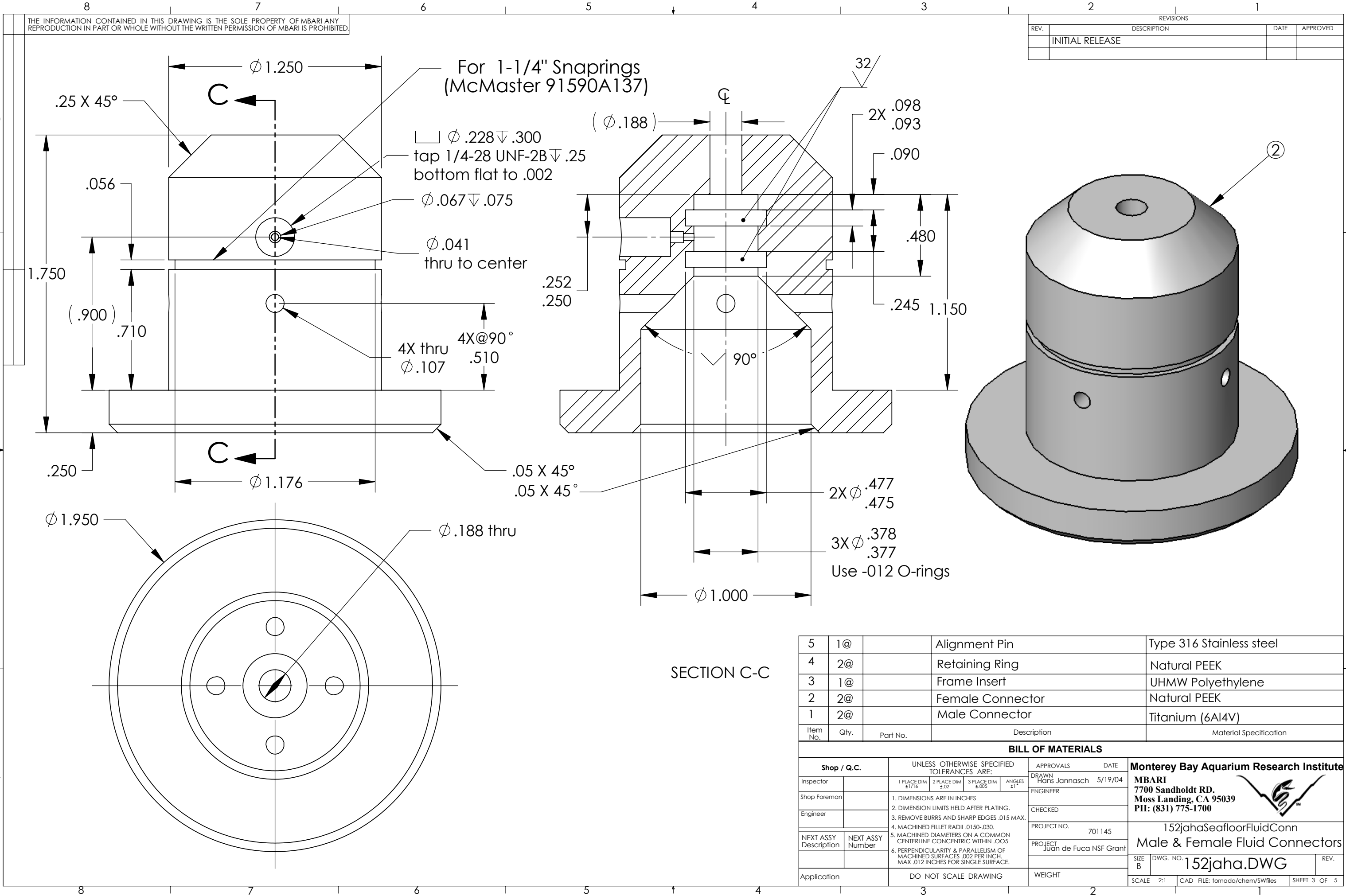
SCALE

2:1

CAD FILE:

tornado/chem/SWfiles

SHEET 2 OF 5



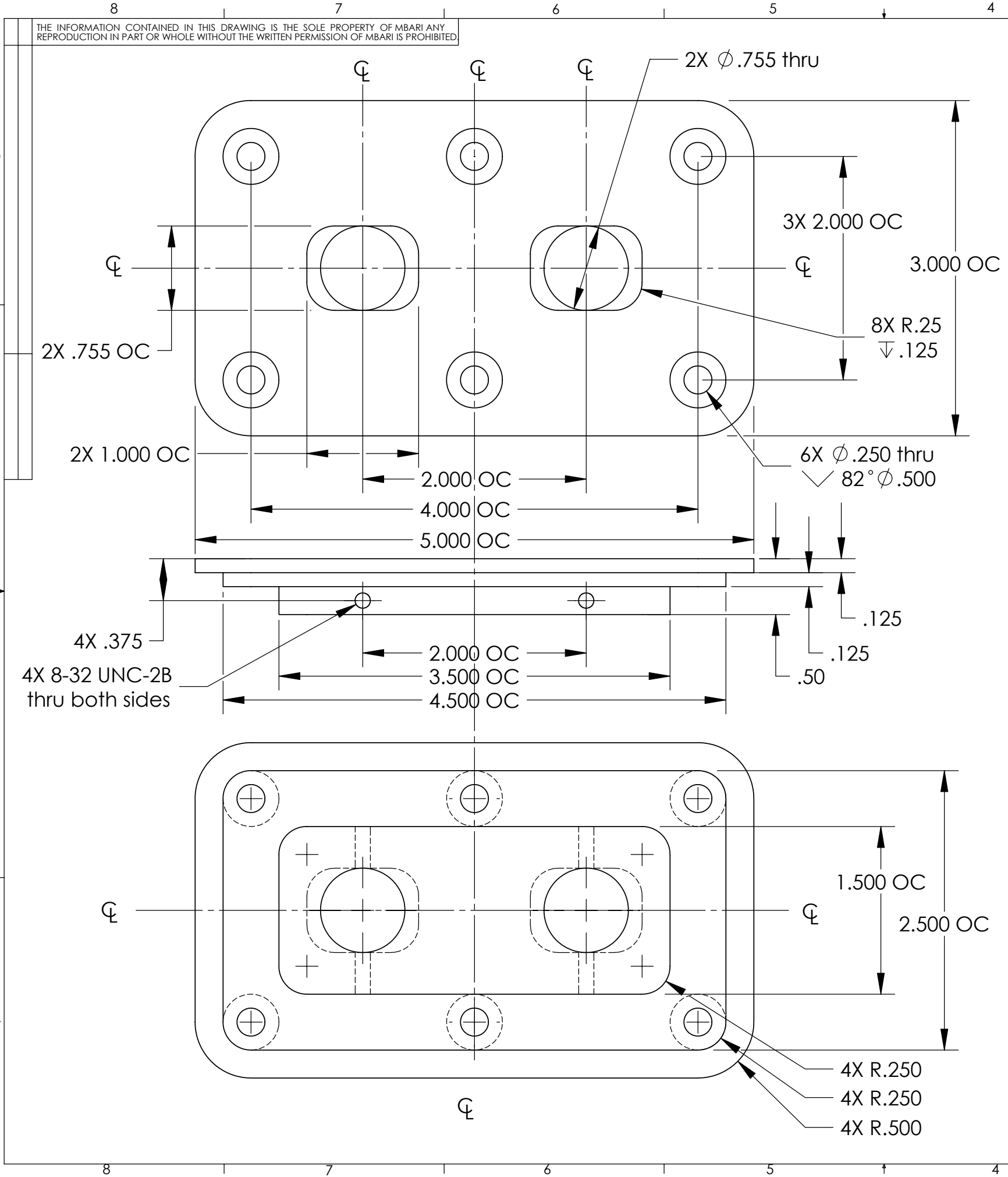
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

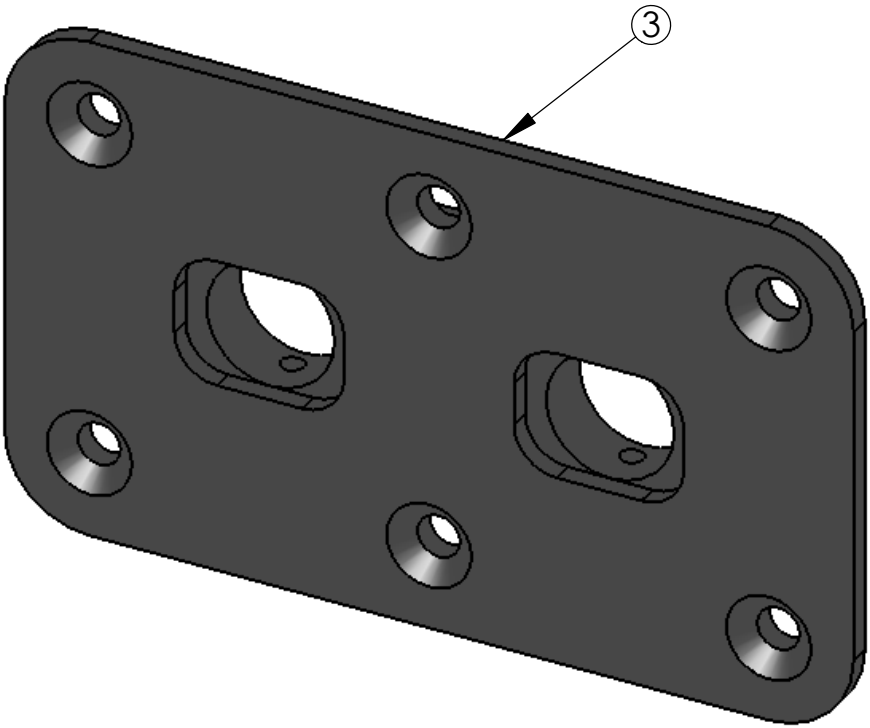
SECTION C-C

5	1@		Alignment Pin	Type 316 Stainless steel
4	2@		Retaining Ring	Natural PEEK
3	1@		Frame Insert	UHMW Polyethylene
2	2@		Female Connector	Natural PEEK
1	2@		Male Connector	Titanium (6Al4V)
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS													
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquarium Research Institute			
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch	5/19/04	ENGINEER					
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.				CHECKED		152jahaSeafloorFluidConn Male & Female Fluid Connectors					
Engineer						PROJECT NO.						701145	
NEXT ASSY Description						PROJECT						Juan de Fuca NSF Grant	
NEXT ASSY Number													
Application		DO NOT SCALE DRAWING				WEIGHT		SIZE B		DWG. NO. 152jaha.DWG			
								SCALE 2:1		CAD FILE: tornado/chem/SWfiles			
		3				2				SHEET 3 OF 5			

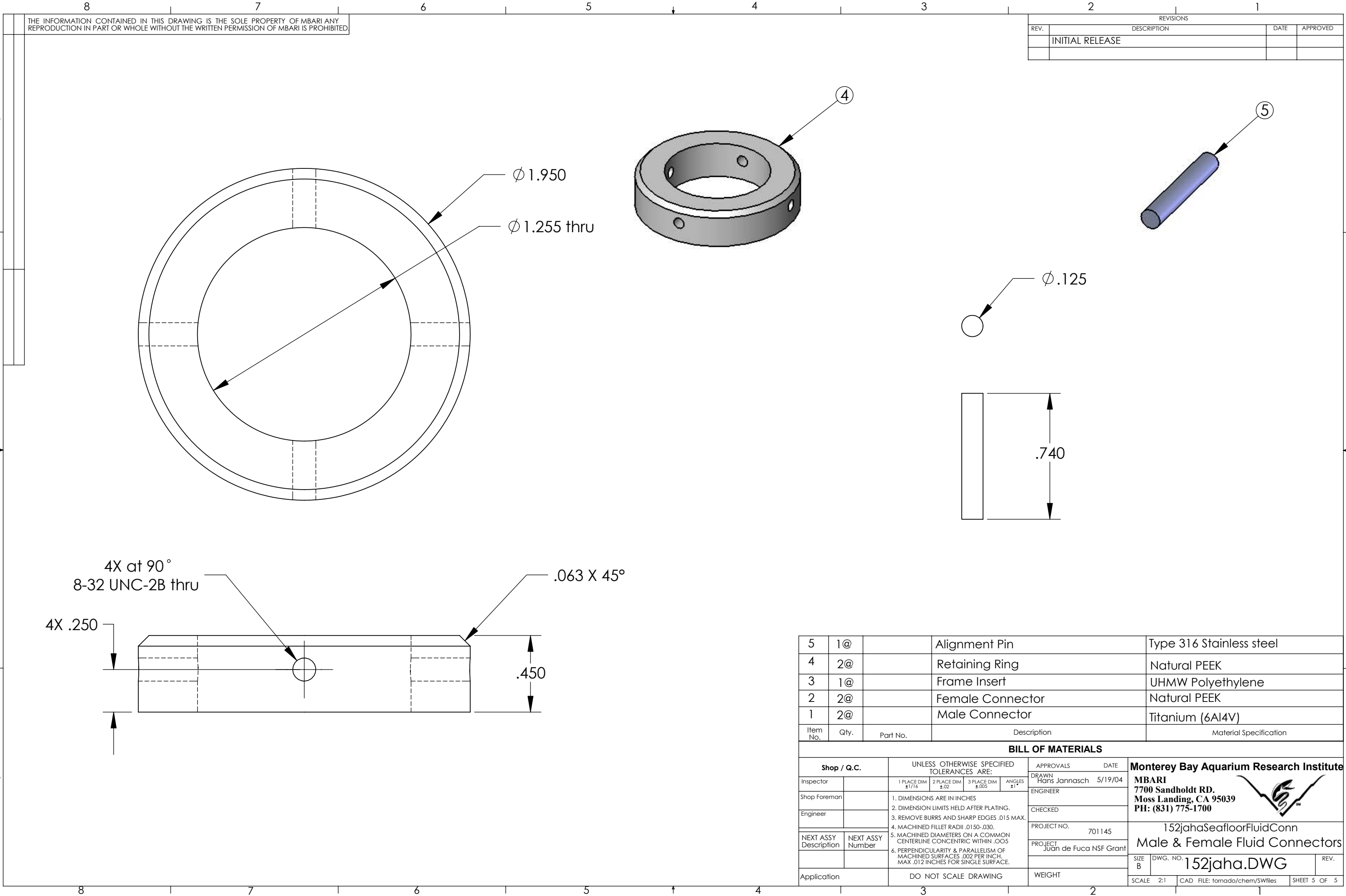


REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		



5	1@		Alignment Pin	Type 316 Stainless steel
4	2@		Retaining Ring	Natural PEEK
3	1@		Frame Insert	UHMW Polyethylene
2	2@		Female Connector	Natural PEEK
1	2@		Male Connector	Titanium (6Al4V)
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS				Monterey Bay Aquarium Research Institute			
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS		DATE	
Inspector		1 PLACE DIM $\pm .1/16$	2 PLACE DIM $\pm .02$	3 PLACE DIM $\pm .005$	ANGLES $\pm 1^\circ$	DRAWN	Hans Jannasch 5/19/04
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.		ENGINEER		CHECKED	
Engineer				PROJECT NO.		701145	
NEXT ASSY Description	NEXT ASSY Number			PROJECT		Juan de Fuca NSF Grant	
Application		DO NOT SCALE DRAWING		WEIGHT		SIZE B	
						DWG. NO. 152jaha.DWG	
						REV.	
						SCALE 1:1	
						CAD FILE: tornado/chem/SWfiles	
						SHEET 4 OF 5	



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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

5	1@		Alignment Pin	Type 316 Stainless steel
4	2@		Retaining Ring	Natural PEEK
3	1@		Frame Insert	UHMW Polyethylene
2	2@		Female Connector	Natural PEEK
1	2@		Male Connector	Titanium (6Al4V)
Item No.	Qty.	Part No.	Description	Material Specification

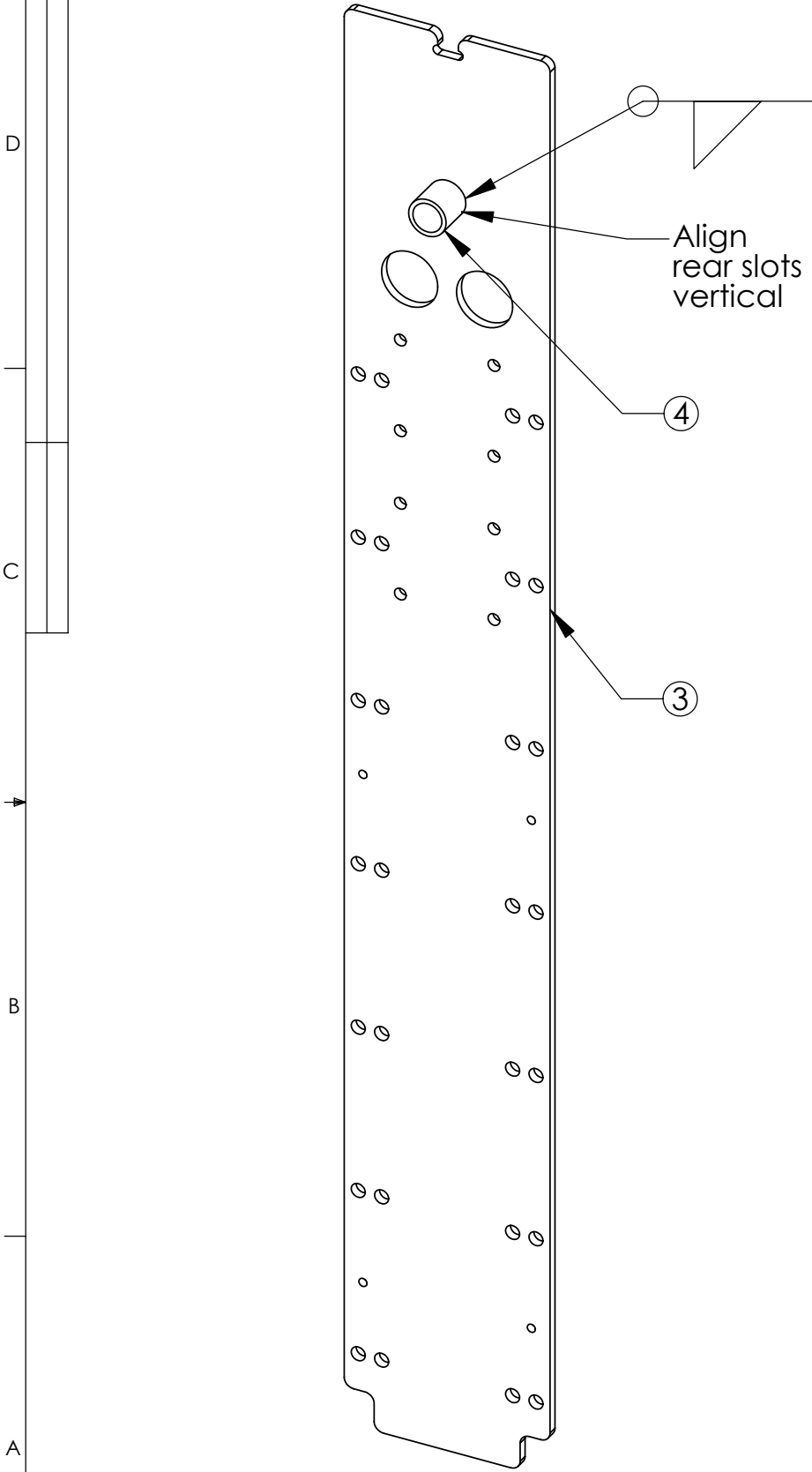
BILL OF MATERIALS

Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS	DATE	Monterey Bay Aquarium Research Institute		
Inspector		1 PLACE DIM $\pm 1/16$	2 PLACE DIM $\pm .02$	3 PLACE DIM $\pm .005$	ANGLES $\pm 1^\circ$	DRAWN Hans Jannasch	5/19/04	MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700 		
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER				
Engineer						CHECKED				
NEXT ASSY Description	NEXT ASSY Number					PROJECT NO.	701145	152jahaSeafloorFluidConn Male & Female Fluid Connectors		
						PROJECT	Juan de Fuca NSF Grant			
Application		DO NOT SCALE DRAWING				WEIGHT		SIZE B	DWG. NO. 152jaha.DWG	REV.
						SCALE	2:1	CAD	FILE: tornado/chem/SWfiles	SHEET 5 OF 5

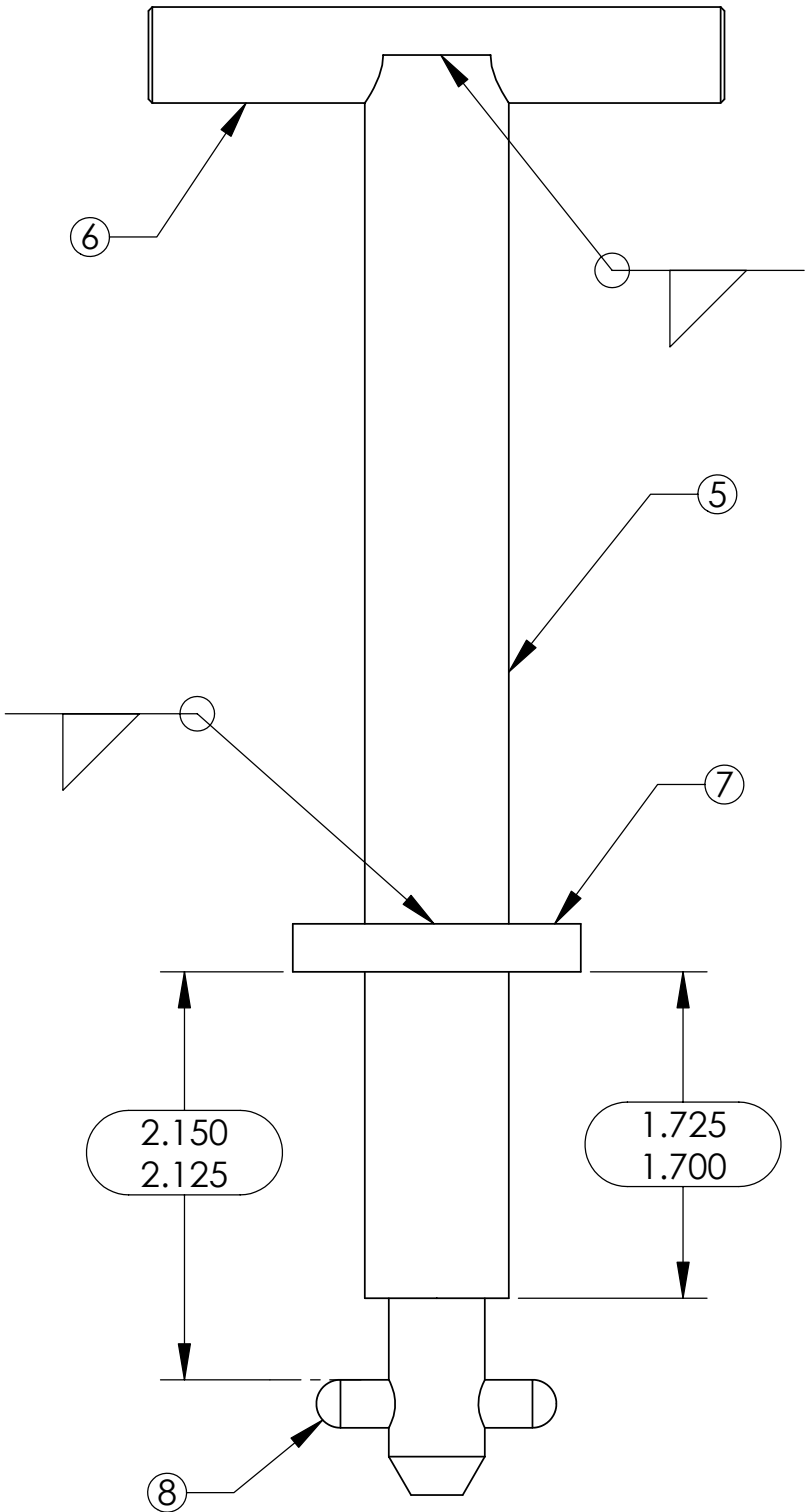
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		



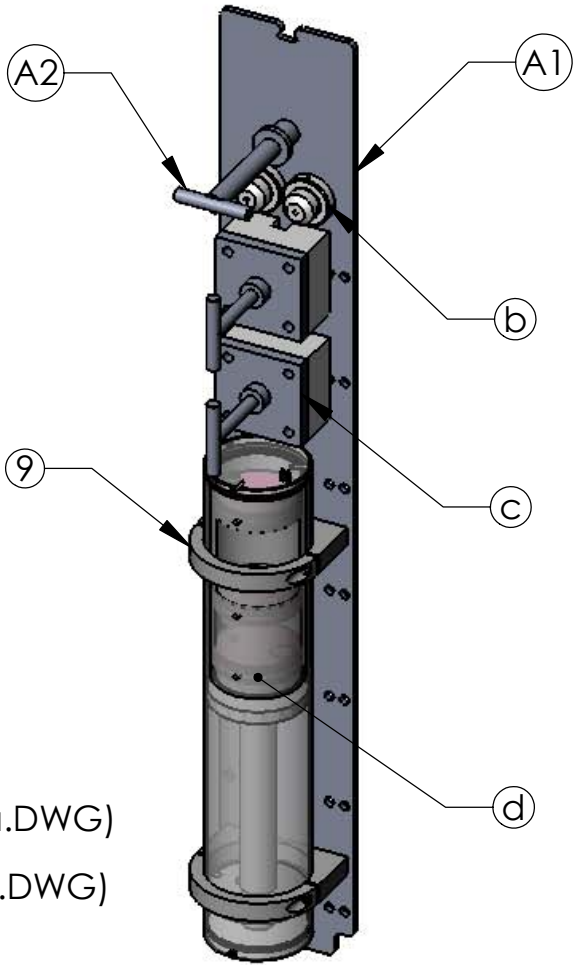
OsmoSampler Plate (Welded Assembly)



Lock Handle (Welded Assembly)

NOTE: T-handle Pin(p8) will be field installed

Other parts include:
b: Fluid Connections (152jaha.DWG)
c: Mini Valves (150jaha.DWG)
d: 4in OsmoSampler (157jaha.DWG)

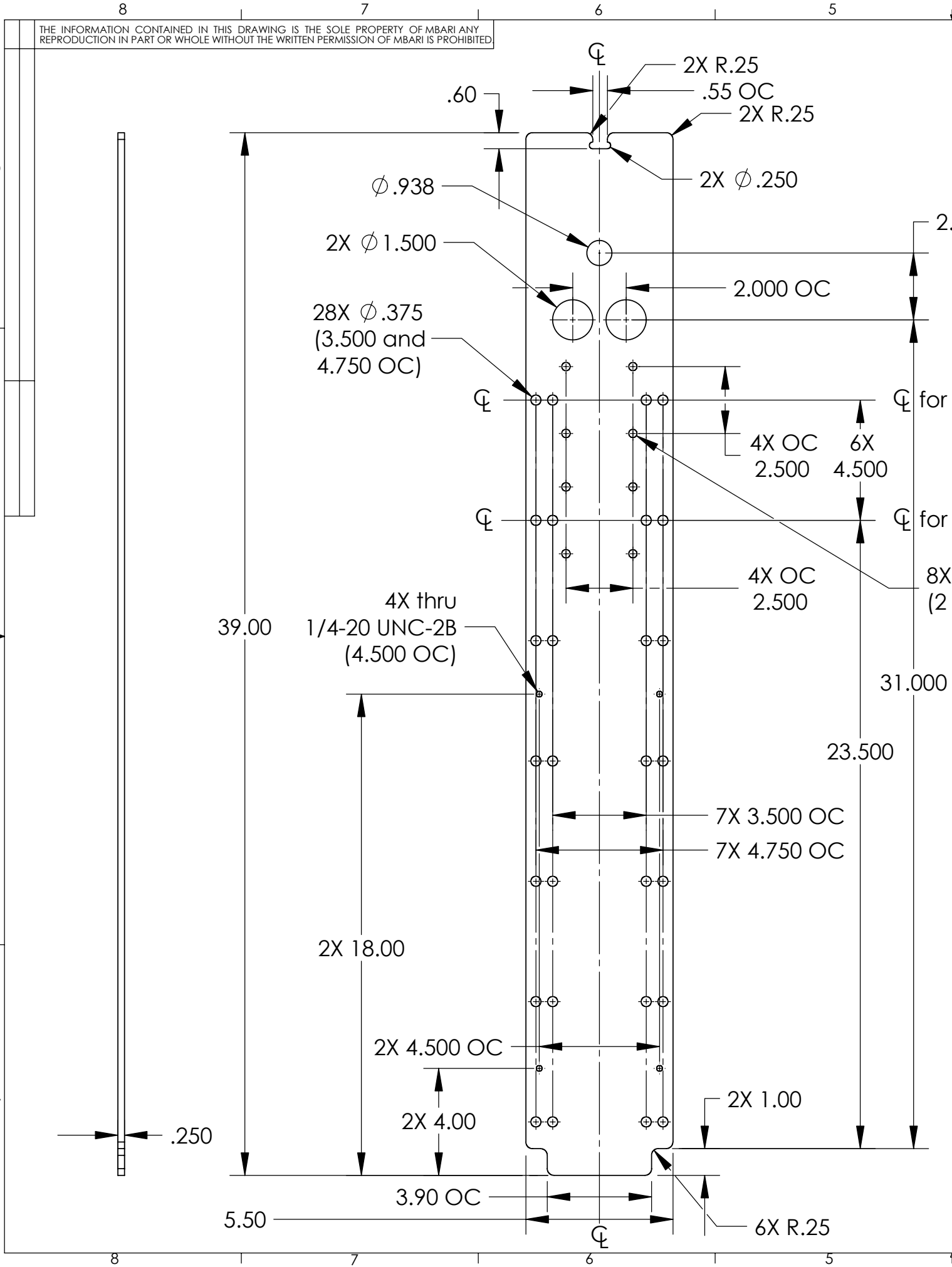


Seafloor OsmoSampler Assembly

9	2@		OsmoSampler Bracket	Delrin or PVC
8	1@		T-handle pin	Type 316 Stainless steel
7	1@		T-handle stop	Type 316 Stainless steel
6	1@		T-handle end	Type 316 Stainless steel
5	1@		T-handle shaft	Type 316 Stainless steel
4	1@		Guide	Type 316 Stainless steel
3	1@		Mounting Plate	Type 316 Stainless steel
A2	P5-7		Lock Handle (welded assy)	Welded Assy
A1	P3-4		OsmoSampler Plate (welded assy)	Welded Assy
Item No.	Qty.	Part No.	Description	Material Specification

BILL OF MATERIALS

Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquarium Research Institute		
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN	Hans Jannasch	5/10/04		MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700		
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER						
Engineer						CHECKED						
NEXT ASSY Description	NEXT ASSY Number					PROJECT NO.	701145					
						PROJECT	Juan de Fuca NSF Grant					
Application		DO NOT SCALE DRAWING				WEIGHT				SIZE B	DWG. NO. 153jaha.DWG	REV.
										SCALE 1:2	CAD FILE: tornado/chem/SWfiles	SHEET 1 OF 4



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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

9	2@		OsmoSampler Bracket	Delrin or PVC
8	1@		T-handle pin	Type 316 Stainless steel
7	1@		T-handle stop	Type 316 Stainless steel
6	1@		T-handle end	Type 316 Stainless steel
5	1@		T-handle shaft	Type 316 Stainless steel
4	1@		Guide	Type 316 Stainless steel
3	1@		Mounting Plate	Type 316 Stainless steel
A2	P5-7		Lock Handle (welded assy)	Welded Assy
A1	P3-4		OsmoSampler Plate (welded assy)	Welded Assy
Item No.	Qty.	Part No.	Description	Material Specification

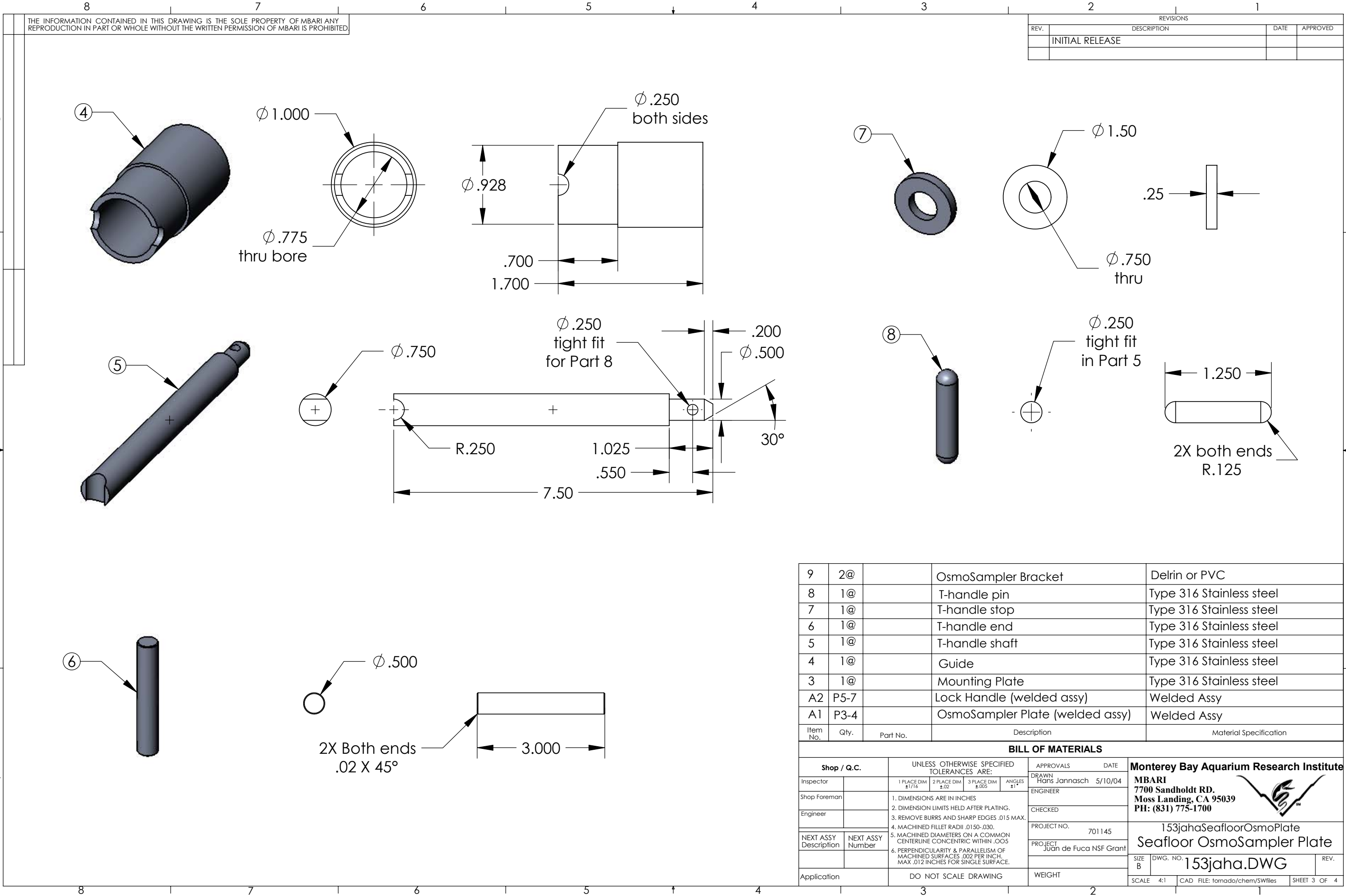
BILL OF MATERIALS			
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02
Shop Foreman		3 PLACE DIM ±.005	ANGLES ±1°
Engineer		1. DIMENSIONS ARE IN INCHES	
		2. DIMENSION LIMITS HELD AFTER PLATING.	
		3. REMOVE BURRS AND SHARP EDGES .015 MAX.	
		4. MACHINED FILLET RADII .0150-.030.	
NEXT ASSY Description	NEXT ASSY Number	5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	
		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.	
Application		DO NOT SCALE DRAWING	
		WEIGHT	
		SCALE 1:12	
		CAD FILE: tornado/chem/SWfiles	
		SHEET 2 OF 4	

Monterey Bay Aquarium Research Institute
MBARI
7700 Sandholdt RD.
Moss Landing, CA 95039
PH: (831) 775-1700



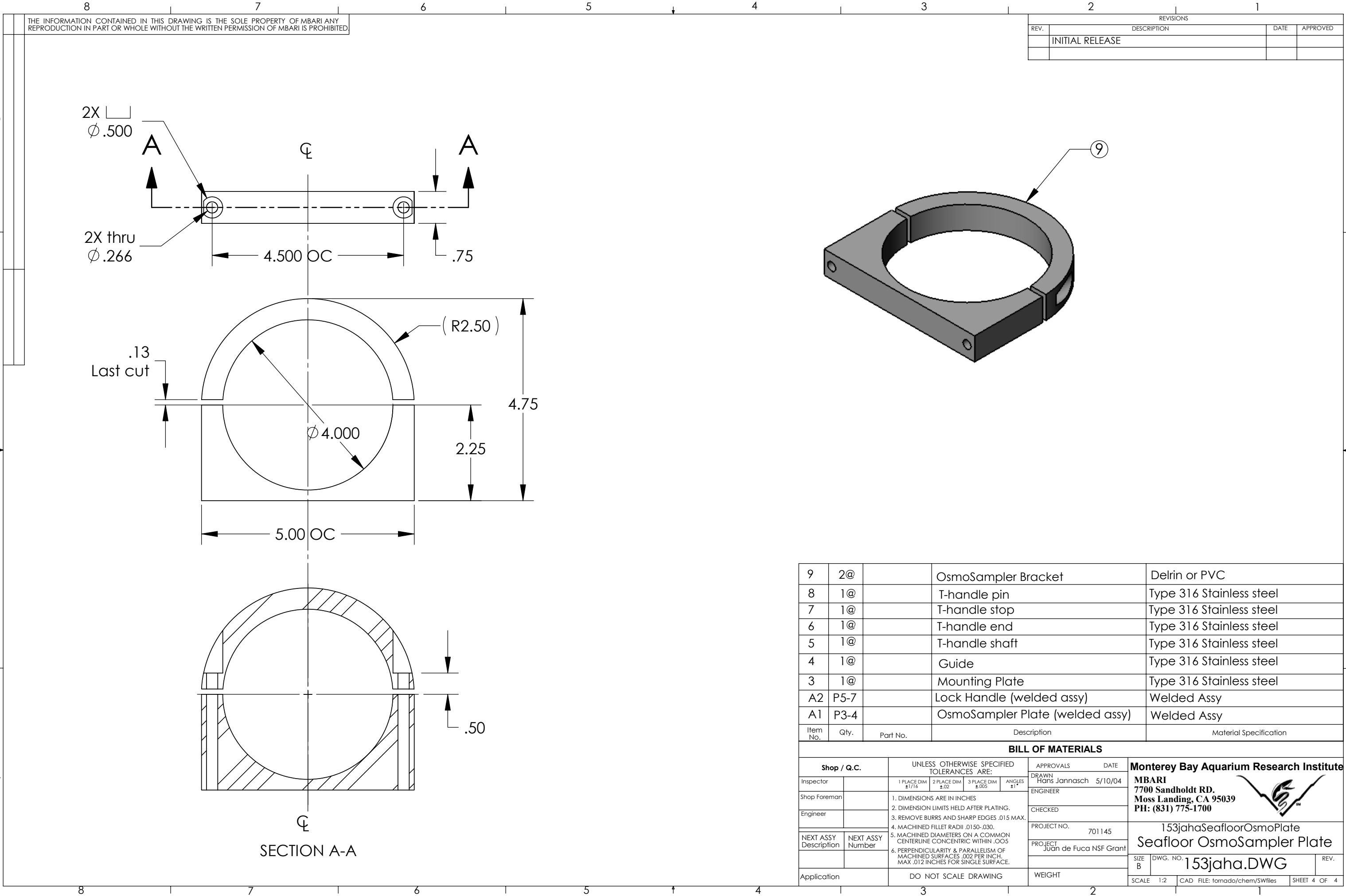
153jahaSeafloorOsmoPlate
Seafloor OsmoSampler Plate

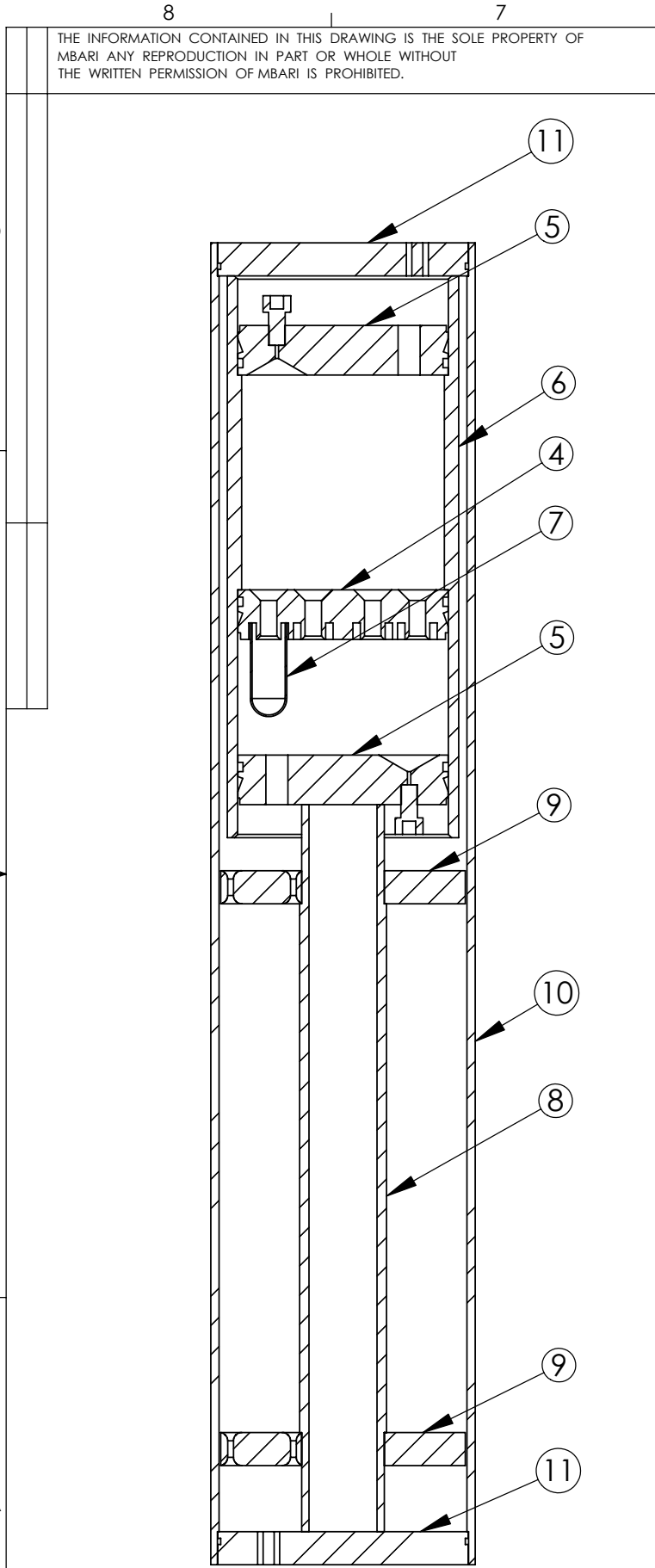
SIZE B DWG. NO. 153jaha.DWG REV.



9	2@		OsmoSampler Bracket	Delrin or PVC
8	1@		T-handle pin	Type 316 Stainless steel
7	1@		T-handle stop	Type 316 Stainless steel
6	1@		T-handle end	Type 316 Stainless steel
5	1@		T-handle shaft	Type 316 Stainless steel
4	1@		Guide	Type 316 Stainless steel
3	1@		Mounting Plate	Type 316 Stainless steel
A2	P5-7		Lock Handle (welded assy)	Welded Assy
A1	P3-4		OsmoSampler Plate (welded assy)	Welded Assy
Item No.	Qty.	Part No.	Description	Material Specification

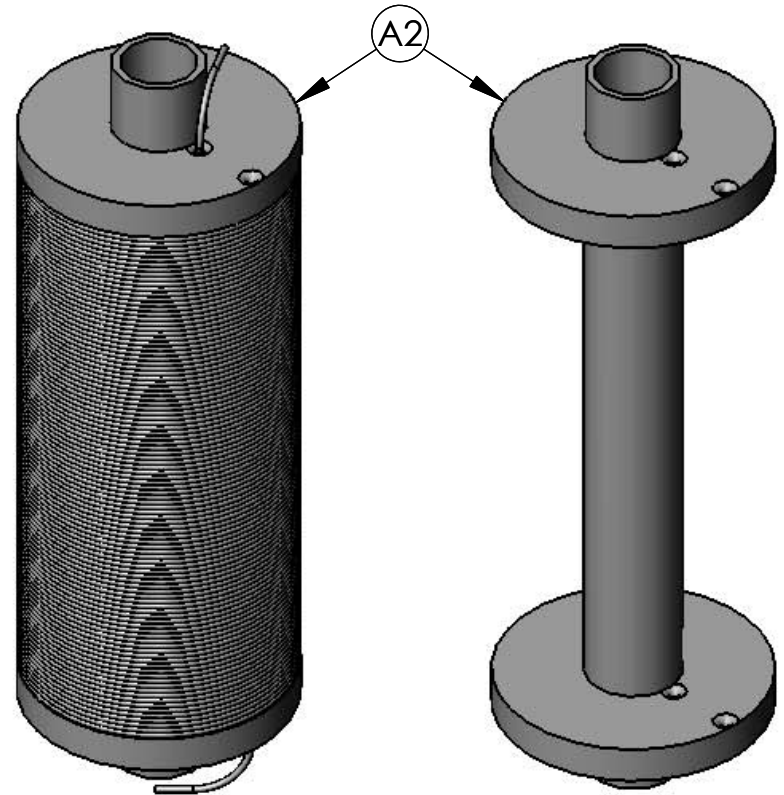
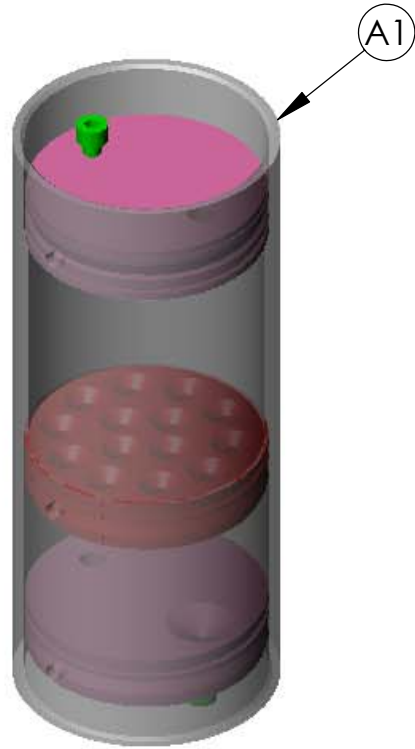
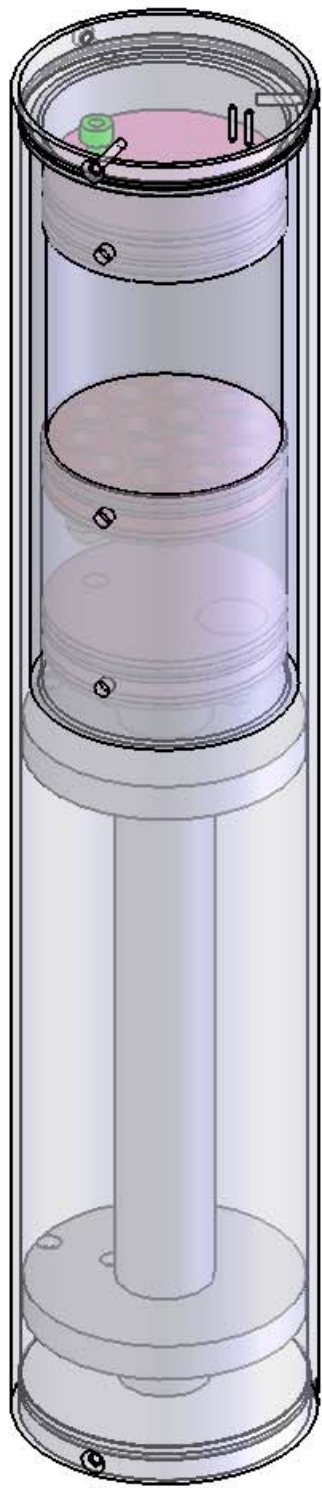
BILL OF MATERIALS											
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquarium Research Institute MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700 	
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch		5/10/04			
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER					
Engineer						CHECKED					
NEXT ASSY Description		NEXT ASSY Number				PROJECT NO.		701145		153jahaSeafloorOsmoPlate Seafloor OsmoSampler Plate	
						PROJECT		Juan de Fuca NSF Grant			
										SIZE B	
Application		DO NOT SCALE DRAWING				WEIGHT		DWG. NO.		153jaha.DWG	
								SCALE 4:1		CAD FILE: tornado/chem/SWfiles	
										SHEET 3 OF 4	





Seafloor OsmoSampler Section

Seafloor OsmoSampler Assembly



Wrapped Spool Assy

Note 7.
Bonded spools to be wrapped with evenly laid tubing in one continuous length. Tubing must not be kinked, pinched, severely stretched, or have joints. All Teflon tubing will be supplied by MBARI.
Tubing comes on 1000 ft spools. Loose tubing ends should extend 24-30 in on each end.

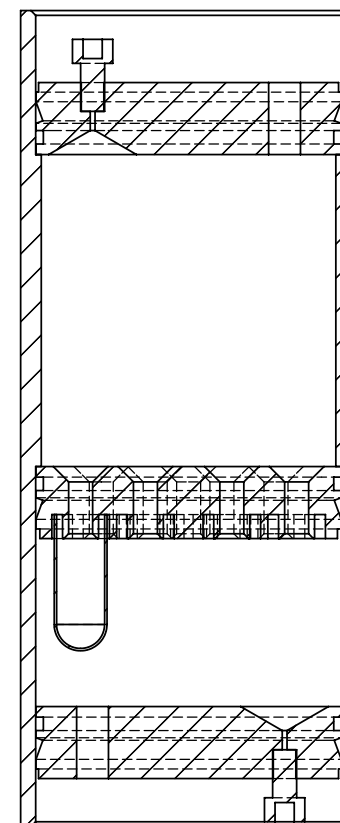
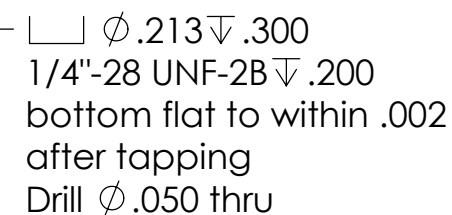
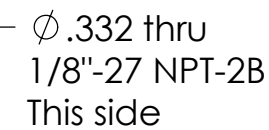
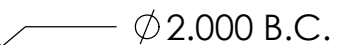
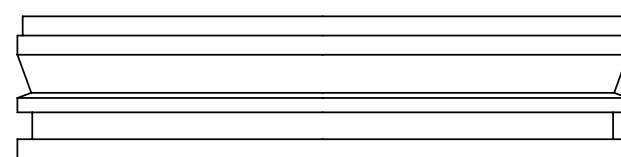
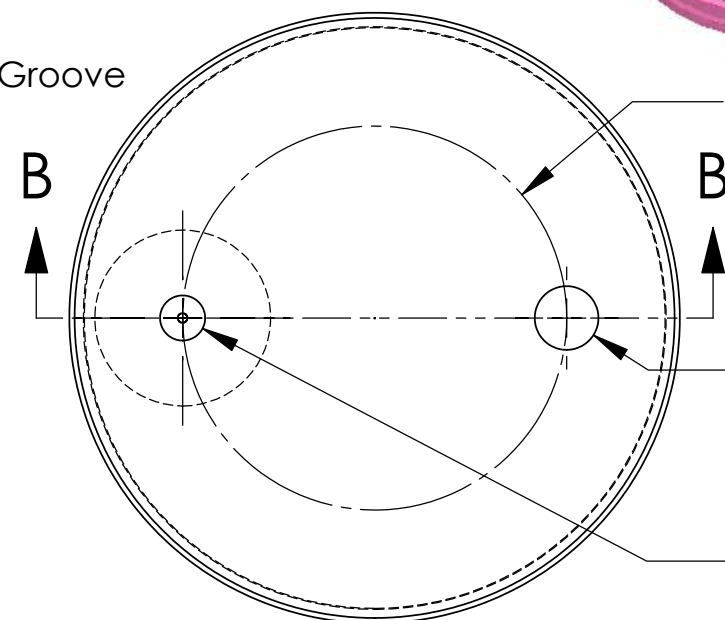
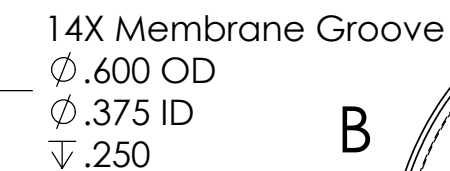
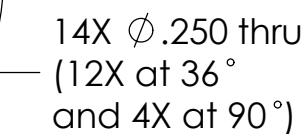
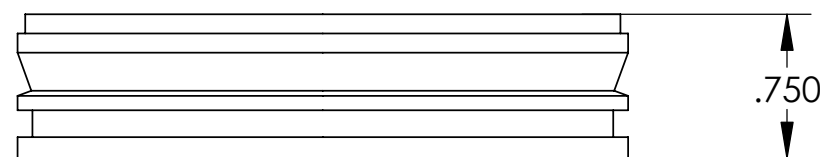
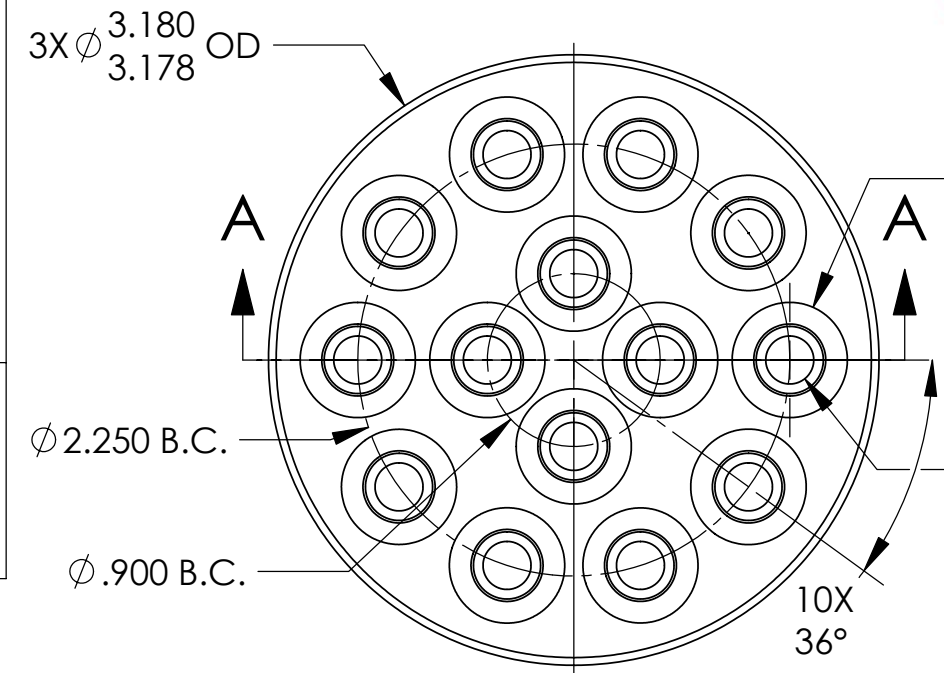
A2- Wrap with .079in OD Teflon tubing, 15 layers of about 100 wraps per layer. Total length about (~980 ft).

NEXT ASSY	USED ON
APPLICATION	

11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	4"OD 1/8" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" Sched-40 PVC pipe
7	14@		Pump membrane	Alza 2ML1 (MBARI supplied)
6	1@		Pump housing	3" Sched 40 Clear Acrylic Pipe
5	2@		Pump Endcap	Clear Acrylic
4	1@		Membrane Manifold	Clear Acrylic
A3		P10-11	OsmoSampler Housing Assy	
A2		P8-9	Spool Assembly (w/ Teflon tube)	
A1		P4-7	Osmotic Pump Assy	
ITEM NO.	QTY	PART NO.	DESCRIPTION	MATERIAL SPECIFICATION
BILL OF MATERIALS				
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS	DATE
1 PLACE DIM ±.1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch 04/20/04
1. DIMENSIONS ARE IN INCHES			ENGINEER	
2. DIMENSION LIMITS HELD AFTER PLATING.			CHECKED	
3. REMOVE BURRS AND SHARP EDGES .015 MAX.			PROJECT NO. 701445	
4. MACHINED FILLET RADII .0150-.030.			PROJECT Juan de Fuca Boreholes	
5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005			WEIGHT	
6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.			SCALE	
			CAD FILE: TORNADO/CHEM/SWFILES	
			SHEET 1 OF 5	
			REV.	
			DWG. NO. 157jaha.DWG	
			SIZE B	
			Monterey Bay Aquarium Research Institute	
			7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770	
			Juan de Fuca Seafloor OsmoSampler	

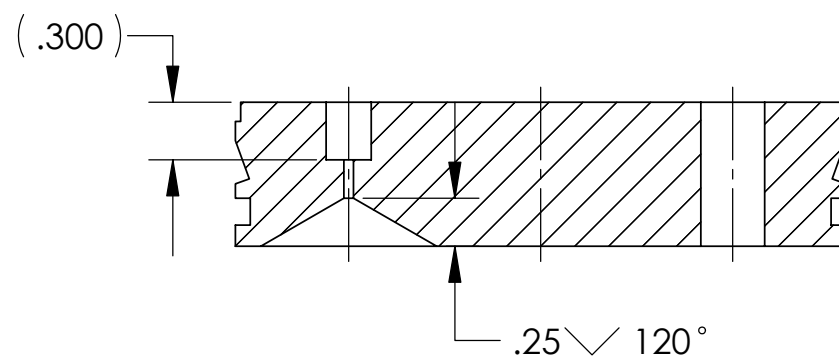
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

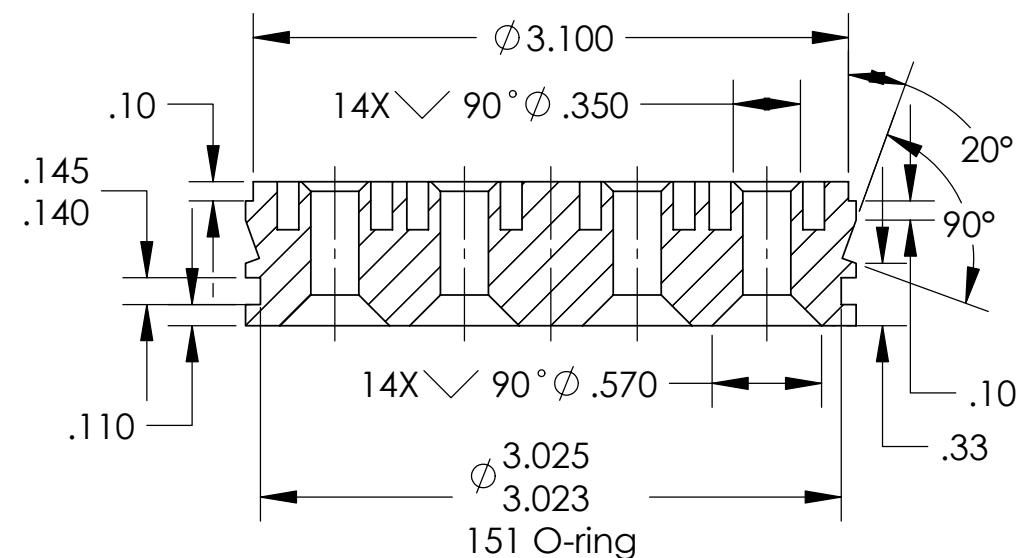


Pump Assembly Section
Pump to be assembled at MBARI

**All other dimensions
same as Part 4**



SECTION B-B
SCALE 1 : 1



SECTION A-A
SCALE 1 : 1

11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	4"OD 1/8" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" Sched-40 PVC pipe
7	14@		Pump membrane	Alza 2ML1 (MBARI supplied)
6	1@		Pump housing	3" Sched 40 Clear Acrylic Pipe
5	2@		Pump Endcap	Clear Acrylic
4	1@		Membrane Manifold	Clear Acrylic

A3		P10-11	OsmoSampler Housing Assy	
A2		P8-9	Spool Assembly (w/ Teflon tube)	
A1		P4-7	Osmotic Pump Assy	
ITEM NO.	QTY	PART NO.	DESCRIPTION	MATERIAL SPECIFICATION

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE		Monterey Bay Aquariu Research Institute				
1 PLACE DIM ±.1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±.1°	DRAWN Hans Jannasch		04/20/04						
1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX. 4. MACHINED FILLET RADII .0150-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.				ENGINEER				7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770				
				CHECKED								
				PROJECT NO.		701445		Juan de Fuca Seafloor OsmoSampler				
				PROJECT		Juan de Fuca Boreholes		SIZE B		DWG. NO. 157jaha.DWG		REV.
DO NOT SCALE DRAWING				WEIGHT				SCALE		CAD FILE: TORNADO/CHEM/SWFILES		SHEET 2 OF 5

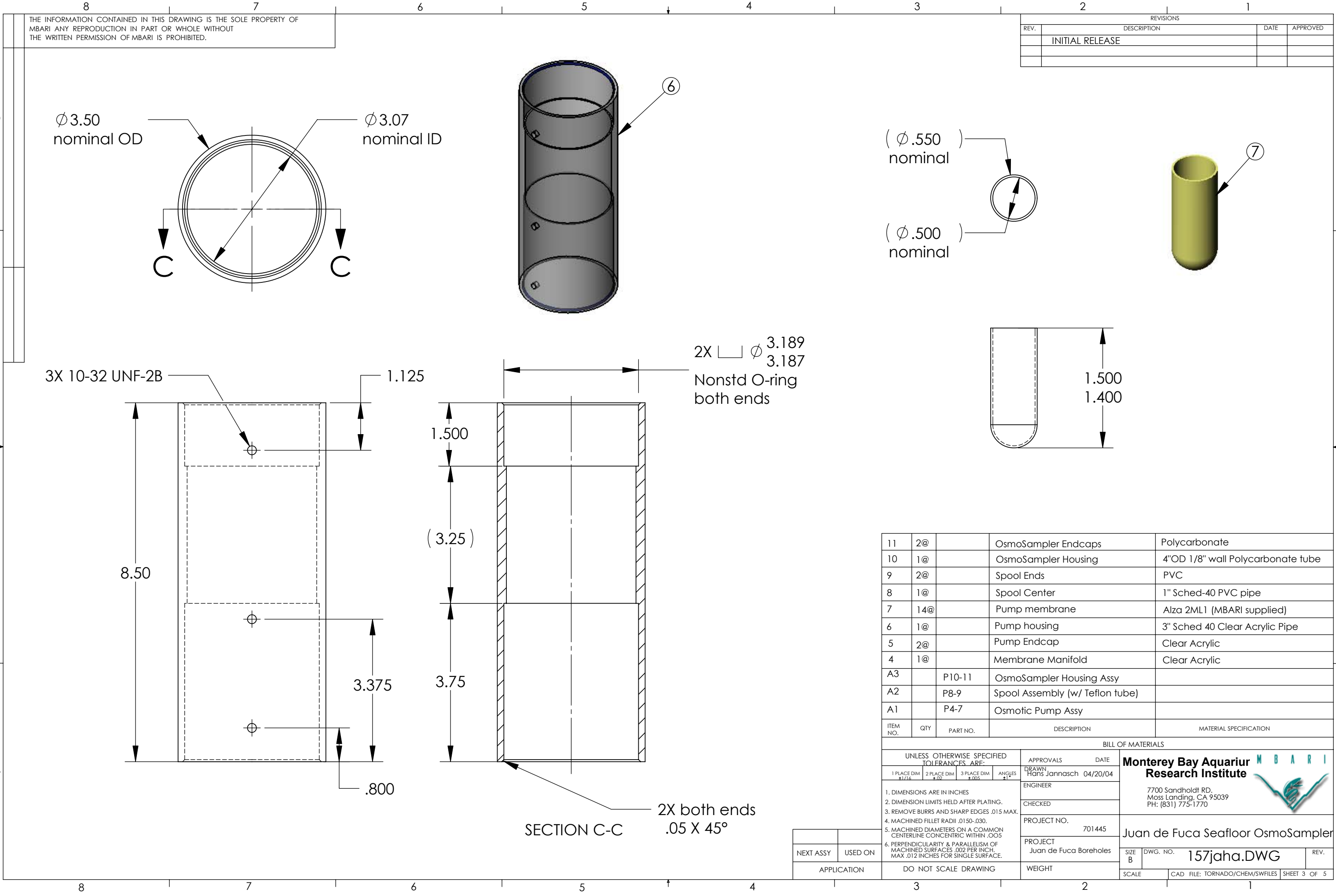
Monterey Bay Aquarium Research Institute

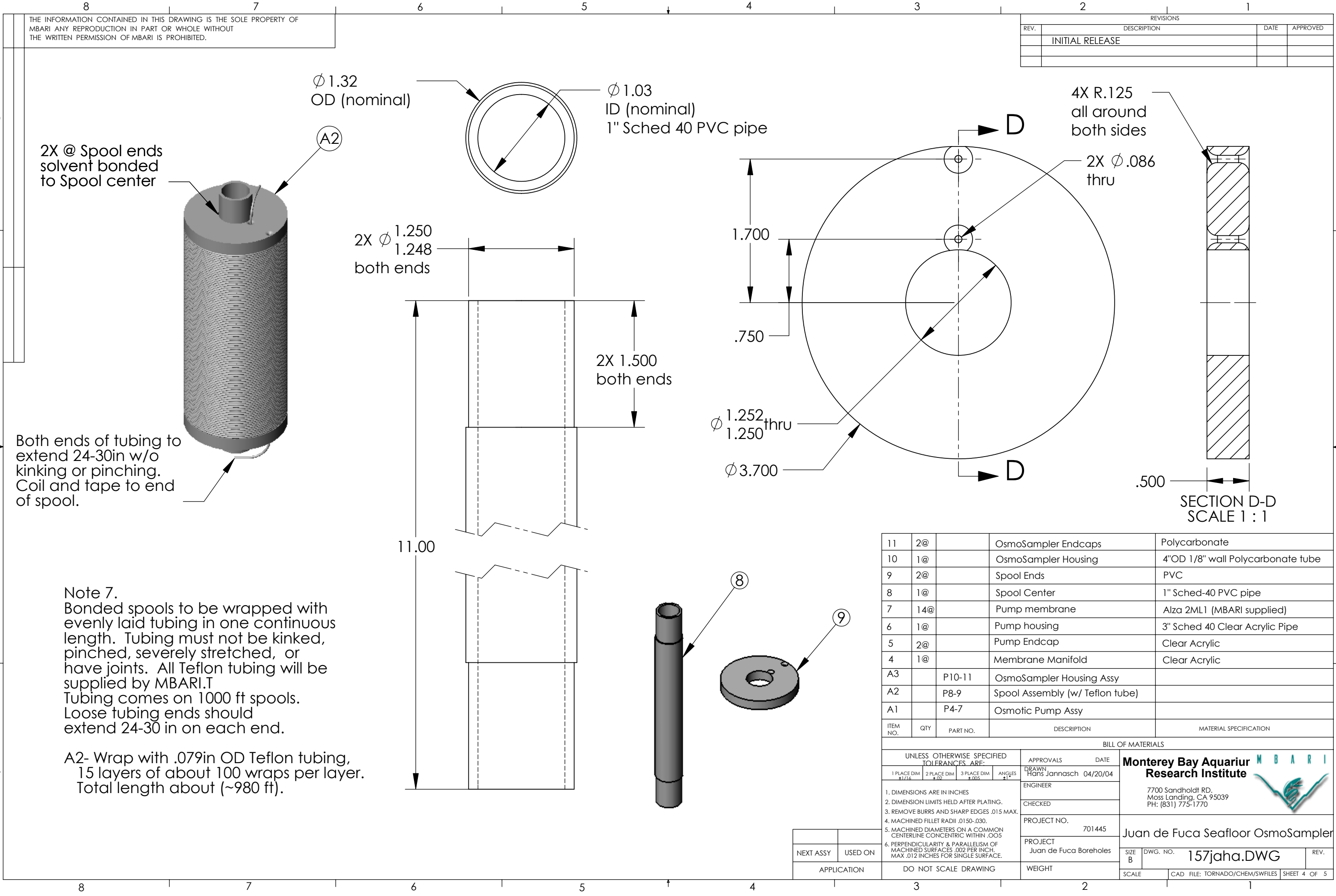
7700 Sandholdt RD.
Moss Landing, CA 95039
PH: (831) 775-1770

Juan de Fuca Seafloor OsmoSampler

SIZE R	DWG. NO.	157jahq.DWG	REV.
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SCALE	CAD FILE: TORNADO/CHEM/SWFILES	SHEET 2 OF 5
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		

11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	4"OD 1/8" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" Sched-40 PVC pipe
7	14@		Pump membrane	Alza 2ML1 (MBARI supplied)
6	1@		Pump housing	3" Sched 40 Clear Acrylic Pipe
5	2@		Pump Endcap	Clear Acrylic
4	1@		Membrane Manifold	Clear Acrylic
A3		P10-11	OsmoSampler Housing Assy	
A2		P8-9	Spool Assembly (w/ Teflon tube)	
A1		P4-7	Osmotic Pump Assy	
ITEM NO.	QTY	PART NO.	DESCRIPTION	MATERIAL SPECIFICATION

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS		DATE	Monterey Bay Aquarium Research Institute	
1 PLACE DIM $\pm .016$	2 PLACE DIM $\pm .02$	3 PLACE DIM $\pm .005$	ANGLES $\pm 1^\circ$	DRAWN	Hans Jannasch	04/20/04	7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770	
1. DIMENSIONS ARE IN INCHES				ENGINEER				
2. DIMENSION LIMITS HELD AFTER PLATING.				CHECKED				
3. REMOVE BURRS AND SHARP EDGES .015 MAX.				PROJECT NO.		701445	Juan de Fuca Seafloor OsmoSampler	
4. MACHINED FILLET RADII .0150-.030.				PROJECT		Juan de Fuca Boreholes		
5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005				WEIGHT			SIZE B	DWG. NO. 157jaha.DWG
6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.				SCALE			CAD FILE: TORNADO/CHEM/SWFILES	SHEET 4 OF 5
NEXT ASSY		USED ON		APPLICATION		DO NOT SCALE DRAWING		

