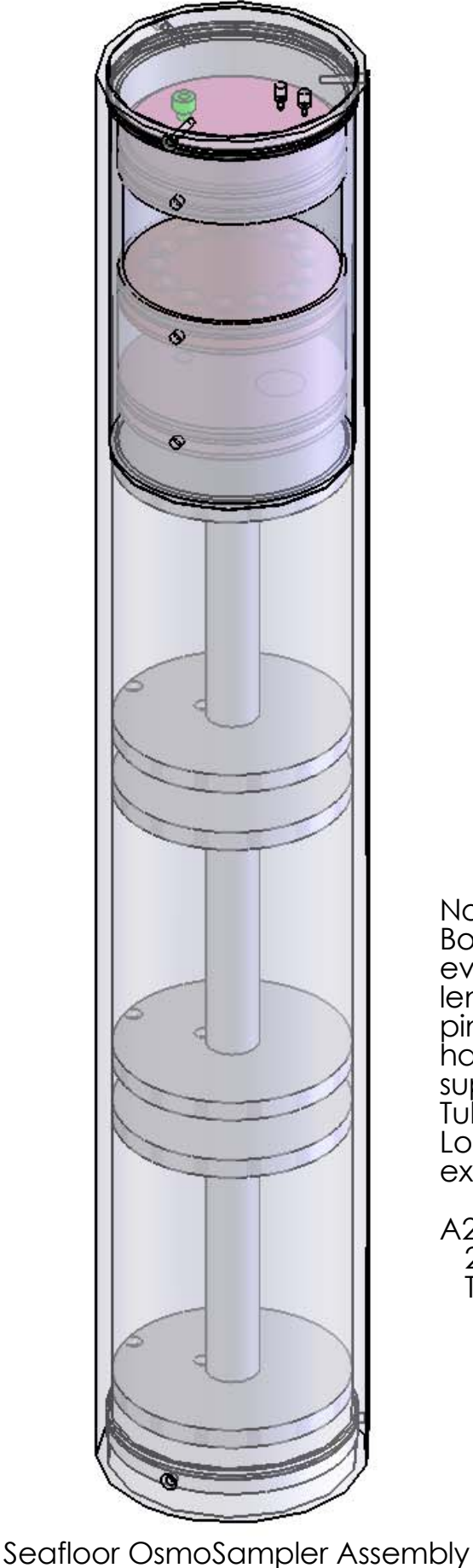
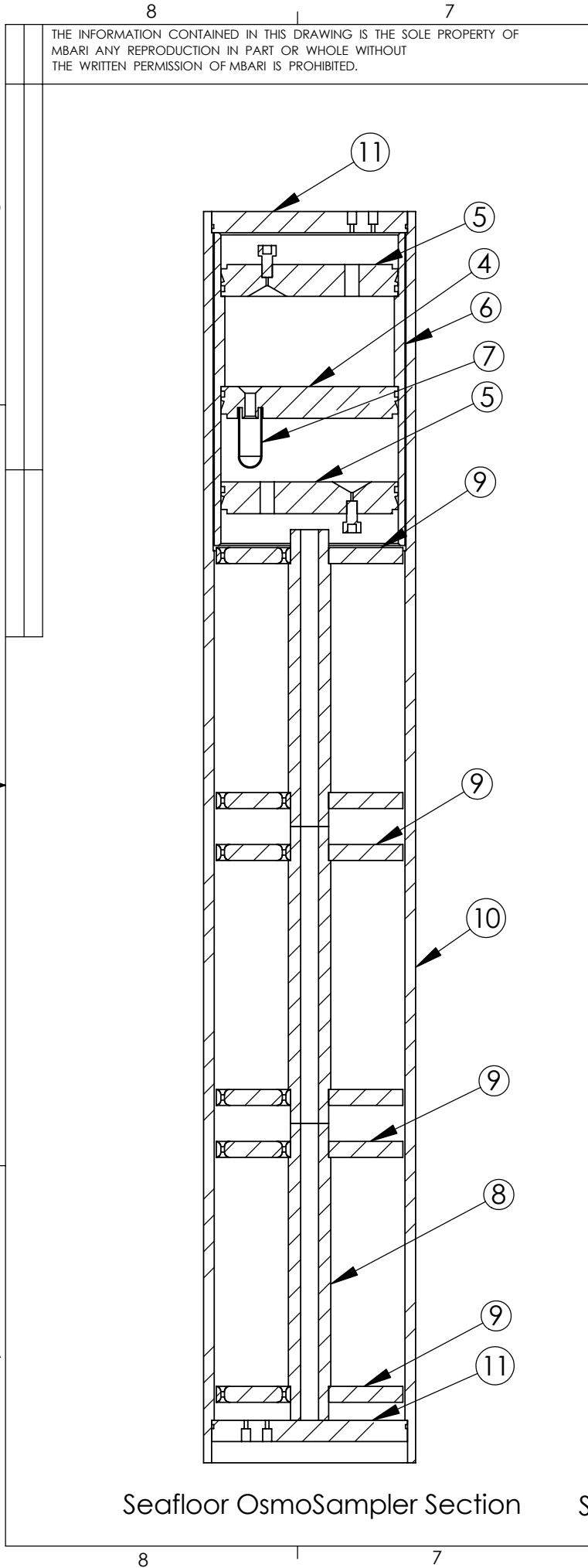
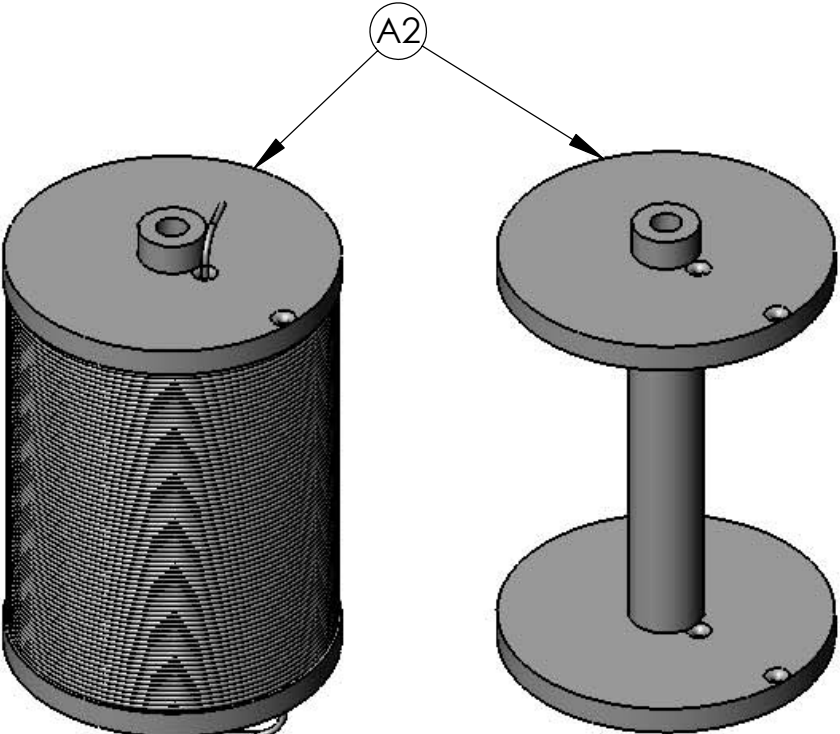
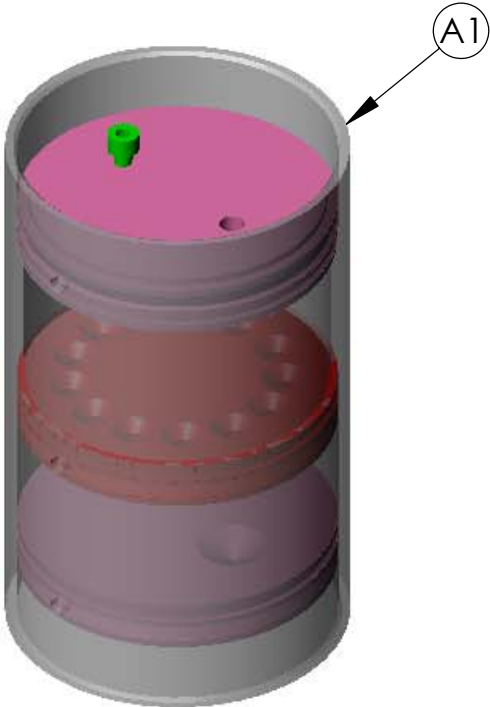




Note 7.
Bonded spools to be wrapped with evenly laid tubing in one continuous length. Tubing must not be kinked, pinched, severely stretched, or have joints. All Teflon tubing will be supplied by MBARI. Tubing comes on 1000 ft spools. Loose tubing ends should extend 24-30 in on each end.

A2- Wrap with .079in OD Teflon tubing, 21 layers of about 68 wraps per layer. Total length about (~980 ft).

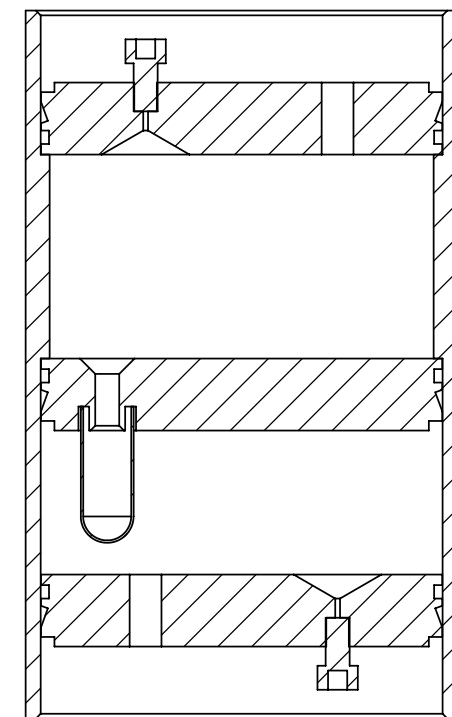
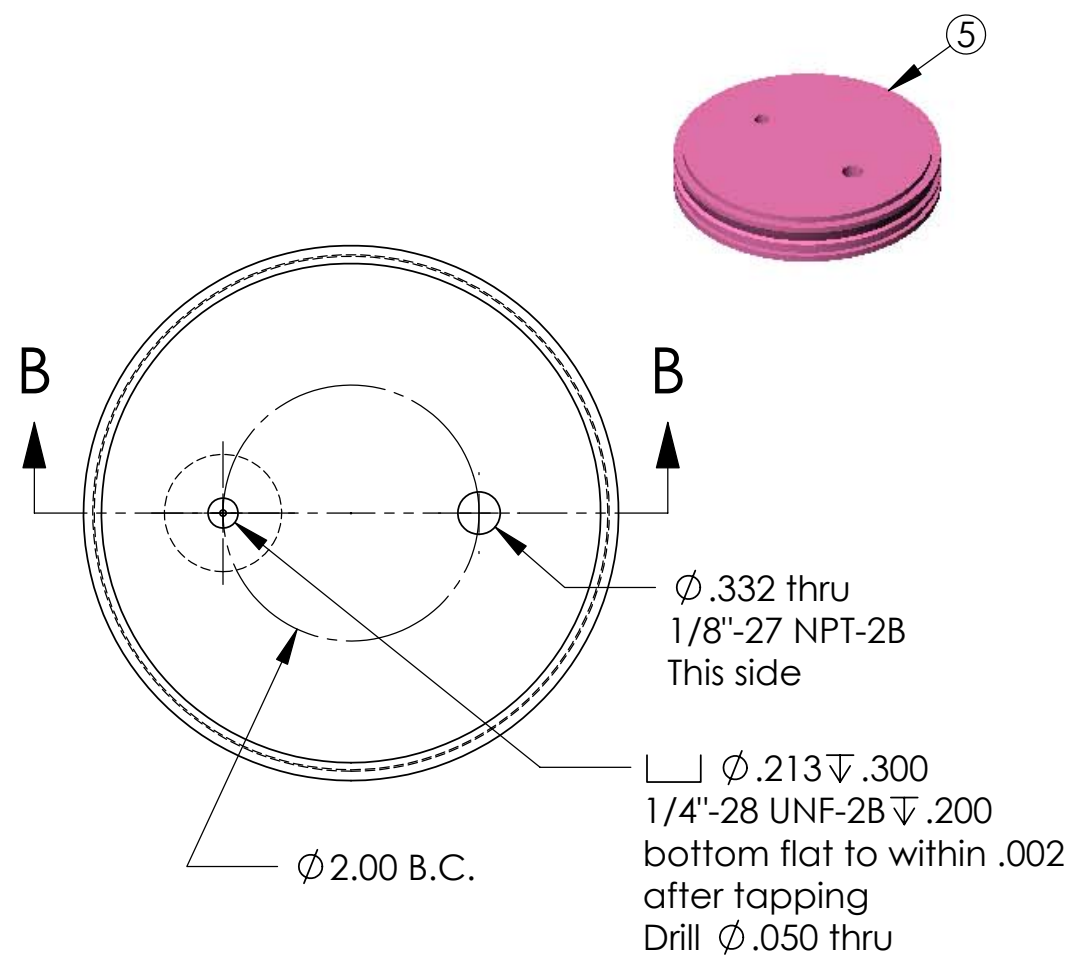
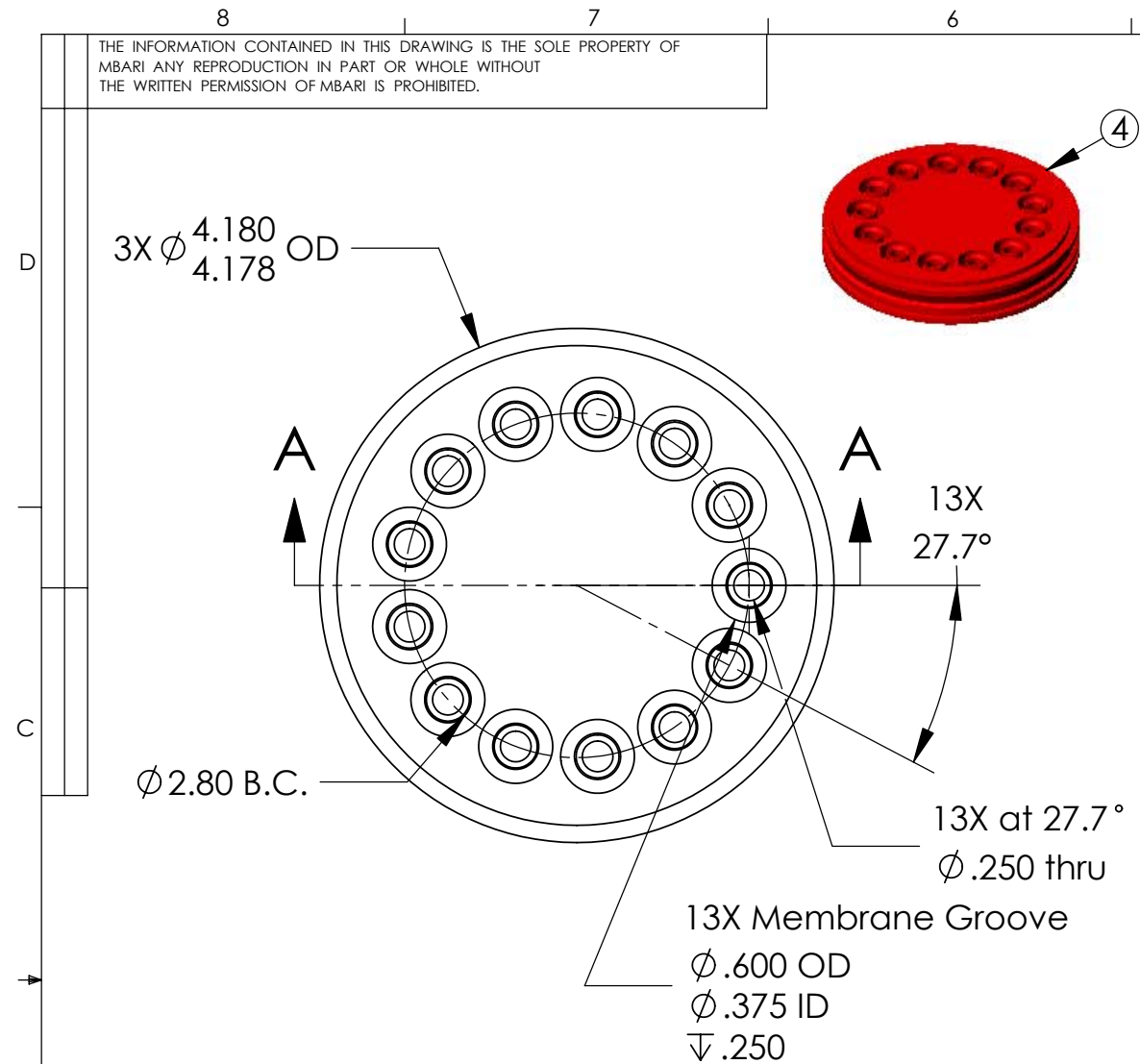


Wrapped Spool Assy

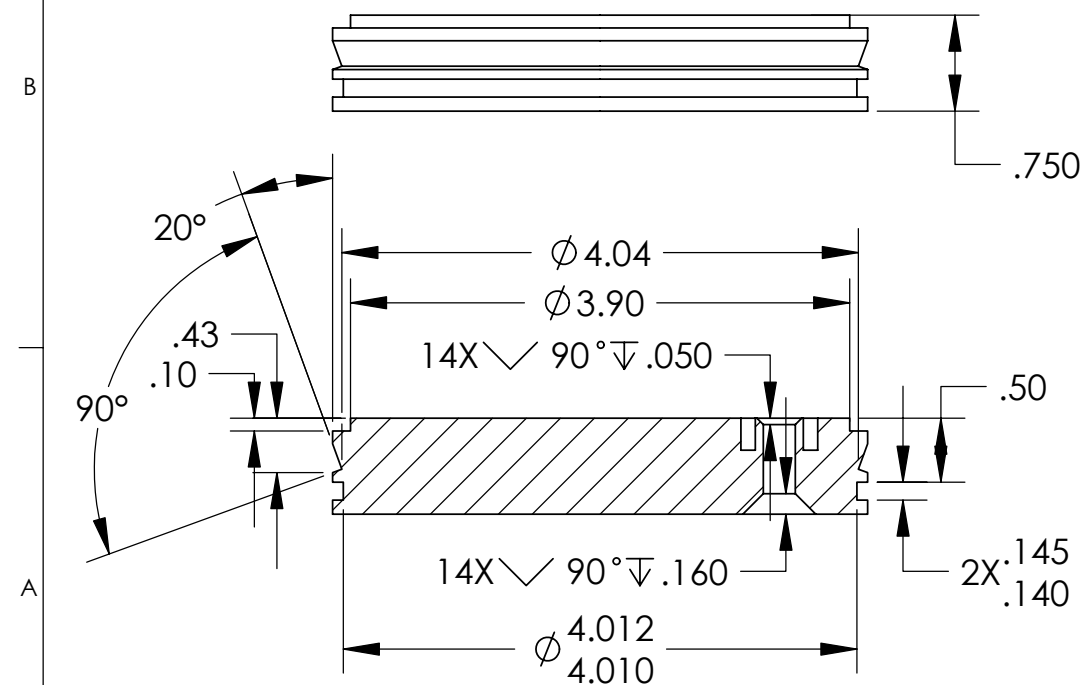
12	2@		OsmoSampler Retainers	3/4" PVC or HDPE
11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	5" OD 1/4" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" PVC rod
7	14@		Pump membrane	Alza 2ML1 (MBARI supplied)
6	1@		Pump housing	4.5" OD 1/4" wall Clear Acrylic Tube
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. $\pm .016$	2 PLACE DIM. $\pm .02$	3 PLACE DIM. $\pm .005$	ANGLES $\pm .1^\circ$	DRAWN Hans Jannasch 04/20/04
1. DIMENSIONS ARE IN INCHES				ENGINEER Jon Erickson 5/10/04
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
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	CAD FILE: TORNADO/CHEM/SWFILES
Monterey Bay Aquarium Research Institute				SHEET 1 OF 5
7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770				
3-Year Seafloor OsmoSampler				
SIZE B	DWG. NO. 157jaha.DWG	REV. A		

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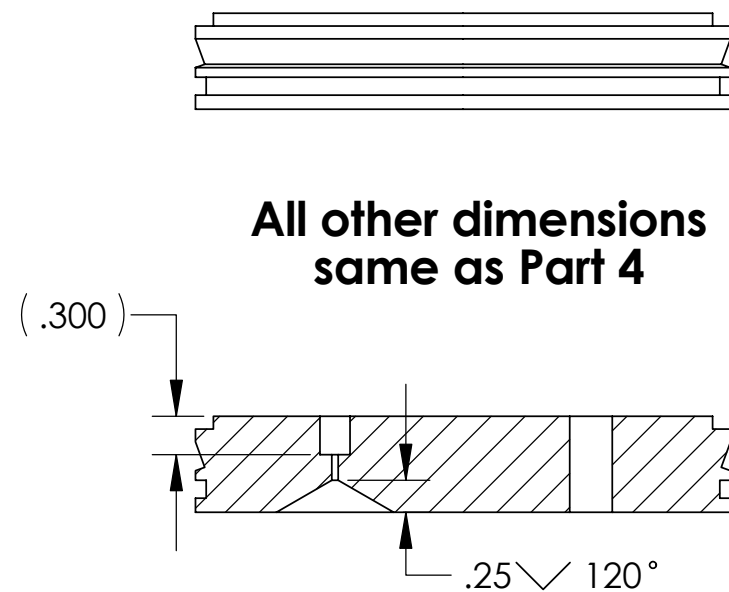
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		
A	3-yr version	6/17/05	HWJ



Pump Assembly Section
Pump to be assembled at MBARI



SECTION A-A
SCALE 1 : 1.5



**All other dimensions
same as Part 4**

SECTION B-B
SCALE 1 : 1.5

12	2@		OsmoSampler Retainers	3/4" PVC or HDPE
11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	5" OD 1/4" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" PVC rod
7	14@		Pump membrane	Alza 2ML1 (MBARl supplied)
6	1@		Pump housing	4.5" OD 1/4" wall Clear Acrylic Tube
5	2@		Pump Endcap	Clear Acrylic
4	1@		Membrane Manifold	Clear Acrylic

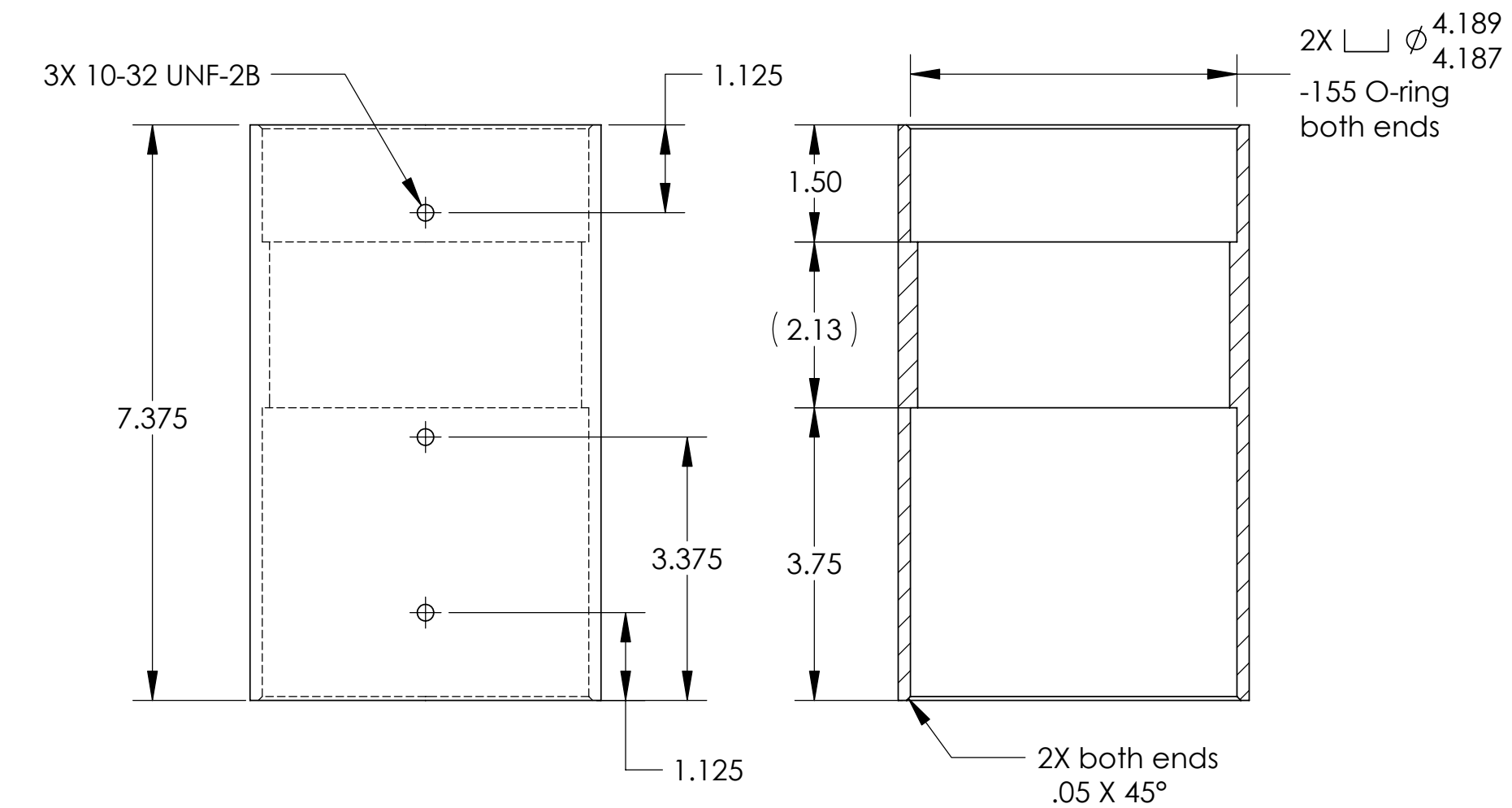
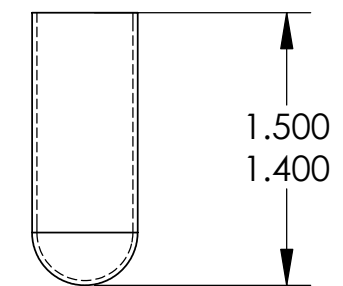
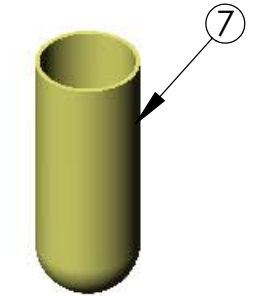
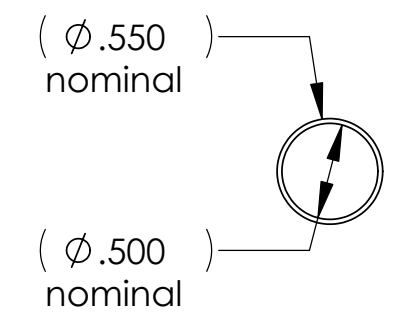
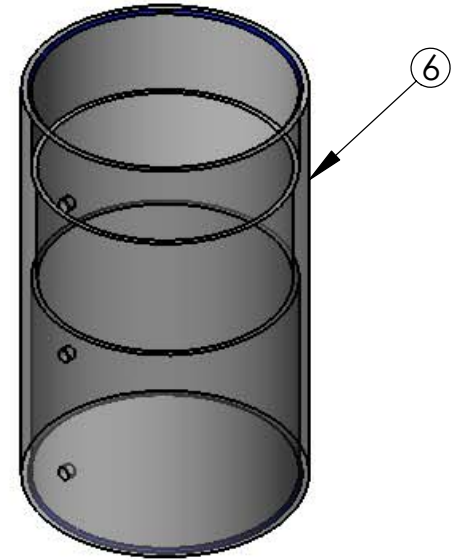
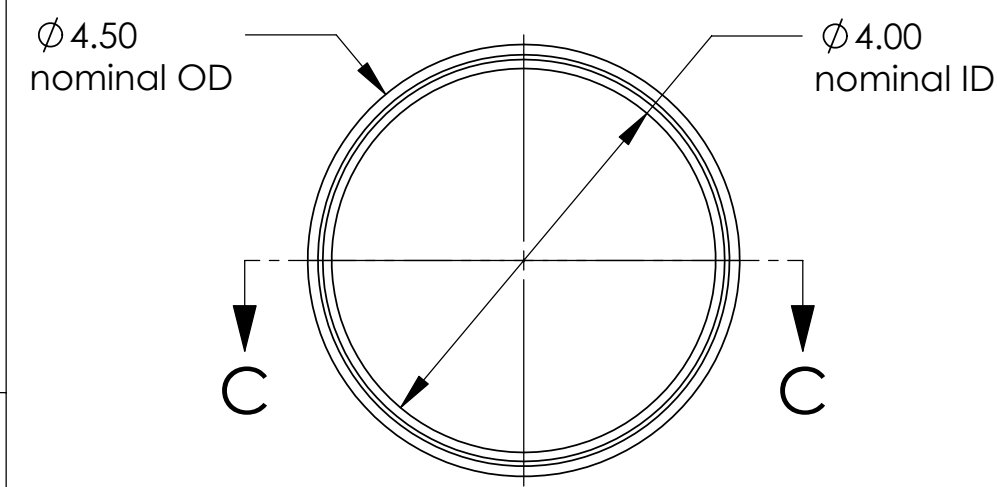
A3		P10-11	OsmoSampler Housing Assy	
A2		P8-9	Spool Assembly (w/ Teflon tube)	
A1		P4-7	Osmotic Pump Assy	
ITEM NO.	QTY	PART NO.	DESCRIPTION	MATERIAL SPECIFICATION

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:					APPROVALS		DATE		BILL OF MATERIALS			
1 PLACE DIM ±.1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±.1°	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.	DRAWN Hans Jannasch	04/20/04		Monterey Bay Aquarium Research Institute 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770				
					ENGINEER Jon Erickson	5/10/04						
					CHECKED							
					PROJECT NO.	701445						
				PROJECT	Juan de Fuca Boreholes					3-Year Seafloor OsmoSampler		
				WEIGHT								
DO NOT SCALE DRAWING								SIZE B	DWG. NO.	157jaha.DWG		REV. A
								SCALE	CAD FILE: TORNADO/CHFM/SWFILES	SHEET 1 OF 5		

NEXT ASSY	USED ON
APPLICATION	

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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		
A	3-yr version	6/17/05	HWJ

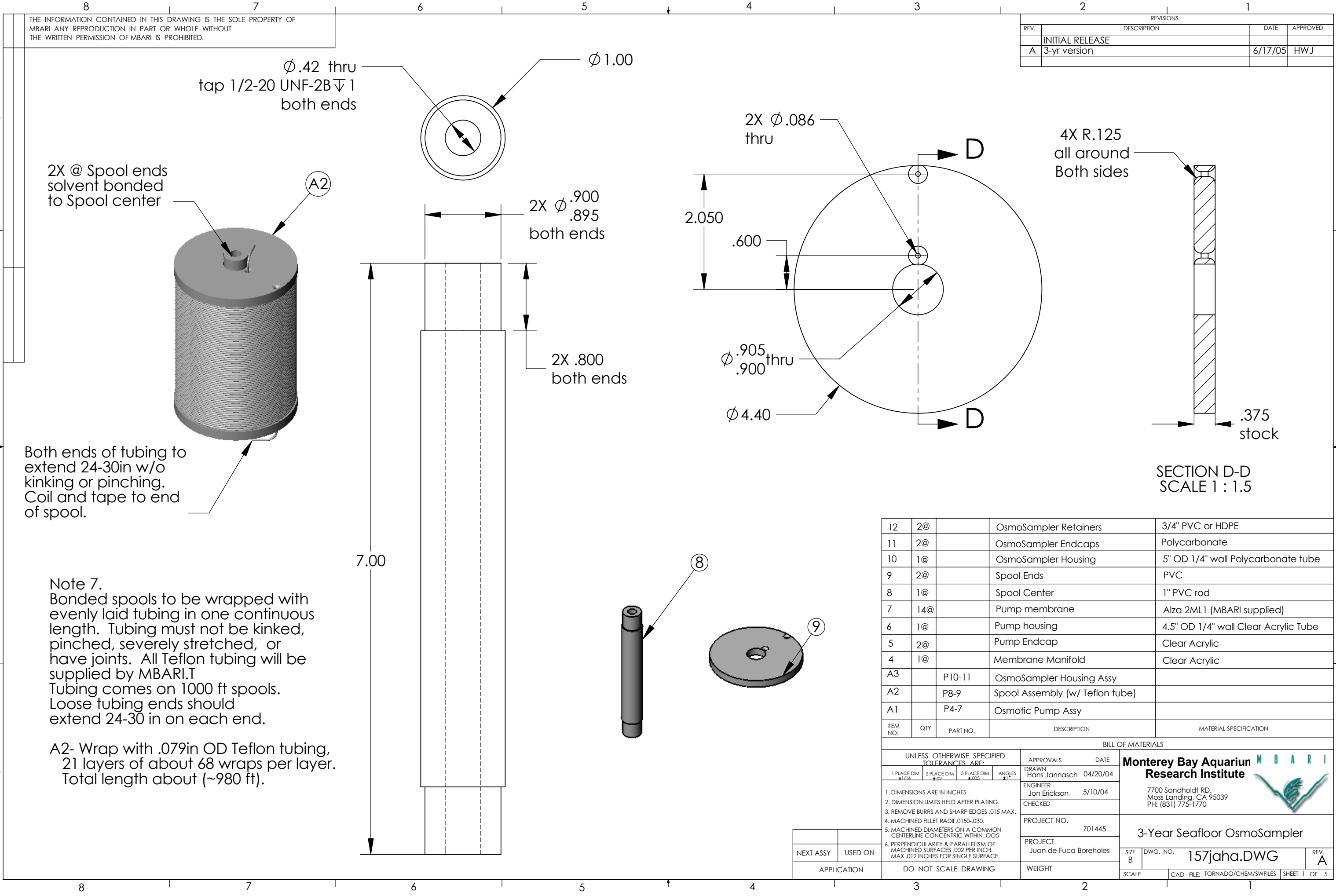


SECTION C-C

12	2@		OsmoSampler Retainers	3/4" PVC or HDPE
11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	5" OD 1/4" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" PVC rod
7	14@		Pump membrane	Alza 2ML1 (MBARl supplied)
6	1@		Pump housing	4.5" OD 1/4" wall Clear Acrylic Tube
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 ±.1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±.1°	DRAWN Hans Jannasch	04/20/04	7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770	
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				CHECKED			
				PROJECT NO. 701445			
				PROJECT Juan de Fuca Boreholes			
DO NOT SCALE DRAWING				WEIGHT		SCALE CAD FILE: TORNADO/CHEM/SWFILS SHEET 1 OF 5	

NEXT ASSY	USED ON
APPLICATION	



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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE		
A	3-yr version	6/17/05	HWJ

2X @ Spool ends solvent bonded to Spool center

Both ends of tubing to extend 24-30in w/o kinking or pinching. Coil and tape to end of spool.

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.T
Tubing comes on 1000 ft spools. Loose tubing ends should extend 24-30 in on each end.

A2- Wrap with .079in OD Teflon tubing, 21 layers of about 68 wraps per layer. Total length about (~980 ft).

12	2@		OsmoSampler Retainers	3/4" PVC or HDPE
11	2@		OsmoSampler Endcaps	Polycarbonate
10	1@		OsmoSampler Housing	5" OD 1/4" wall Polycarbonate tube
9	2@		Spool Ends	PVC
8	1@		Spool Center	1" PVC rod
7	14@		Pump membrane	Alza 2ML1 (MBARI supplied)
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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

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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	Monterey Bay Aquarium Research Institute 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770	
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				CHECKED				
				PROJECT NO.		701445	3-Year Seafloor OsmoSampler	
				PROJECT		Juan de Fuca Boreholes		
NEXT ASSY		USED ON		WEIGHT		SCALE	CAD FILE: TORNADO/CHEM/SWFILES	SHEET 1 OF 5
APPLICATION		DO NOT SCALE DRAWING				SCALE	CAD FILE: TORNADO/CHEM/SWFILES	SHEET 1 OF 5

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8 7 6 5

8 7 6 5

SECTION E-E
SCALE 1 : 4

10

3X @ 120° each end
(=6X) $\phi .177$ thru
 $\angle 82^\circ \phi .10$

3X .700

29.50

8.05
8.00

2X $\phi 4.627$
 $\phi 4.625$
both ends

$\phi 5.00$
nominal OD

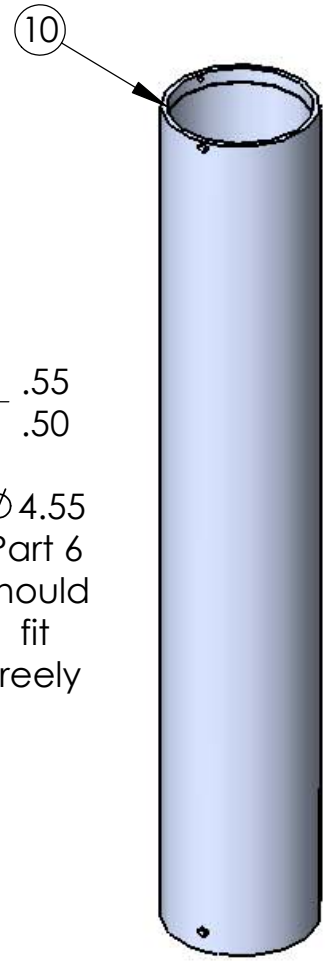
$\phi 4.50$
nominal ID

3X .200

.55
.50

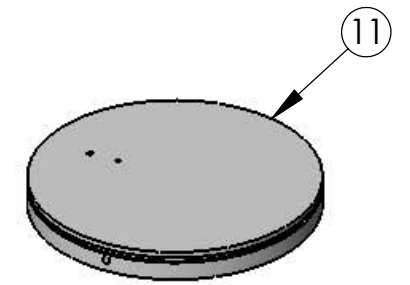
$\phi 4.55$
Part 6
should
fit
freely

1.000



Technical drawing of a mechanical assembly showing dimensions and tolerances. The drawing includes the following dimensions and tolerances:

- Top left dimension: .100
- Top right dimension: .50
- Bottom left dimension: .098
- Bottom left dimension: .093
- Bottom right dimension: .200
- Bottom center dimension: $\phi 4.525$
- Bottom center dimension: 4.523
- Bottom center dimension: .047 O-ring



2X $\square$ ϕ .213 ∇ .30
tap 1/4-28 UNF-2B ∇ .25
bottom flat to .002
 ϕ .084 thru

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS DATE		Monterey Bay Aquarium M B A Q I Research Institute 	
1 PLACE DIM ±.016	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN Hans Jannasch	04/20/04	7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1770	
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				CHECKED			
				PROJECT NO.		701445	
				PROJECT Juan de Fuca Boreholes			
DO NOT SCALE DRAWING				WEIGHT		3-Year Seafloor OsmoSampler SIZE B DWG. NO. 157jaha.DWG REV. A	
				SCALE		CAD FILE: TORNADO/CHEM/SWFILES SHEET 1 OF 5	

**Monterey Bay Aquarium
Research Institute**

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

The logo for the Monterey Bay Aquarium Research Institute (MBARI) features the letters 'M B A R I' in a stylized, blue, serif font. Below the letters is a graphic of a blue, stylized wave or fish-like shape, possibly representing a submarine or a marine animal.

3-Year Seafloor OsmoSampler

SIZE B	DWG. NO. 157jaha.DWG	REV. A
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SCALE	CAD FILE: TORNADO/CHEM/SWFILES	SHEET 1 OF 5
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