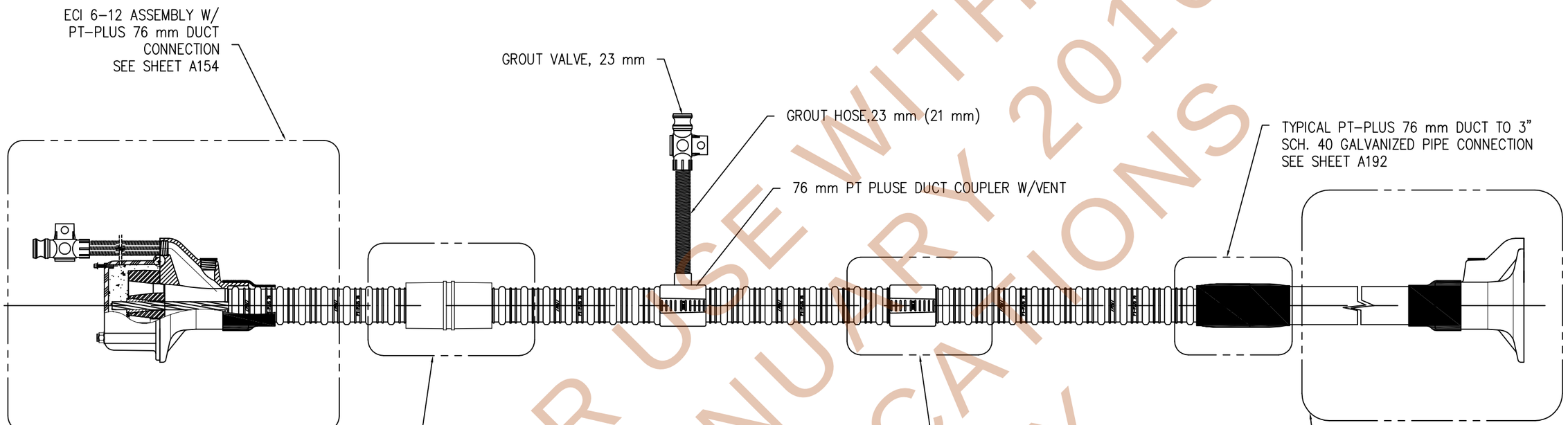


OVERALL ASSEMBLY

NOTE: MINIMUM BENDING RADIUS FOR PT PLUS 76 mm DUCT IS 4.87 m (16'-0")

REV.	DATE	REVISION	BY	CHK
3	2/23/10	APPROVED FOR CONSTRUCTION	SAN	MM
2	11/30/07	APPROVED FOR CONSTRUCTION	GDH	MM
1	4/5/06	APPROVED FOR CONSTRUCTION	GDH	ZX

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

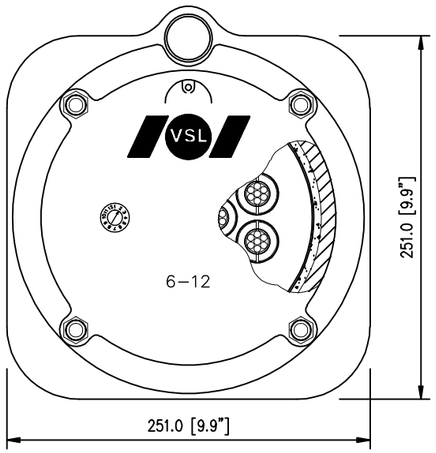
DWG. TITLE: ECI 6-12 INTERNAL SEGMENTAL TENDON W/ 76MM PT-PLUS DUCT
OVERALL ASSEMBLY

PROJECT: VSL SYSTEMS DRAWING

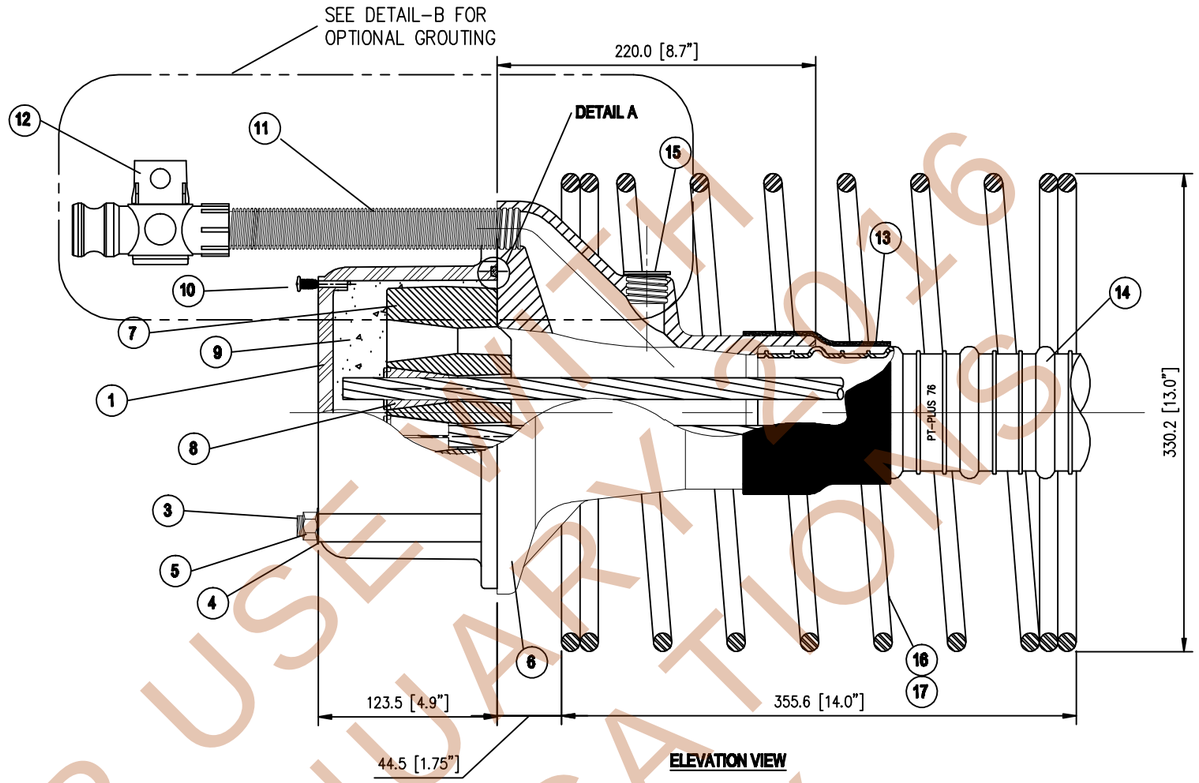
SCALE: NONE

VSL JOB NO:

VSL DWG. NO.
A191.3



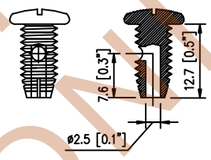
FRONT VIEW



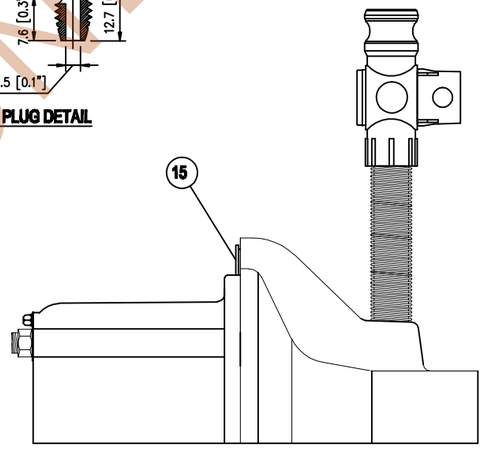
ELEVATION VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING REFERENCE	INVENTORY NUMBER
17*	1	SPIRAL, #4, DIA. 13", 3" PITCH, 7 TURNS	A615	–	02BP0097
16*	1	SPIRAL, #5, DIA. 13", 3" PITCH, 7 TURNS	A615	–	02BP0096
15	1	BEARING PLATE GROUT PLUG, 23MM	P.P.	C583	02DT0341
14	1	DUCT, WHT PP, 76 MM PT–PLUS	P.P.	E0937–3	02DT0426
13	1	HEAT SHRINK SLEEVE	POLYOLEFIN	(CANUSA) PLA 90 YE	02DT0505
12	1	GROUT VALVE, 23 MM	P.S.	C589 & C590	02DT0311
11		GROUT HOSE, 23 MM (21 MM)	P.E.	C587	02DT0310
10	1	CAP VENT PLUG, SS–SCREW	STAINLESS STEEL	–	02WX7001
9		GROUT	JOB SPECIFIC	–	–
8	12	1.6G WEDGE	11–L–17	C218	02WG0008
7	1	ECI 6–12 ANCHOR HEAD	A536 GR80–55–06	C556	02AH0037
6	1	ECI 6–12 GALV BEARING PLATE	A536 GR80–55–06	C553	02BP0037
5	4	1/2"–13 NUT	(316L) STAINLESS	–	INCLUDED W/02WX5021
4	4	ø1/2" FLAT WASHER	(316L) STAINLESS	–	INCLUDED W/02WX5021
3	4	1/2–13 NC x 6 1/2"	(316L) STAINLESS	–	02WX5021
2	1	O–RING (.210 CS X 7.475" ID # –367)	BUNA–N 70 D.	–	02WX5020
1B	1	GROUT CAP W/ VENT SCREW PORT	ABS LUSTRAN 633	C548	02WX5019
1A	1	GROUT CAP W/ 3/4"NPT GROUT PORTS	ABS LUSTRAN 633	C680	2GC61201

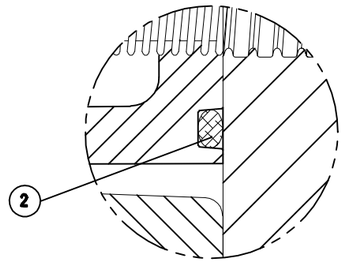
NOTE:
1. USE GROUT CAP ITEM 1A FOR BALANCED CANTILEVER CONSTRUCTION [GROUTING THROUGH DECK]
2. USE ITEM 16 FOR CONCRETE WITH fc' = 3500 psi, ITEM 17 FOR CONCRETE WITH fc' = 5500 psi



CAP VENT PLUG DETAIL



DETAIL-B GROUTING THRU DECK
SCALE: 1:4



DETAIL A
SCALE: 1:1

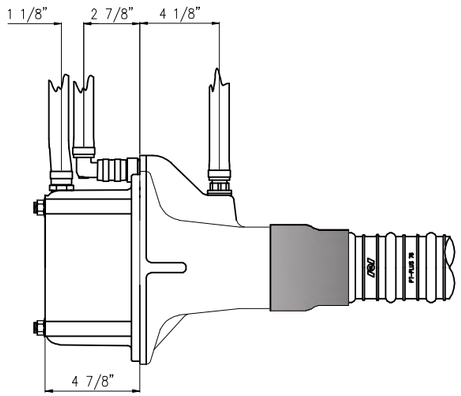
REV.	DATE	BY	CHK	REVISION
2	11/18/10	GY	MM	ADDED ITEMS TO BOM
1	4/5/06	GDH	ZX	APPROVED FOR CONSTRUCTION

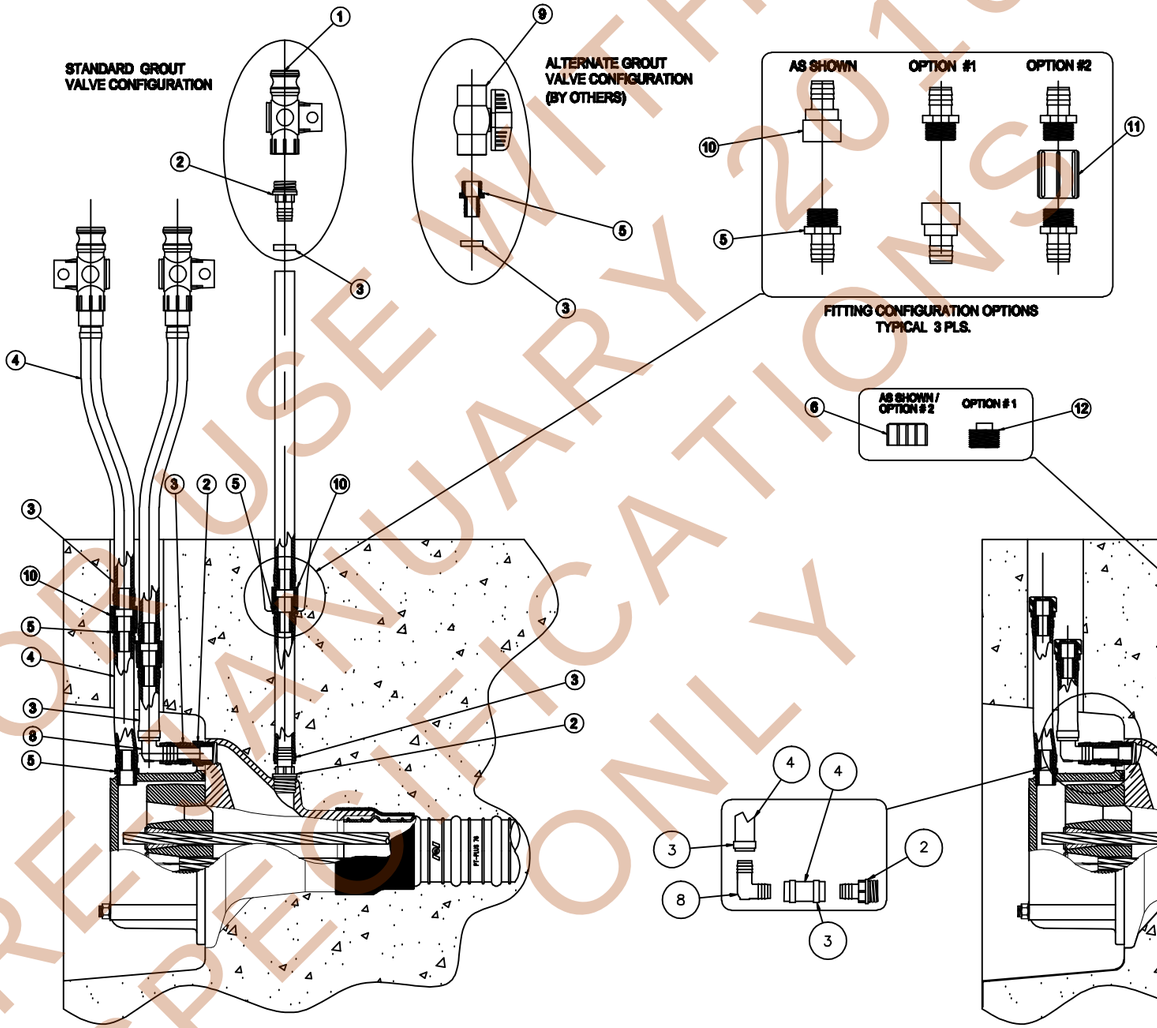
VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

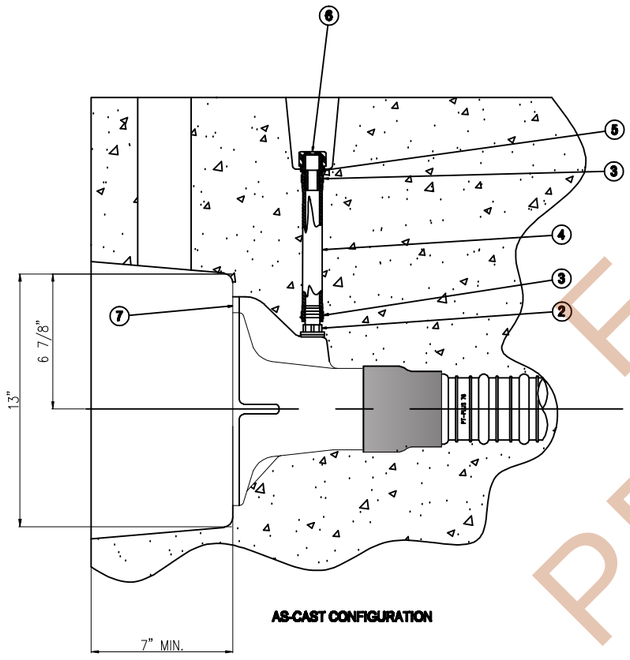
DWG. TITLE: ECI 6-12 INTERNAL TENDON W/ 76 MM PT-PLUS DUCT ASSEMBLY

PROJECT: VSL SYSTEMS DRAWING

SCALE: 1:4 U.N.O.
VSL JOB NO:
VSL DWG. NO. A154







AS-CAST CONFIGURATION

GROUTING CONFIGURATION

FINISHED CONFIGURATION

ITEM	NAME
12	3/4" MPT PLUG
11	3/4" COUPLER PVC (TEMPORARY)
10	3/4" FPT TO 3/4" HOSE BARB ADAPTER
9	3/4" FPT BALL VALVE PVC (TEMPORARY)
8	3/4" X 3/4" HOSE BARB ELBOW
7	23MM GROUT PORT PLUG
6	3/4" FPT CAP
5	3/4" HOSE BARB TO 3/4" MPT ADAPTER
4	3/4" SMOOTH GROUT HOSE
3	ONE EAR HOSE CLAMP 316 S.S.
2	GROUT VALVE TO 3/4" GROUT HOSE ADAPTER
1	23MM GROUT VALVE

Parts List

REV.	DATE	BY	CHK
1	8/18/10	GY	MM

RELEASED FOR PRODUCTION

REVISION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

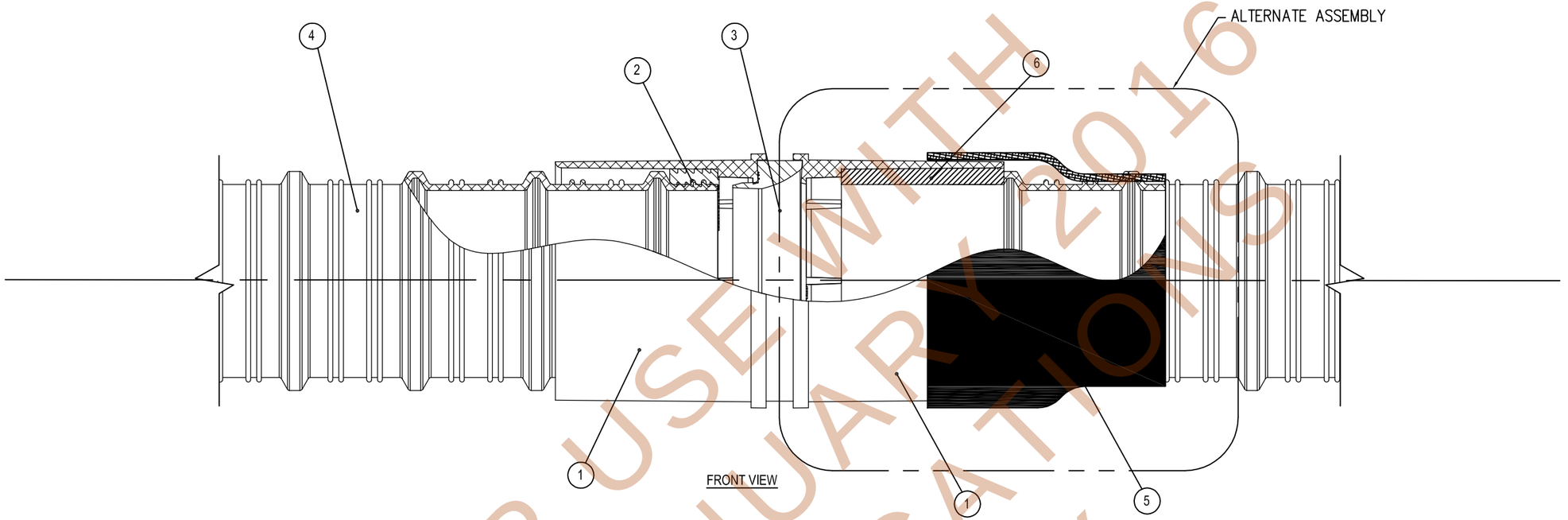
DWG. TITLE: ECI 6-12 GROUTING CONFIGURATION OPTIONS

PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

VSL DWG. NO. A278



FRONT VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
6	1	INSERT	PE	–	–
5	1	HEAT SHRINK	POLYOLEFIN	–	CANUSA PLA-90-YE
4	--	DUCT, WHT PP, 76 MM PT-PLUS	PP	E0937-3	02DT0426
3	1	FACE SEAL	PP	C648	02SC07603
2	2	HUB SEAL	SANTOPRENE	C647	02SC07602
1	2	HUB	SANTOPRENE	C646	02SC07601

NOTE: ALTERNATE ASSEMBLY ACCEPTABLE ONLY WHEN PRE-FABRICATED BY VSL. ALTERNATE ASSEMBLY DOES NOT ALTER STANDARD INSTALLATION PROCEDURES.

REV.	DATE	REVISION	BY	CHK
1	5/24/10	APPROVED FOR CONSTRUCTION	SAN	MM
1	2/23/10	APPROVED FOR CONSTRUCTION	SAN	MM

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE: TYPICIAL 76 MM PT-PLUS SEGMENTAL DUCT COUPLER CONNECTION

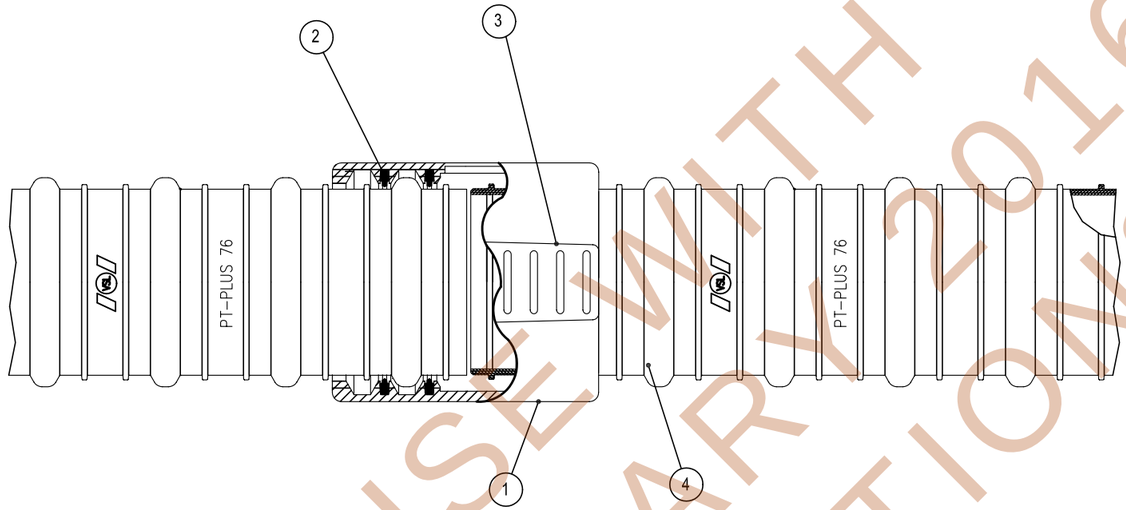
PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

VSL DWG. NO.

A240



FRONT VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
4		DUCT, WHT PP, 76 MM PT-PLUS	ASTM D4101	E0937-3	02DT0426
3	2	COUPLER CLAMP, 76 MM PT-PLUS	ASTM D4101		02DT0029
2	2	SEAL (INCLUDED IN COUPLER HALF)			02DT0027
1	2	COUPLER HALF, 76 MM PT-PLUS	ASTM D4101	E0941-2	02DT0027

REV.	DATE	BY	CHK
1	4/5/06	VEN	ZX

APPROVED FOR CONSTRUCTION

REVISION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

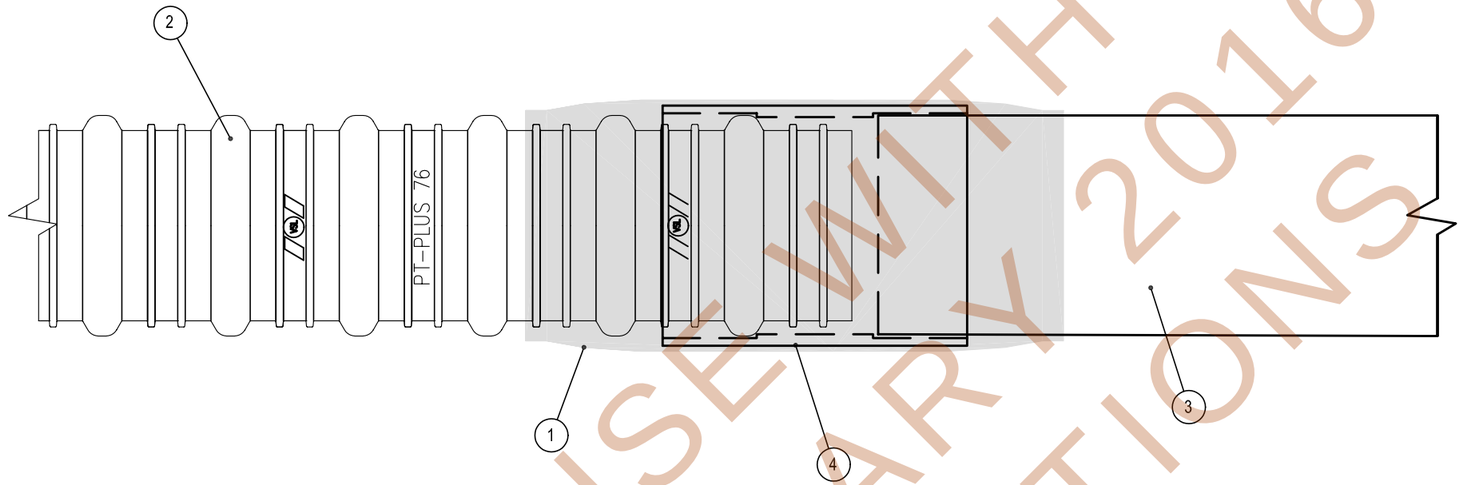
DWG. TITLE:
TYPICIAL ECI 6-12
76 MM PT-PLUS DUCT TO DUCT CONNECTION

PROJECT:
VSL
SYSTEMS DRAWING

SCALE: 1:2

VSL JOB NO:

VSL DWG. NO.
A190



FRONT VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
4	1	SLIP ON COUPLER	HDPE	(GTI 220305)	(GTI 220305)
3		GALVANIZED 3" SCHEDULE 40 PIPE	ASTM A53		
2		DUCT, WHT PP, 76 MM PT-PLUS	ASTM D4101	E09037-3	02DT0426
1	1	HEAT SHRINK SLEEVE (12" LONG)			(CANUSA) PLA-90-YE

REV.	DATE	BY	CHK
1	4/5/06	GDH	ZX

APPROVED FOR CONSTRUCTION

REVISION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE: TYPICAL ECI 6-12
76 MM PT-PLUS DUCT TO PIPE CONNECTION

PROJECT: VSL
SYSTEMS DRAWING

SCALE: 1:2

VSL JOB NO:

VSL DWG. NO.
A192

STEEL PIPE ASSEMBLY

(IF APPLICABLE)
ALL DIMENSIONS IN MM U.N.O.

REV.	DATE	BY	CHK
1	4/5/06	VEN	ZX

APPROVED FOR CONSTRUCTION

REVISION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

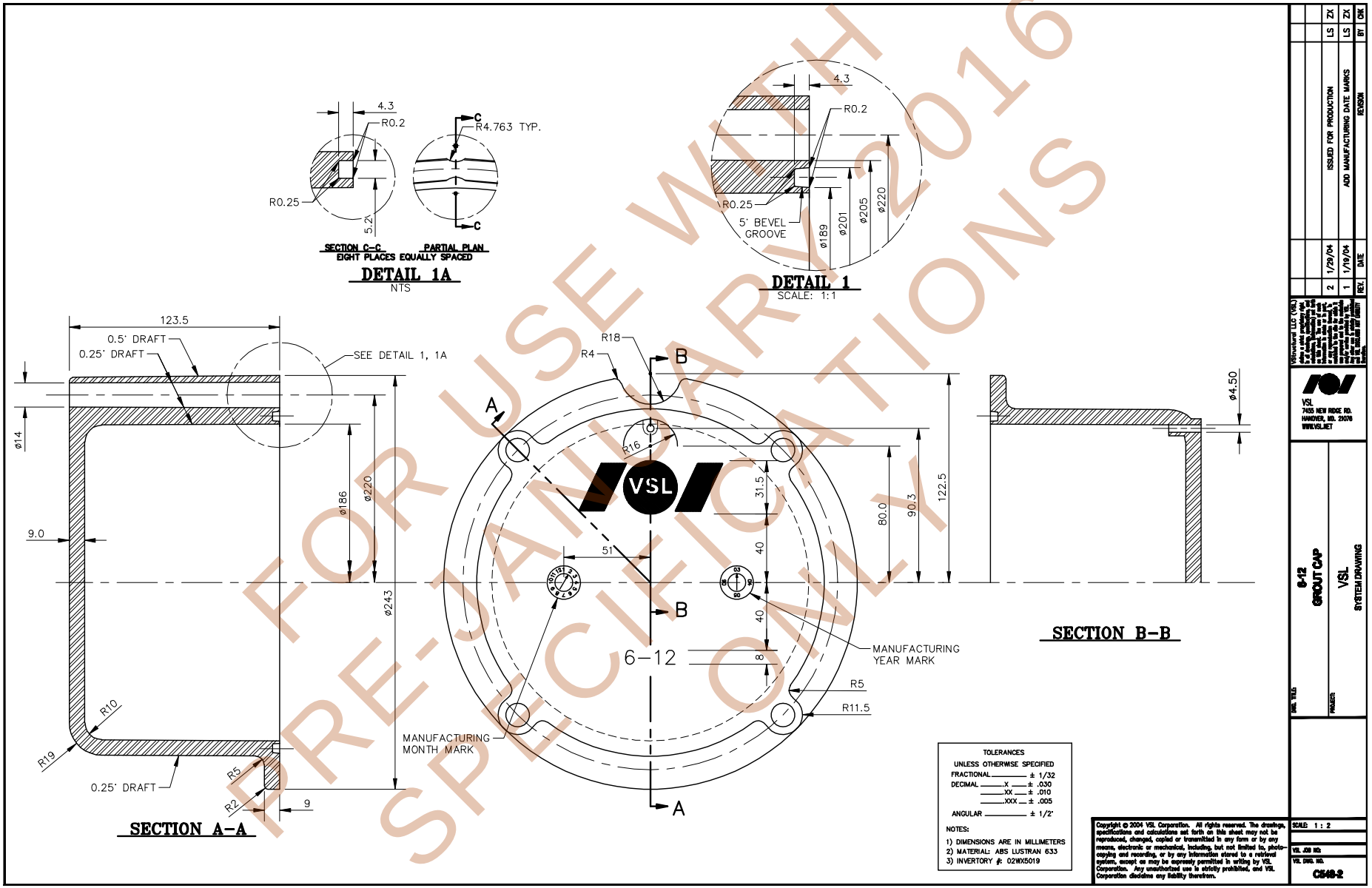
DWG. TITLE: ECI 6-12 INTERNAL TENDON WITH STEEL PIPE ASSEMBLY

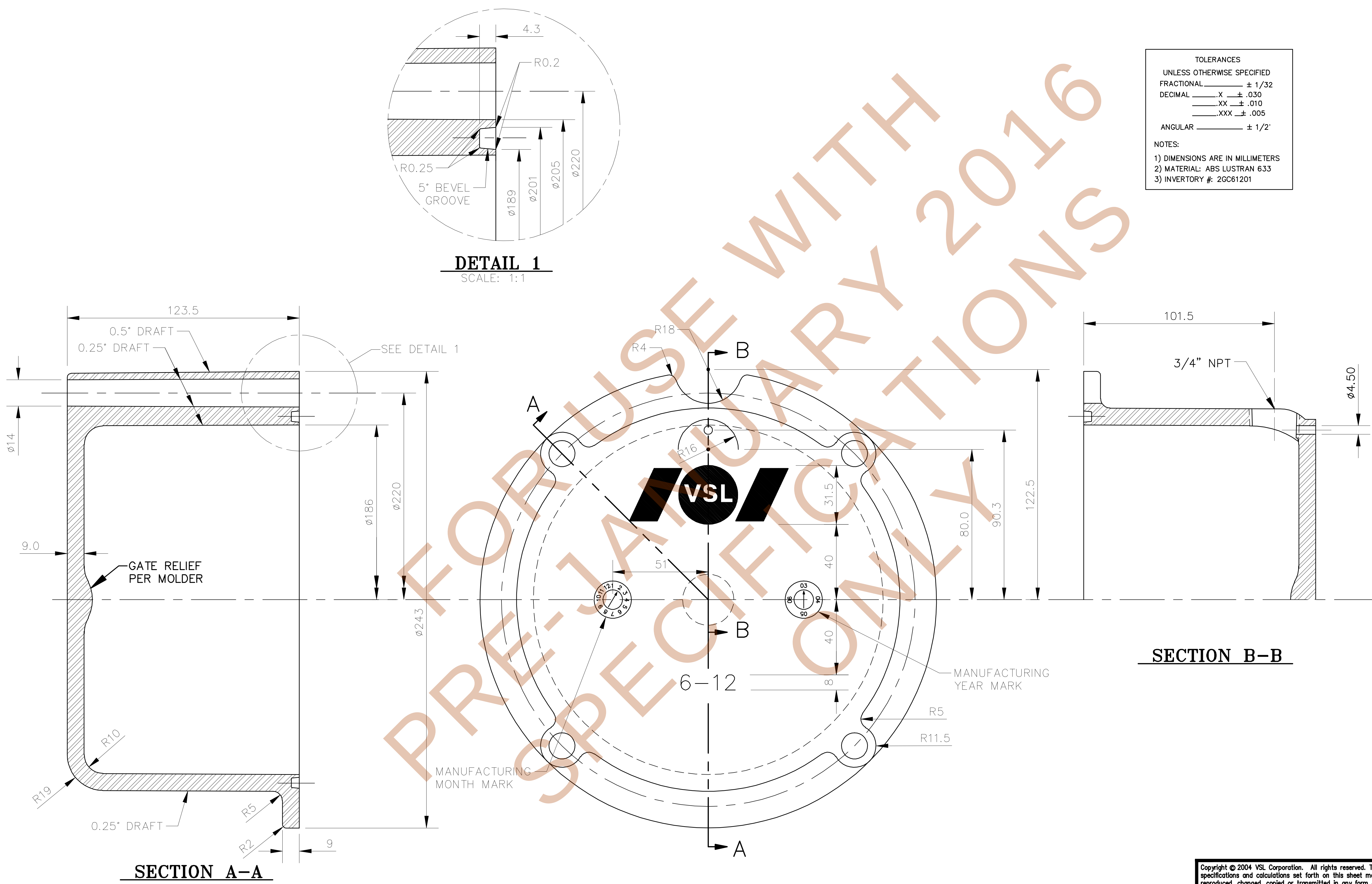
PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

VSL DWG. NO.
A189





TOLERANCES
UNLESS OTHERWISE SPECIFIED
FRACTIONAL ± 1/32
DECIMAL .X ± .030
.XX ± .010
.XXX ± .005
ANGULAR ± 1/2°

NOTES:
1) DIMENSIONS ARE IN MILLIMETERS
2) MATERIAL: ABS LUSTRAN 633
3) INVERTORY #: 2GC61201

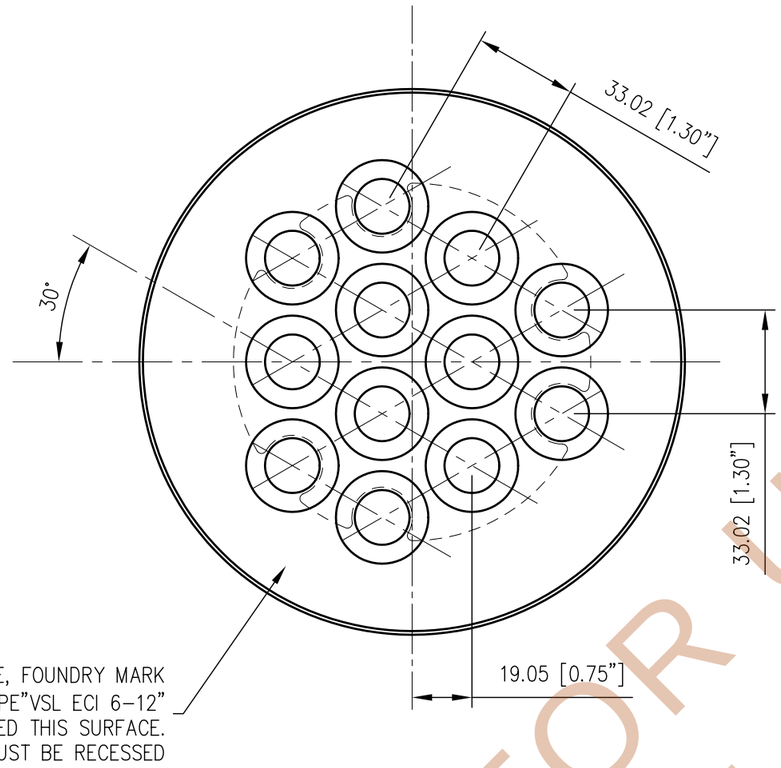
REV.	DATE	REVISION	BY	CHK
3	10/1/10	GATE RELIEF ADDED	GB	MM
2	1/29/04	ISSUED FOR PRODUCTION	LS	ZX
1	1/19/04	ADD MANUFACTURING DATE MARKS	LS	ZX

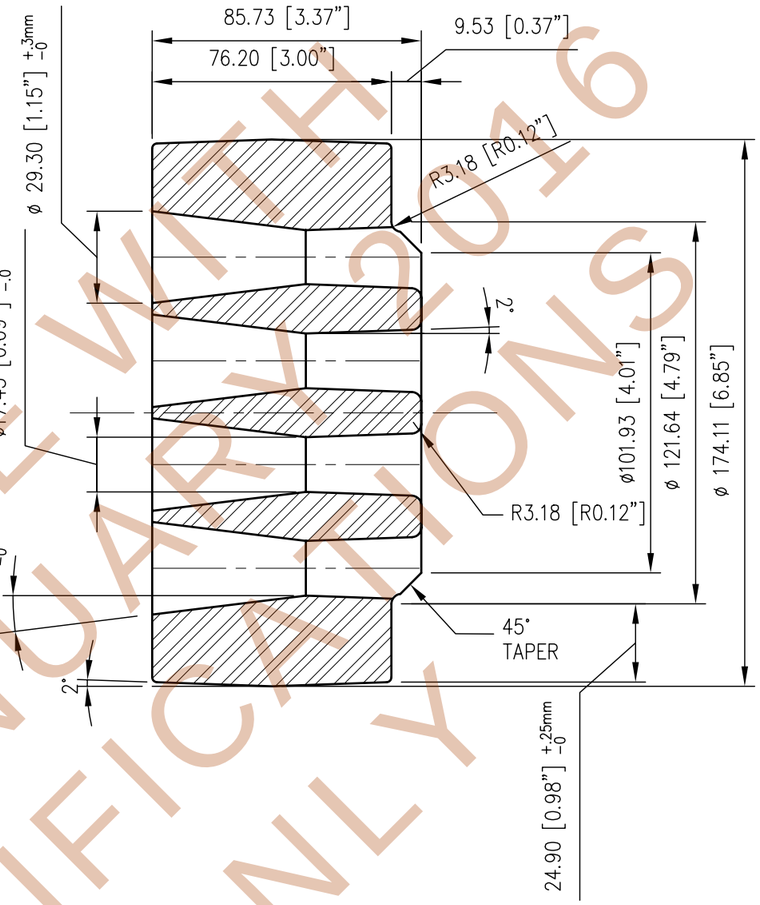
VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE: MODIFIED 6-12 GROUT CAP FOR BALANCED CANTILEVER CONSTRUCTION

PROJECT: VSL SYSTEM DRAWING

SCALE: 1 : 2
VSL JOB NO:
VSL DWG. NO. C680





ANCHORHEAD ECI 6-12

GENERAL CASTING NOTES

1) ALL HOLES TO BE FREE FROM BURRS
2) ALL RADII 1mm UNO
3) MATERIAL: ASTM A536 GR 80-55-06
   VSL Q.A. DOC MS 1.1.005
4) MANUFACTURERS IDENTIFICATION AND BATCH No. MUST BE CLEARLY VISIBLE ON CASTING
5) HARDNESS RANGE: 187-255 BHN (TEST AT *)
6) SCALE: DRAWING NOT TO SCALE
7) WEIGHT: 43.6

INVENTORY No. 02AH0037

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN MILLIMETERS.

0 THROUGH 50mm	±0.5
51mm THROUGH 100mm	±1.0
MORE THAN 100mm	±1.5
ANGULAR	±1/2°
SURFACE QUALITY	√

NOTES:
1) BREAK SHARP EDGES
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) ALL DRAFT ANGLES 2° UNO

REV.	DATE	BY	REMSION
2	7/12/04	GDH	UP DATED WEDGE CAVITY
1	6/17/03	GDH	ISSUED FOR PRODUCTION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

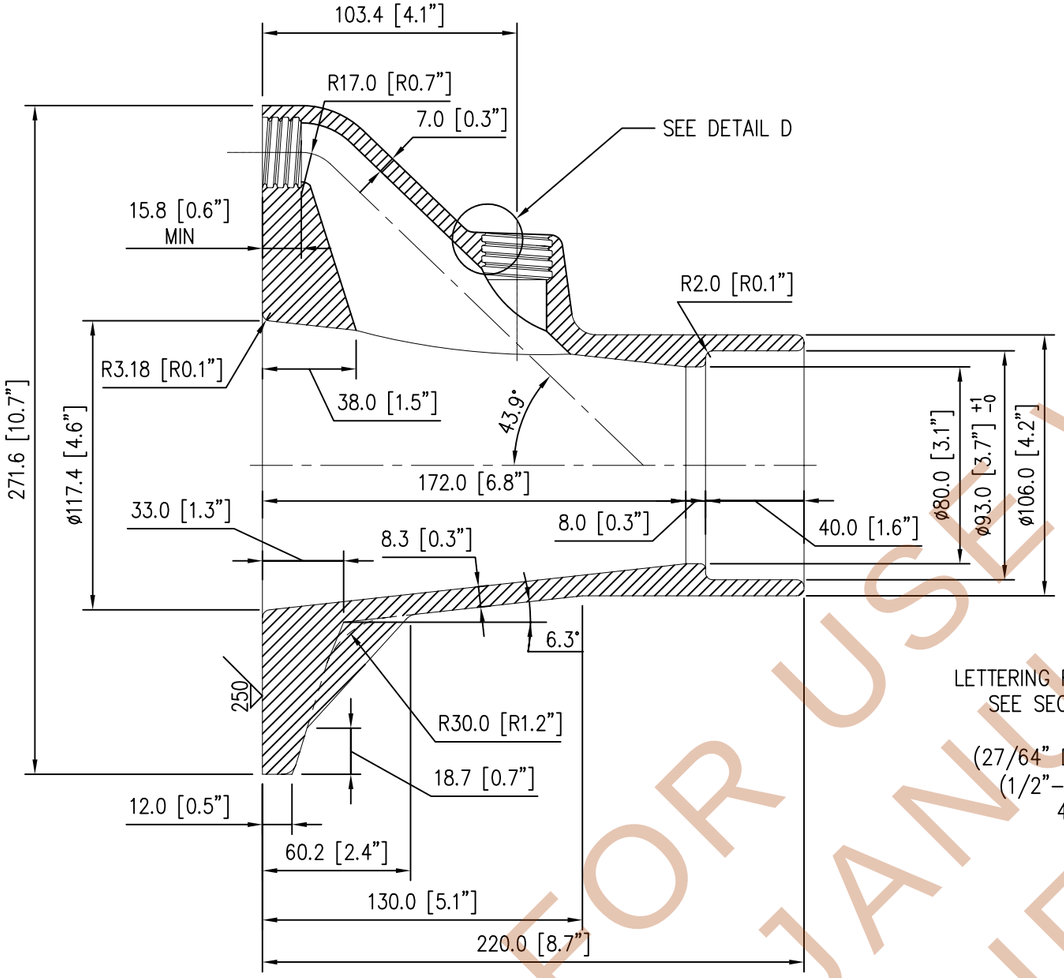
DWG. TITLE: ECI 6-12 ANCHOR HEAD

PROJECT: VSL SYSTEMS DRAWING

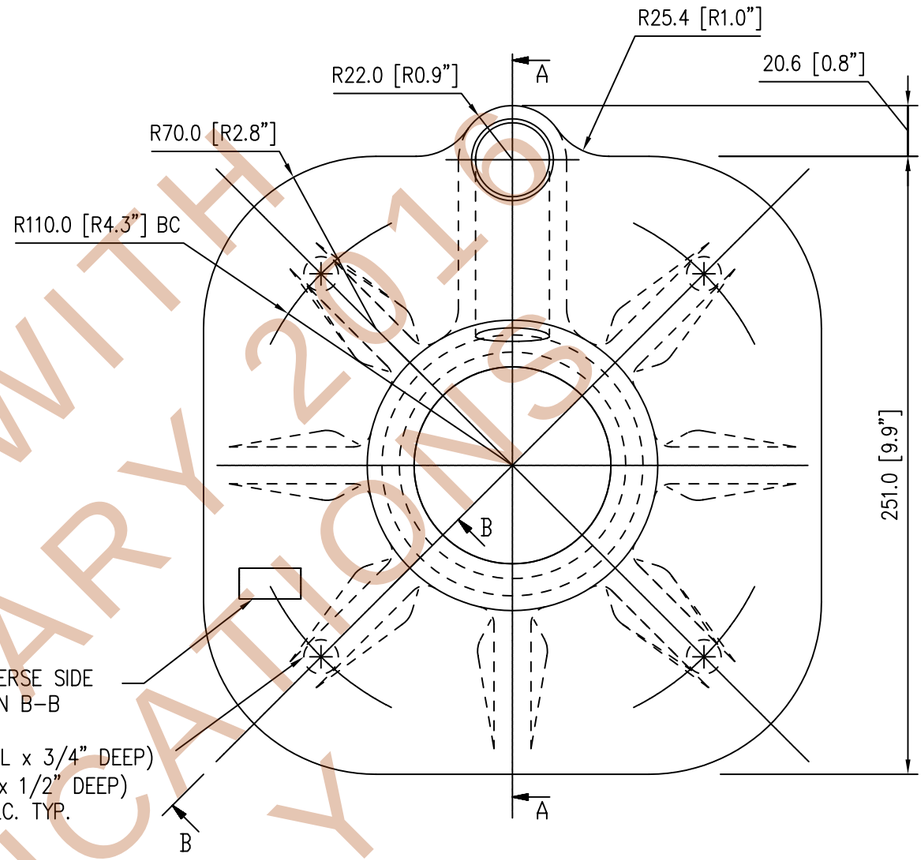
SCALE: 1:2

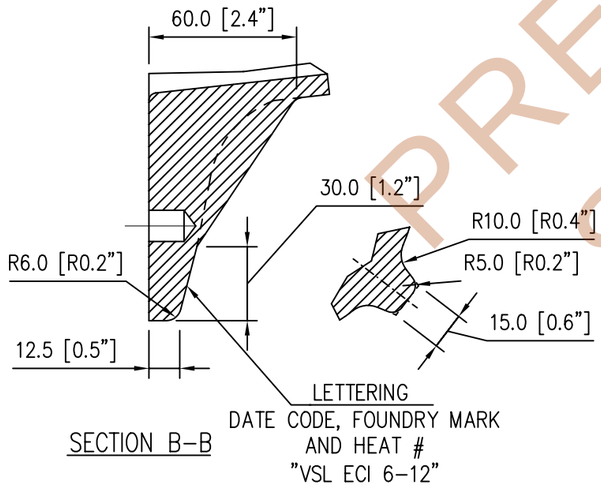
VSL JOB NO:

VSL DWG. NO. C556

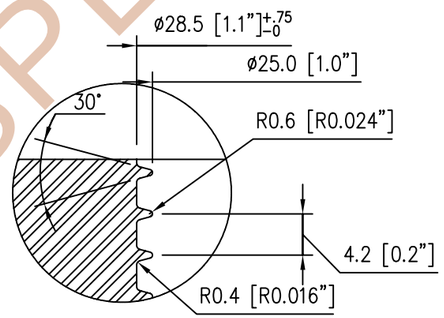


SECTION A–A





SECTION B–B



DETAIL D
TYP. THREAD

GENERAL CASTING NOTES

1) ALL HOLES TO BE FREE FROM BURRS
2) ALL RADII 1mm UNO
3) MATERIAL: ASTM A536 GR 80–55–06
   VSL Q.A. DOC MS 1.1.006
4) MANUFACTURERS IDENTIFICATION AND BATCH No. MUST BE CLEARLY VISIBLE ON CASTING
5) HARDNESS RANGE: 187–255 BHN (TEST AT *)
6) SCALE: DRAWING NOT TO SCALE

INVENTORY No. 02BP0037

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN MILLIMETERS.

0 THROUGH 50mm	±0.5
51mm THROUGH 100mm	±1.0
MORE THAN 100mm	±1.5
ANGULAR	±1/2°
SURFACE QUALITY	√

NOTES:
1) BREAK SHARP EDGES .25 MAX.
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) DIMENSIONS IN MM SHALL CONFORM TO DIN 1685 GTB16 TOLERANCES

REV.	DATE	REVISION	BY	CHK
1	6/17/03	ISSUED FOR PRODUCTION	GDH	ZX

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

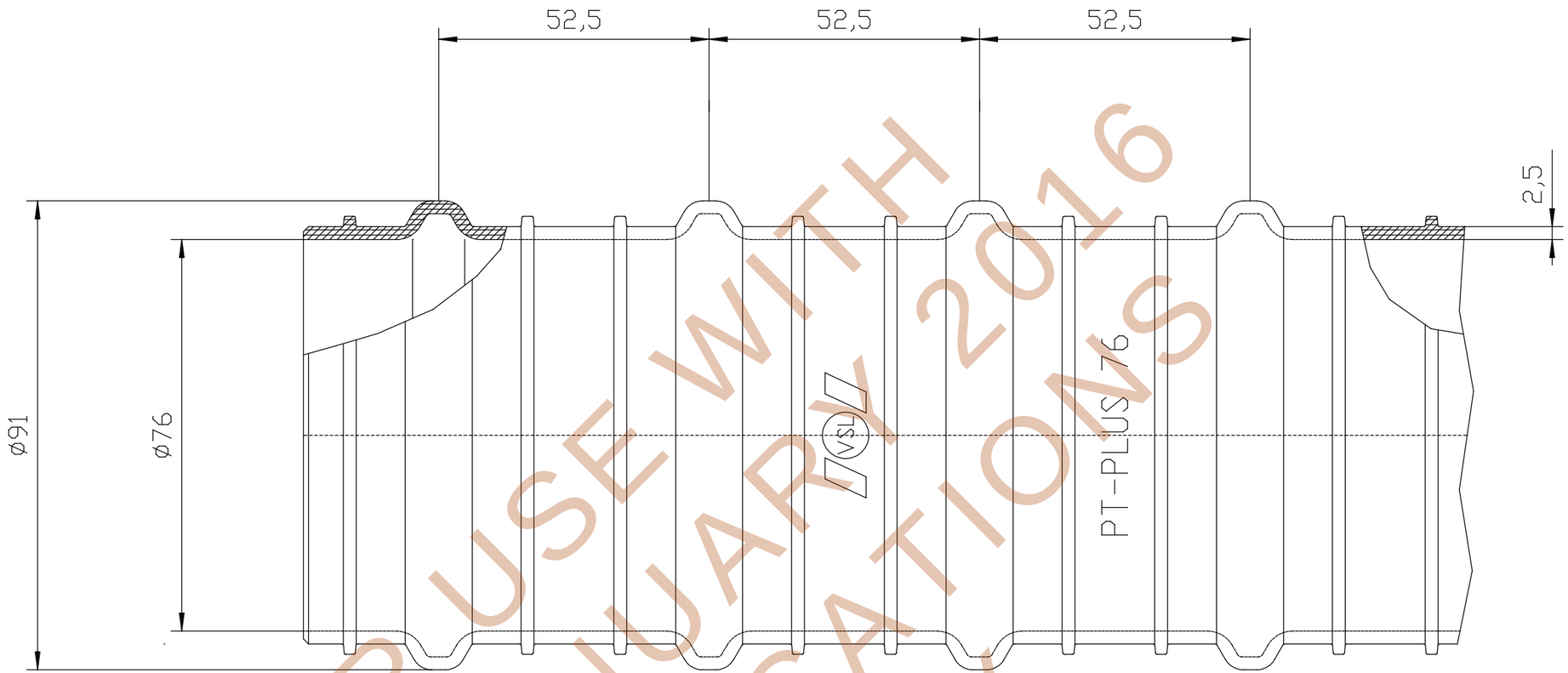
DWG. TITLE: ECI 6-12 BEARING PLATE

PROJECT: VSL SYSTEMS DRAWING

SCALE: N.T.S.

VSL JOB NO:

VSL DWG. NO. C553



Weight/Gewicht: 0,58 kg/m
INVENTORY No. 02DT026

qty.	description	item	material	remarks
1	PT-PLUS 76	1	PP	

VSL

PT-PLUS 76

marking every 2 m
MINIMUM BEND RADIUS: 16FT

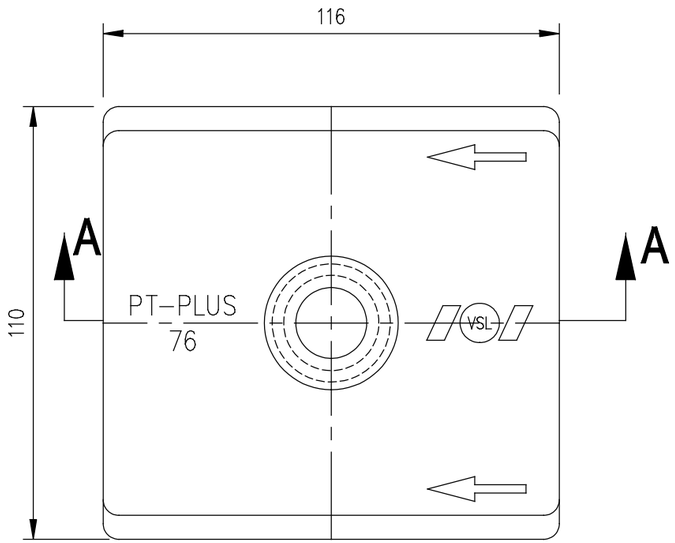
rev. 2.) PP war MDPE 1.6.92 HB
3.) Add Inventory No. FEB-18-97

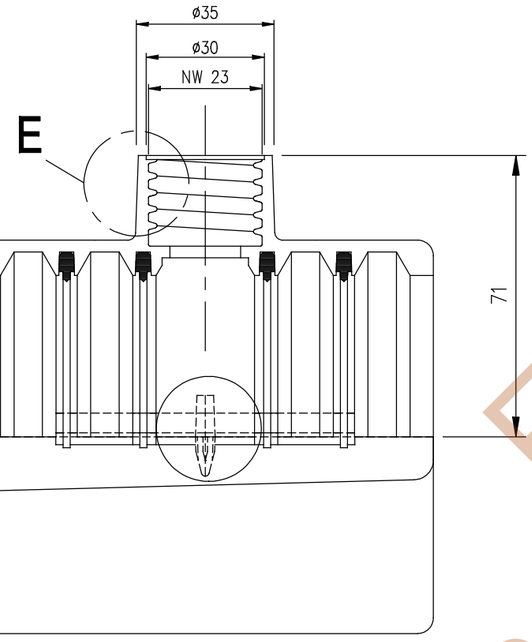
proj./job PT-PLUS System

title DUCT/HULLROHR
PT-PLUS 76

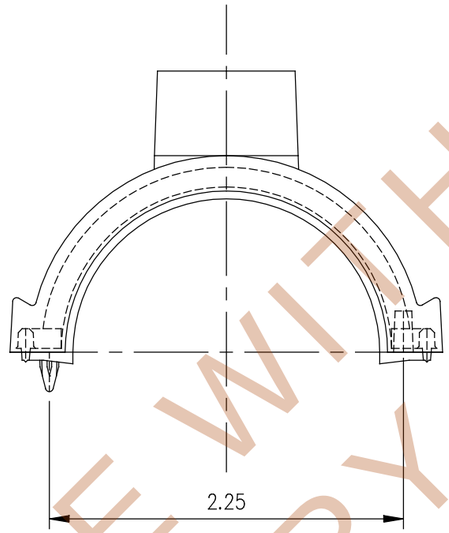
scale	1:1	
drawn	16.01.1992	HB
checked		LI
subst. by/for		
proj.no		

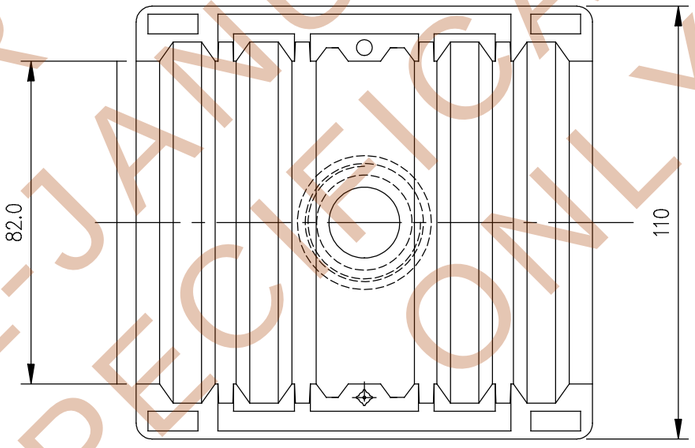
E0937-3

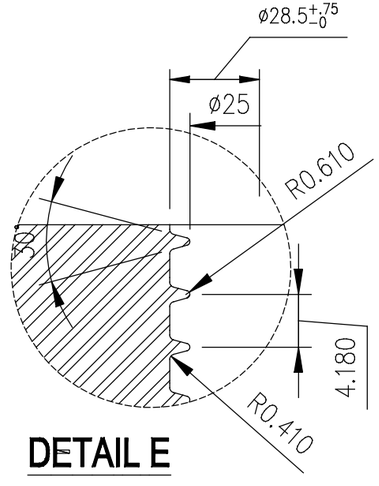




SECTION A-A







DETAIL E

NOTES:

1. MATERIAL POLYPROPYLENE ELTEX PRS210 (OR EQUIVALENT)
2. DIMENSIONS ARE IN mm
3. DO NOT SCALE
4. COMPATIBILITY WITH PT+76-US DUCT
5. ONE HALF SHELL WITH VENT AND ONE WITHOUT.

INVENTORY No. 02DT0027, W/OUT VENT
INVENTORY No. 02DT0028, WITH VENT

NOTE:

USE TWO HALF-SHELLS W/OUT VENT (02DT0027) FOR STANDARD DUCT COUPLING

USE ONE HALF SHELL W/OUT VENT (02DT0027) AND ONE HALF-SHELL WITH VENT (02DT0028) FOR DUCT COUPLING WHERE A GROUT VENT IS NEEDED

REV.	DATE	BY	CHK
1	6/4/07	GDH	MM
	3/9/07	GDH	MM

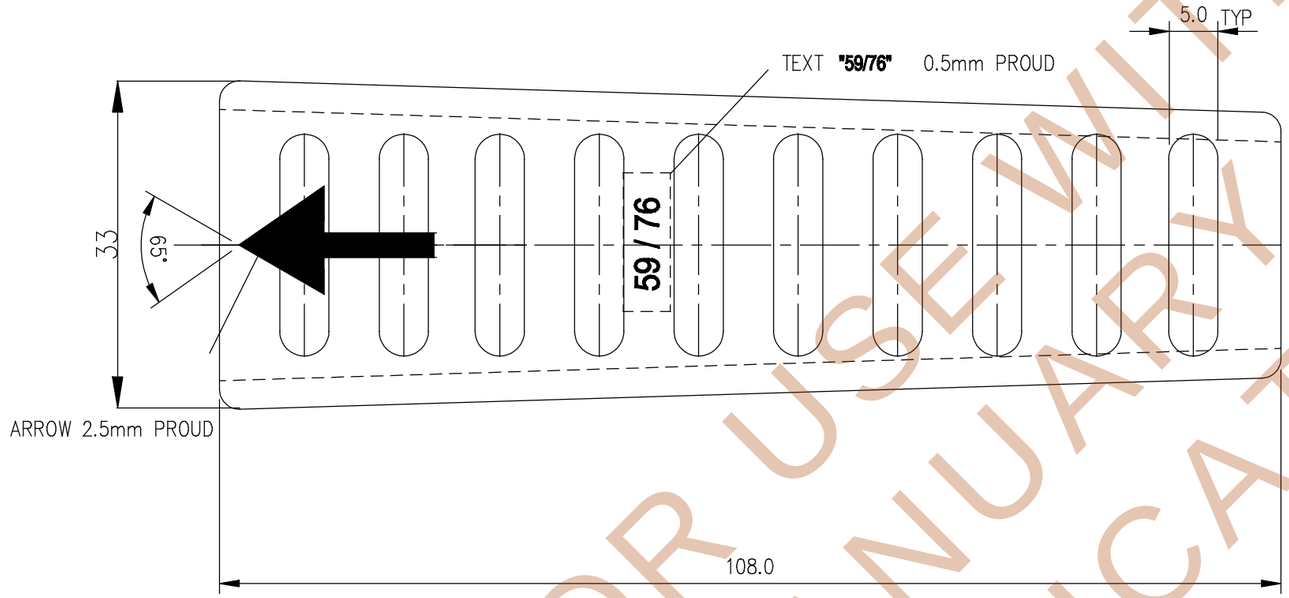
DEMINSON CHANGES
APPROVED PRODUCTION
REVISION

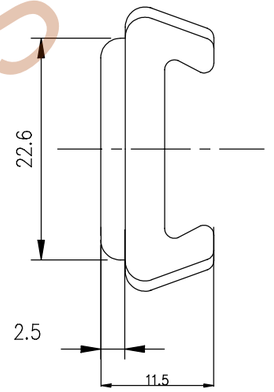
VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE:
76MM PT-PLUS DUCT COUPLER
Half Shell Non-Vented and Half-Shell Vented

PROJECT:
VSL
SYSTEMS DRAWING

SCALE: NTS
VSL JOB NO:
VSL DWG. NO.
C626





GENERAL NOTES

1) ALL HOLES TO BE FREE FROM BURRS
2) ALL RADII 1mm UNO
3) MATERIAL SHALL BE: NYLON
4) MANUFACTURERS IDENTIFICATION AND BATCH No. MUST BE CLEARLY VISIBLE ON PART
5) SCALE: DRAWING NOT TO SCALE

INVENTORY No. 02DT0046

TOLERANCES – U.S.
UNLESS OTHERWISE SPECIFIED

DIMENSIONS IN INCHES.

FRACTIONAL	_____	± 1/64
DECIMAL	_____.X ___	± .030
	_____.XX ___	± .010
	_____.XXX __	± .005
ANGULAR	_____	± 1/2°
SURFACE QUALITY		√

NOTES:
1) BREAK SHARP EDGES .010 MAX.
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) DIMENSIONS SHOWN THUS "(XX)" ARE IN MILLIMETERS.
5) DIMENSIONS IN MM SHALL CONFORM TO DIN 1685 GTB16 TOLERANCES

REV.	DATE	REVISION	BY	CHK
2	7/32/07	OVERALL DIMENSION CHANGES	GDH	MM
1	3/14/07	APPROVED FOR CONSTRUCTION	GDH	

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

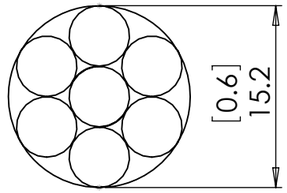
DWG. TITLE: 59 / 76 MM PT-PLUS CLIP FABRICATION

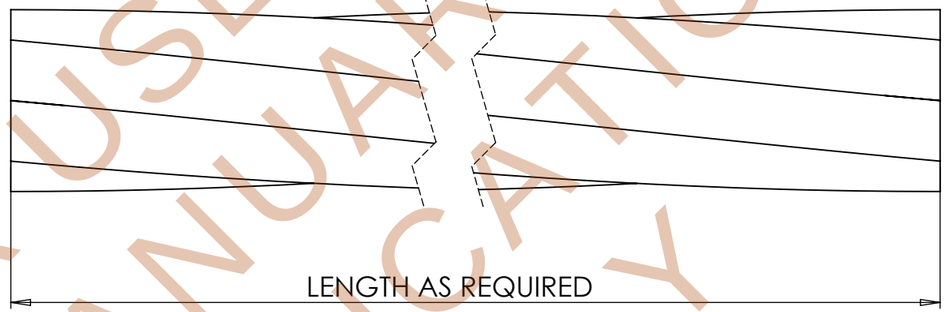
PROJECT: VSL SYSTEMS DRAWING

SCALE: 1:10

VSL JOB NO:

VSL DWG. NO. C628





NO.	DATE	DESCRIPTION	BY	CHK
0	2/24/2010	FOR FDOT	MM	

ISSUED FOR

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL POST TENSIONING

0.6" BARE STRAND (270 KSI)
P/N: 01SD0002 (COMMERCIAL)
P/N: 01SD0013 (DOMESTIC)

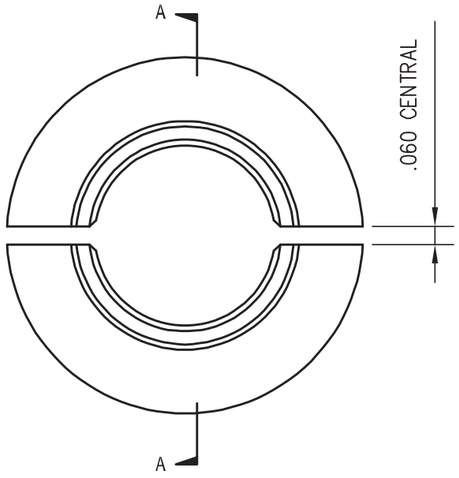
SCALE: DO NOT SCALE

DRW NO: C674

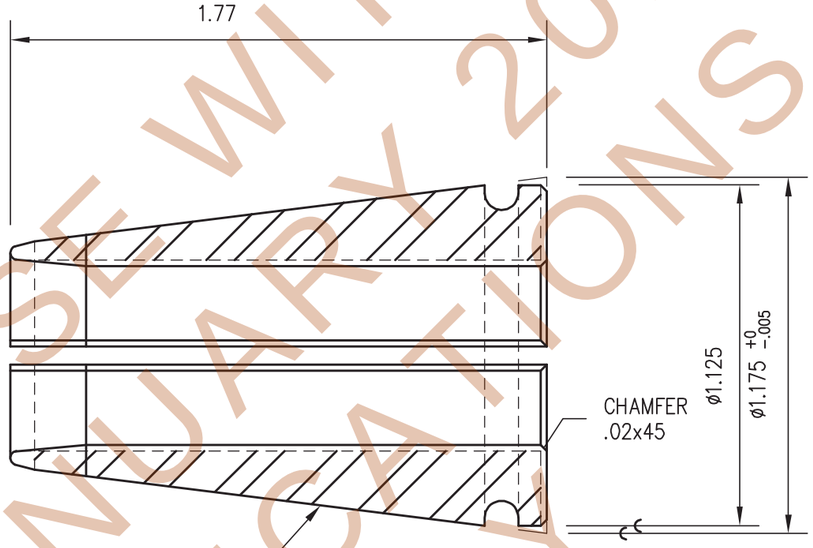
SHEET: 1 OF 1

VStructural LLC (VSL) SHOP DRAWING

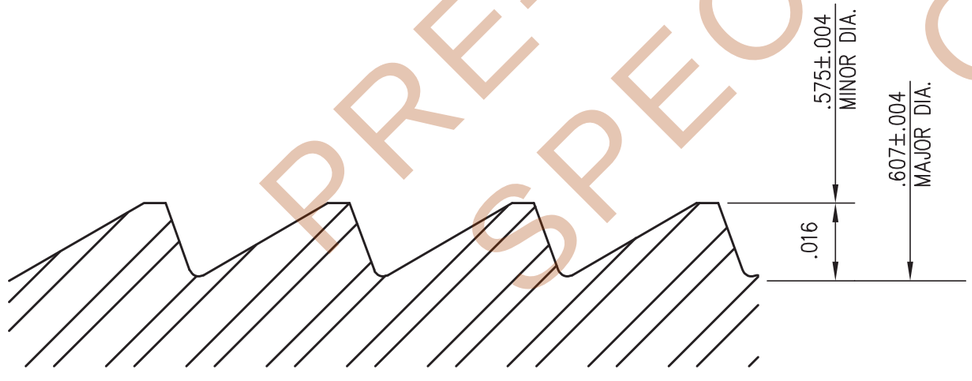
These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.



0.6" DIA. MULTIWEDGES
TYPE 1.6G



SECTION A-A



THREAD DETAIL

TOLERANCES

UNLESS OTHERWISE SPECIFIED

DIMENSIONS IN INCHES.

FRACTIONAL	± 1/64
DECIMAL .X	± .030
.XX	± .010
.XXX	± .005
ANGULAR	± 1/2°
SURFACE QUALITY	√

NOTES:
1) BREAK SHARP EDGES .010 MAX.
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) DIMENSIONS SHOWN THUS "(XX)" ARE IN MILLIMETERS.
5) DIMENSIONS IN MM SHALL CONFORM TO DIN 1685 GTB16 TOLERANCES

GENERAL NOTES

1) MATERIAL: VSL MS 3.1.006
2) WEIGHT: 0.197 LBS. (APPROX.)
3) HEAT TREATMENT: CASEHARDEN– CASE DEPTH .013–.025 TEMPER
CASE HARDNESS TO BE EQUIVALENT TO HRC 59–66, CORE 25–40 HRC
AS MEASURED BY ROCKWELL"SUPERFICAL", VICKERS, KNOOP OR EQUIVALENT.
4) DIAMETERS MARKED ⌖ MUST BE CONCENTRIC WITHIN .004 T.I.R.
5) SURFACE FINISHED 125 U.N.O.

INVENTORY No. 02WG008

REV.	DATE	BY	CHK
3	4/29/04	GDH	NDS
2	1/1/89	TKW	
1	1/1/89	BB	

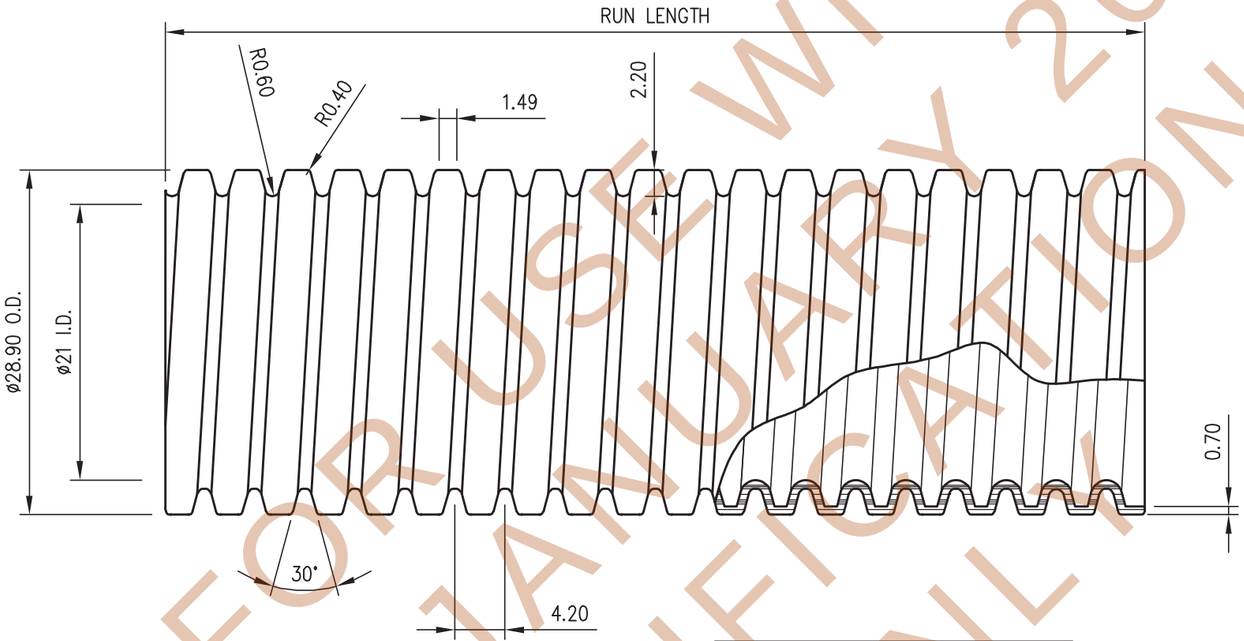
3 UPDATED BORDER
2 ADDED INVENTORY NUMBER
1 ISSUED FOR PRODUCTION
REVISION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE: 0.6" MULTIWEDGE TYPE 1.6G

PROJECT: VSL SYSTEM DRAWING

SCALE: 2:1
VSL JOB NO:
VSL DWG. NO.
C218



TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN MILLIMETERS.

0 THROUGH 50mm	±0.5
51mm THROUGH 100mm	±1.0
MORE THAN 100mm	±1.5
ANGULAR	±1/2°
SURFACE QUALITY	√

NOTES:
1) BREAK SHARP EDGES .25 MAX.
2) REMOVE ALL BURRS.
3) ALL RADII 1mm UNO
4) DO NOT SCALE DRAWING.
5) DIMENSIONS IN MM SHALL CONFORM TO DIN 1685 GTB16 TOLERANCES
6) MATERIAL: PP

INVENTORY No. 02DT0310

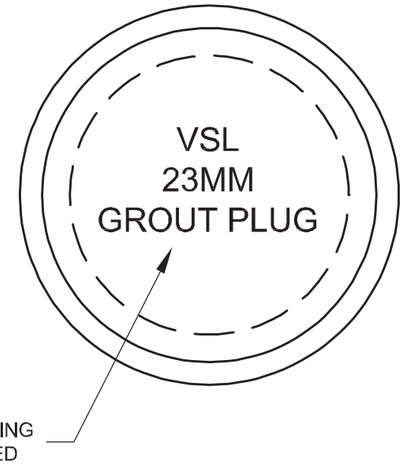
REV.	DATE		GDH	NDS
1	4/26/04	RELEASED FOR PRODUCTION		
		REVISION	BY	CHK

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

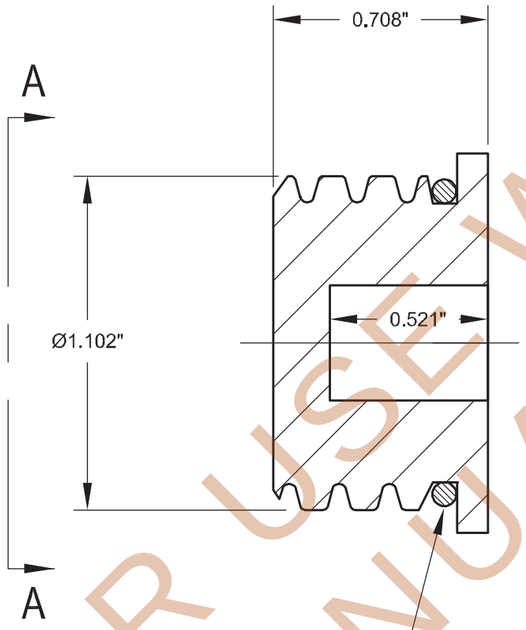
DWG. TITLE: 23MM GROUT HOSE FABRICATION

PROJECT: VSL SYSTEMS DRAWING

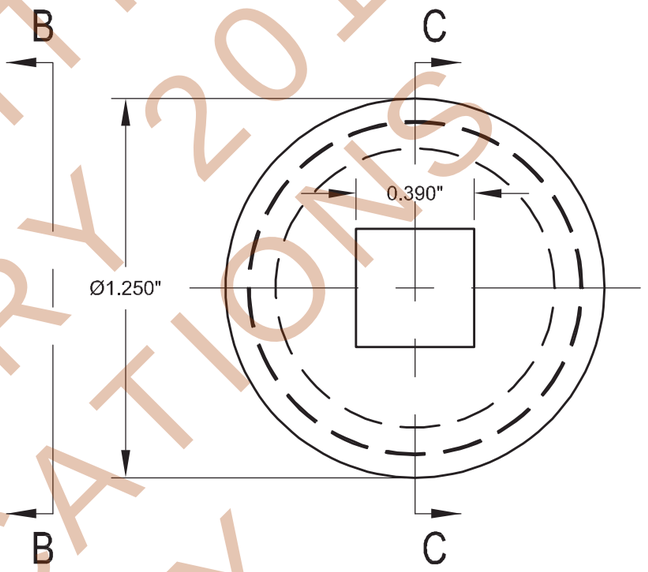
SCALE: 2:1
VSL JOB NO:
VSL DWG. NO.
C587



VIEW A-A



SECTION C-C



VIEW B-B

TOLERANCES

UNLESS OTHERWISE SPECIFIED

DIMENSIONS IN INCHES.

FRACTIONAL _____	± 1/64
DECIMAL _____.X ___	± .030
_____.XX ___	± .010
_____.XXX __	± .005
ANGULAR _____	± 1/2°
SURFACE QUALITY	√

NOTES:

1) BREAK SHARP EDGES .010 MAX.
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) DIMENSIONS SHOWN THUS "(XX)" ARE IN MILLIMETERS.
5) DIMENSIONS IN MM SHALL CONFORM TO DIN 1685 GTB16 TOLERANCES
5) MATERIAL: POLYPROPYLENE BLACK
5) INVENTORY No. 02DT0341

REV.	DATE		
2	1/02/07	MATERIAL CHANGE (BLACK)	GDH
1	4/26/04	RELEASED FOR PRODUCTION	GDH ZK
		REVISION	BY CHK

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE: 23MM GROUT PLUG FABRICATION

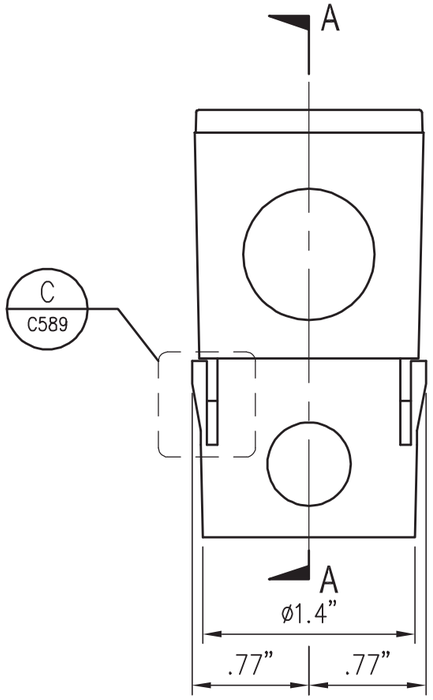
PROJECT: VSL SYSTEMS DRAWING

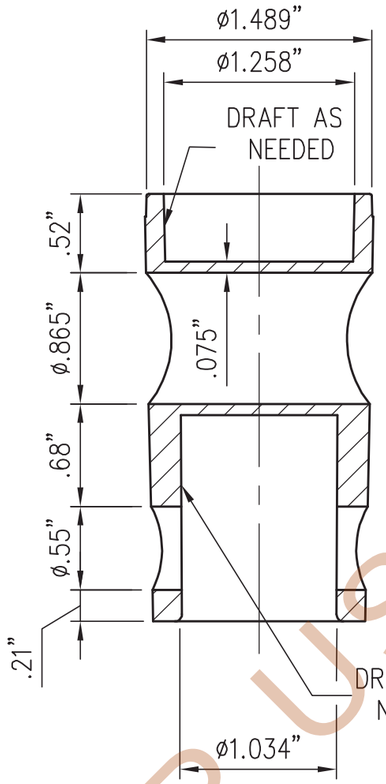
SCALE: 2:1

VSL JOB NO:

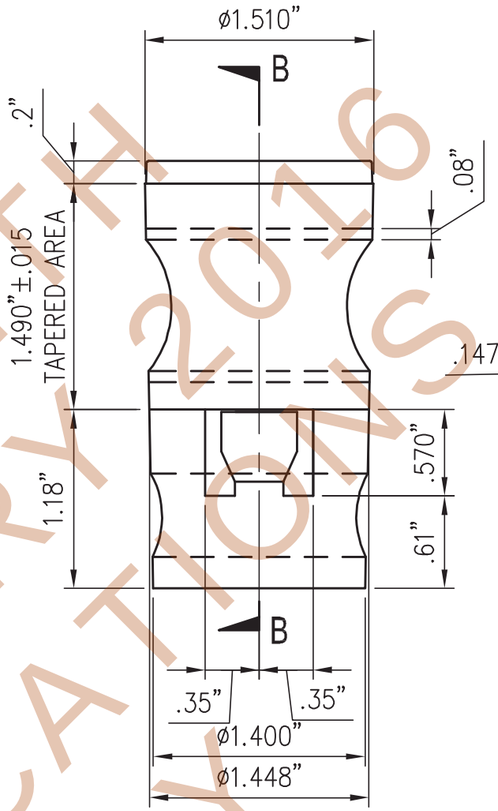
VSL DWG. NO.

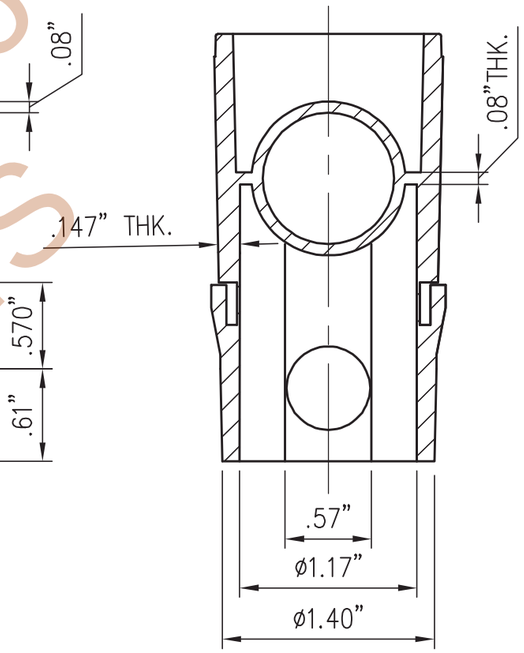
C583



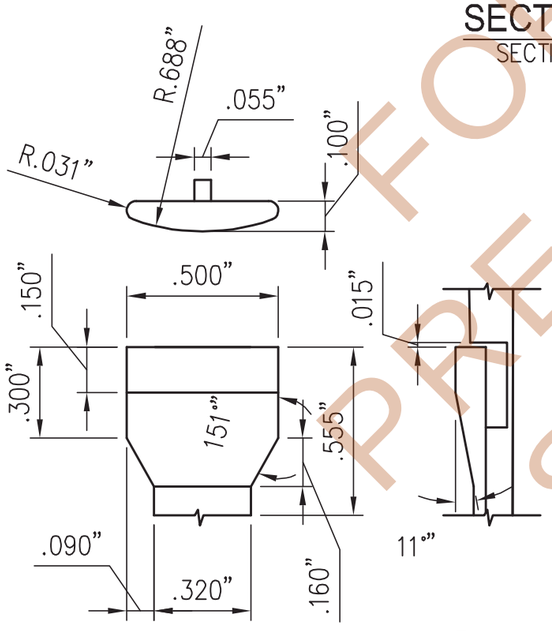


SECTION A-A
SECTION VIEW





SECTION B-B
SECTION VIEW



DEATAIL VIEW
LOCKING TANG
SCALE: 2:1

C
C589

TOLERANCES
UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES.

FRACTIONAL		± 1/32
DECIMAL	.X	± .030
	.XX	± .010
	.XXX	± .005
ANGULAR		± 1/2°
SURFACE QUALITY		√

NOTES:
1) BREAK SHARP EDGES .010 MAX.
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) DIMENSION W/* CRITICAL DIMENSION
5) MATERIAL: HIPS COLOR BLACK
5) INVENTORY: 02DT0330

REV.	DATE	BY	CHK
2	6/22/05	GDH	
1	4/26/04	GDH	NDS

BLACK COLOR ADDED
RELEASED FOR PRODUCTION
REVISION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

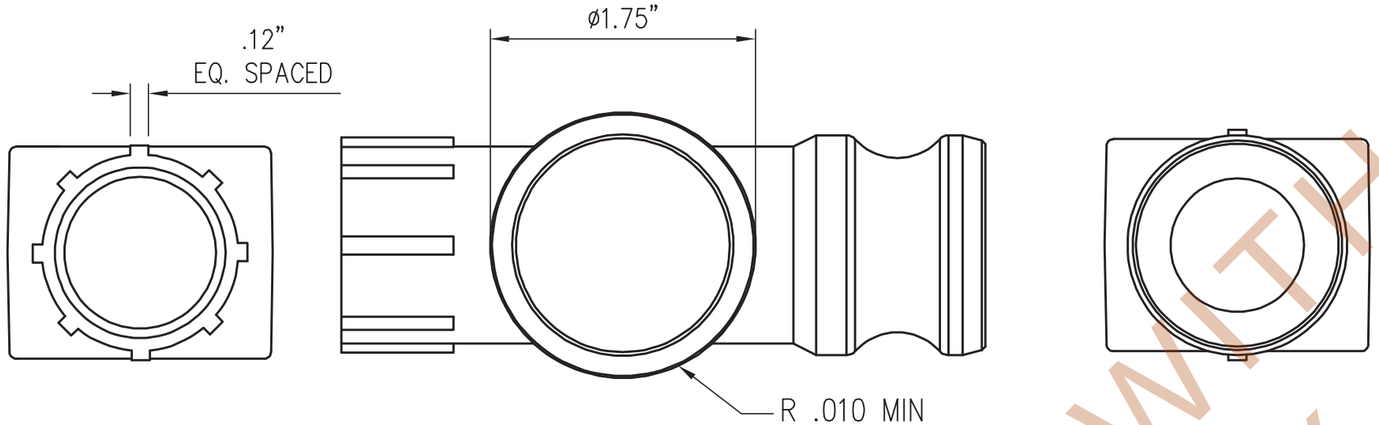
VALVE
GROUT SHUTOFF VALVE

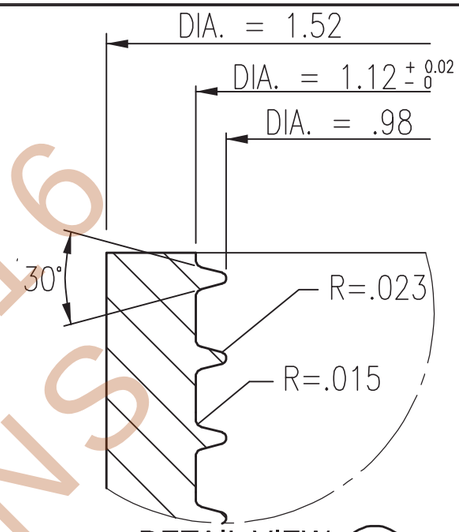
DWG. TITLE:

VSL
SYSTEMS DRAWING

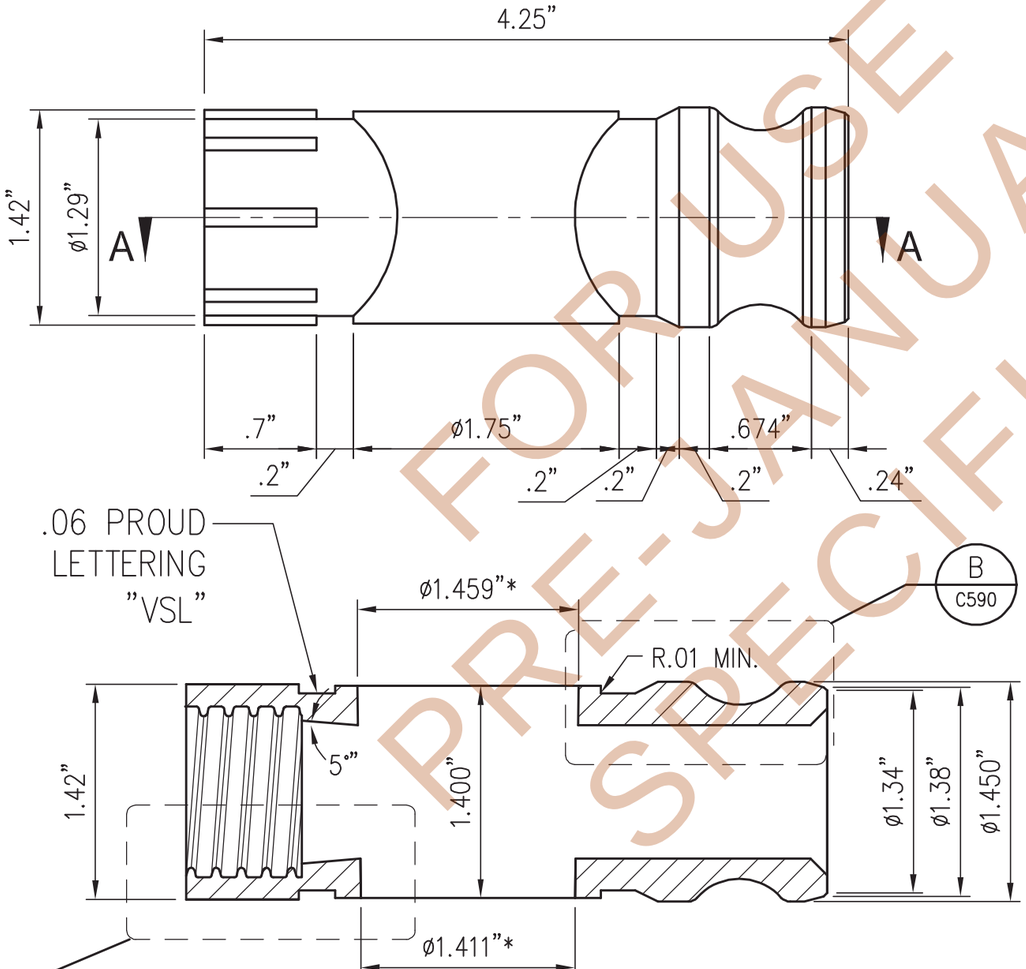
PROJECT:

SCALE: 1:1 UNO
VSL JOB NO:
VSL DWG. NO.
C589

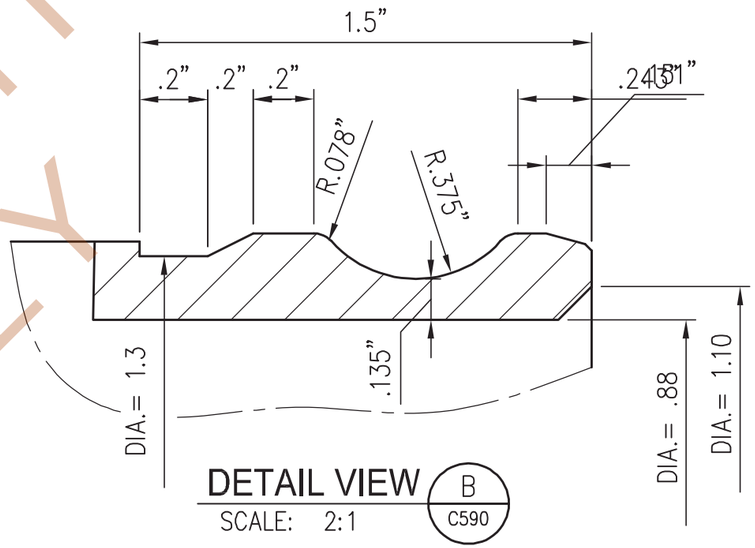




DETAIL VIEW A C590
SCALE: NTS



SECTION C-C



DETAIL VIEW B C590
SCALE: 2:1

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES.

FRACTIONAL		± 1/32
DECIMAL	.X	± .030
	.XX	± .010
	.XXX	± .005
ANGULAR		± 1/2°
SURFACE QUALITY		√

NOTES:
1) BREAK SHARP EDGES .010 MAX.
2) REMOVE ALL BURRS.
3) DO NOT SCALE DRAWING.
4) DIMENSION W/* CRITICAL DIMENSION
5) MATERIAL: HIPS COLOR BLACK
5) INVENTORY: 02DT0330

REV.	DATE	REVISION	BY	CHK
2	6/22/05	BLACK COLOR ADDED	GDH	NDS
1	4/26/04	RELEASED FOR PRODUCTION		

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
WWW.VSL.NET

DWG. TITLE: BODY
GROUT SHUTOFF VALVE

PROJECT: VSL
SYSTEMS DRAWING

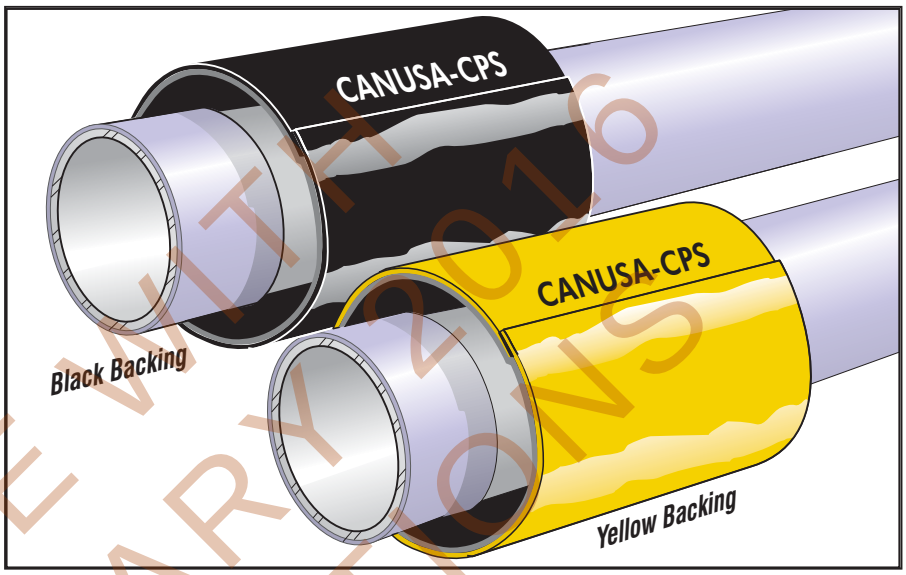
SCALE: 1:10
VSL JOB NO:
VSL DWG. NO. C590

CANUSA-CPS
A SHAWCOR COMPANY

Product Data Sheet

CanusaTube™ - PLA

Tubular sleeve for pipeline corrosion protection



For more than 35 years, Canusa-CPS has been a leading developer and manufacturer of specialty pipeline coatings for the sealing and corrosion protection of pipeline joints and other substrates. Canusa-CPS high performance products are manufactured to the highest quality standards and are available in a number of configurations to accommodate many specific project applications.

Product Description

The CanusaTube™ is a heat shrinkable tubular sleeve designed for corrosion protection of buried and exposed steel pipelines. CanusaTube™ consists of a crosslinked polyolefin backing, coated with a protective heat sensitive adhesive which effectively bonds to steel substrates and common pipeline coatings including polyethylene and fusion bonded epoxy.

Features & Benefits

Rapid & Reliable Installation

Because CanusaTube™ consists of a unique tubular configuration that has been factory constructed, quick and reliable field installation is easy to accomplish. CanusaTube™ is available with a specially formulated adhesive to accommodate demanding operating temperatures and soil stress conditions. To further optimize installation, CanusaTube™ is available in yellow which includes a thermochromic indicator to visually confirm proper installation.

Long Term Corrosion Protection

CanusaTube™ provides excellent resistance to cathodic disbondment resulting in effective long term corrosion protection. The high performance crosslinked backing in combination with the specially formulated adhesive is engineered to have excellent resistance against temperature cycling, and chemical and environmental attack.

Saves Time & Money

With CanusaTube's™ unique construction, less time is required handling, positioning and installing separate closures. With the application of heat, this feature allows for fast, simple and complete installation of the sleeve. No additional costly primers are required. This minimizes installation time and labour costs while promoting high production rates. CanusaTube™ is also available in a high shrink ratio for high profile joint protection. Consult the High Shrink data sheet for additional information.

Applications

- Oil & Gas
- Girth-Weld Joints
- Water Pipelines
- Pre-Insulated Pipes
- Utility Poles

Configurations

- CanusaTube™
- 2-Layer
- Standard Shrink

Pipe Sizes

55 - 315 (2″ - 12″)

Temperature Range

up to 55°C (131°F)

Approvals

DIN 30672

The product selection chart shown here is intended as a guide for standard products.
Consult your Canusa representative for specific projects or unique applications.
The following are typical values based on Black, Heavy Duty (L) Sleeves.

CanusaTube™ - PLA

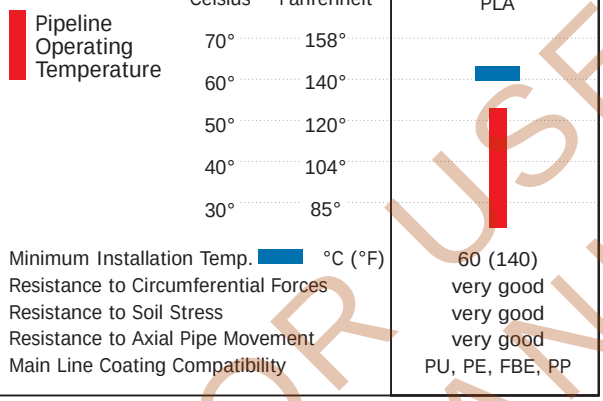
Product Selection Guide **Choose your sleeve based on your Pipe Diameter**

Shrink Range	Nominal Pipe Diameter DN (inches)	Outside Pipe Diameter mm (inches)	Tubular Sleeve PLA XXX-YYY ZZ	Tubular Sleeve Diameter As Supplied mm (in)	Tubular Sleeve Diameter Fully Recovered mm (in)
	50 (2)	61 (2.4)	PLA 55-YYY ZZ	90 (3.5)	55 (2.3)
	65 (2.5)	76 (3)	PLA 63-YYY ZZ	90 (3.5)	63 (2.5)
	80 (3)	89 (3.5)	PLA 90-YYY ZZ	120 (4.8)	81 (3.3)
	90 (3.5)	102 (4)	PLA 100-YYY ZZ	130 (5)	90 (3.5)
	100 (4)	114 (4.5)	PLA 115-YYY ZZ	145 (5.5)	98 (3.8)
	125 (5)	141 (5.5)	PLA 125-YYY ZZ	160 (6.3)	110 (4.3)
	150 (6)	168 (6.6)	PLA 170-YYY ZZ	205 (8)	140 (5.5)
	200 (8)	219 (8.6)	PLA 230-YYY ZZ	260 (10)	180 (7)
	250 (10)	273 (10.7)	PLA 280-YYY ZZ	315 (12.3)	211 (8.3)
	300 (12)	324 (12.8)	PLA 315-YYY ZZ	360 (14)	245 (9.5)

For pipe diameters > DN300 (12"), consult your Canusa representative.

Operating Characteristics

Sleeve Operating Characteristics



	Hot Melt PLA
Minimum Installation Temp. °C (°F)	60 (140)
Resistance to Circumferential Forces	very good
Resistance to Soil Stress	very good
Resistance to Axial Pipe Movement	very good
Main Line Coating Compatibility	PU, PE, FBE, PP

Typical Product Properties

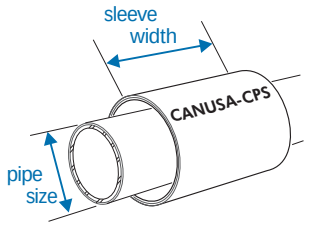
		Test Standard	Unit	PLA
Adhesive	Softening Point	ASTM E28	°C (°F)	72 (162)
	Lap Shear	DIN 30 672	N/cm² (psi)	60 (87)
Backing	Specific Gravity	ASTM D792		0.93
	Tensile Strength	ASTM D638	MPa (psi)	20 (2900)
	Elongation	ASTM D638	%	600
	Hardness	ASTM D2240	Shore D	46
	Abrasion Resistance	ASTM D1044	mg	45
	Volume Resistivity	ASTM D257	ohm-cm	10^{17}
	Dielectric Voltage Brkdwn.	ASTM D149	kV/mm	20
Sleeve	Impact	DIN 30 672	class B	pass
	Indentation	DIN 30 672	class B	pass
	Peel	ASTM D1000	N/cm (pli)	50 (29)
	Peel	DIN 30 672	N/cm (pli)	35 (20)
	Cathodic Disbondment	ASTM G8	mm rad	13
	Water Absorption	ASTM D570	%	0.05
	Low Temp. Flexibility	ASTM D2671-C	°C (°F)	-32 (-26)
	DIN Approval	DIN 30 672	class	B50
	Fully Recovered Thickness		mm (mils)	2.3 (92)

How To Order:

Dimensions & Ordering Info

PLA 115-450 YE

	Standard Ordering Options
Colour	YE - Yellow, BK - Black
Sleeve Width	300mm, 450mm, 600mm, 900mm (12", 18", 24", 36")
Pipe Size	55mm - 315mm (2" - 12")
Adhesive (thickness as supplied)	A - 0.75 mm (30 mils)
Backing (thickness as supplied)	L - 0.80 mm (31 mils)
Configuration	P - Tubular



Min. Sleeve Width =
Bare Steel Dimension + 50 mm (2") min.
on each side of the pipe joint.

The above represent standard ordering options. Consult your Canusa representative for any unique project requirements.

CANUSA-CPS
A SHAWCOR COMPANY

www.canusacps.com

Canada
CANUSA-CPS
a division of SHAWCOR LTD.
25 Bethridge Road
Toronto, Ontario
M9W 1M7,
Canada
Tel: +1 (416) 743-7111
Fax: +1 (416) 743-5927

U.S.A./Latin America
CANUSA-CPS
a division of SHAWCOR INC.
2408 Timberloch Place
Building C-8
The Woodlands, Texas
77380, U.S.A.
Tel: +1 (281) 367-8866
Fax: +1 (281) 367-4304

Europe/Middle East
CANUSA-CPS
a division of Canusa Systems Ltd.
Unit 3, Sterling Park
Gatwick Road
Crawley, West Sussex
England RH10 9QT
Tel: +44 (1293) 541254
Fax: +44 (1293) 541777

Asia/Pacific
CANUSA-CPS
a division of SHAWCOR LTD.
#05-31, Blk 52, Frontier
Ubi Avenue 3
Singapore
408867
Tel: +65-6749-8918
Fax: +65-6749-8919

Printed on recycled paper. Recyclable. PDS-CTpla-rev013

PATENT PENDING

MATERIAL

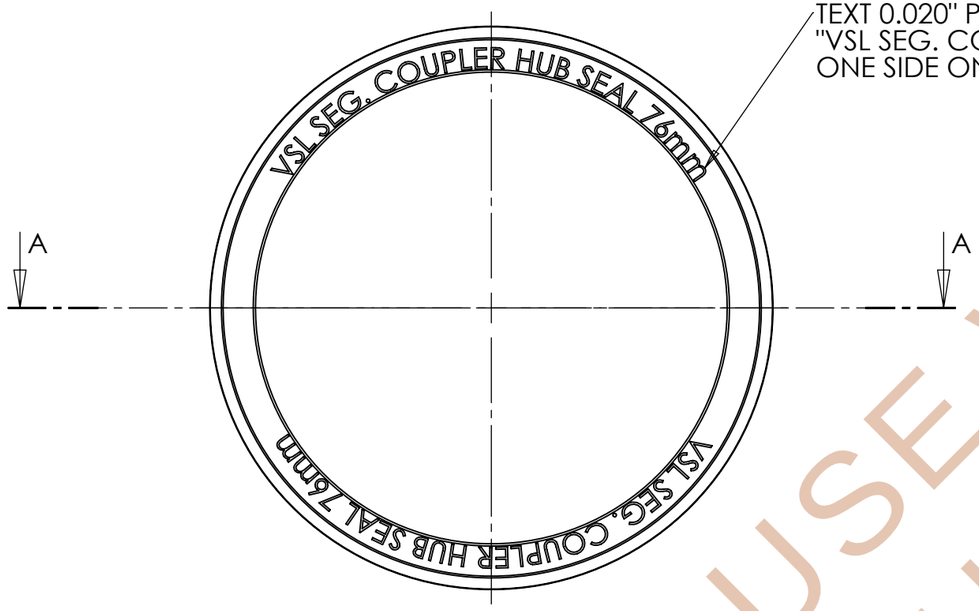
Santoprene, Black in color
(per VSL MS 8.1.091209.2)

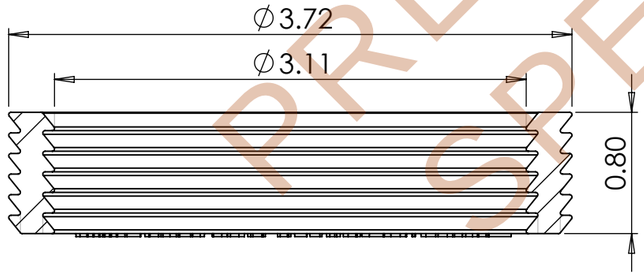
TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	_____ .X ___	± .030
DECIMAL	_____ .XX __	± .010
DECIMAL	_____ .XXX _	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____





SECTION A-A

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
2	1/14/2010	FOR PRODUCTION		MM	GY
1	11/10/09	FOR REVIEW		MM	GY
0	10/30/09	PRELIMINARY		MM	GY

VSL

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

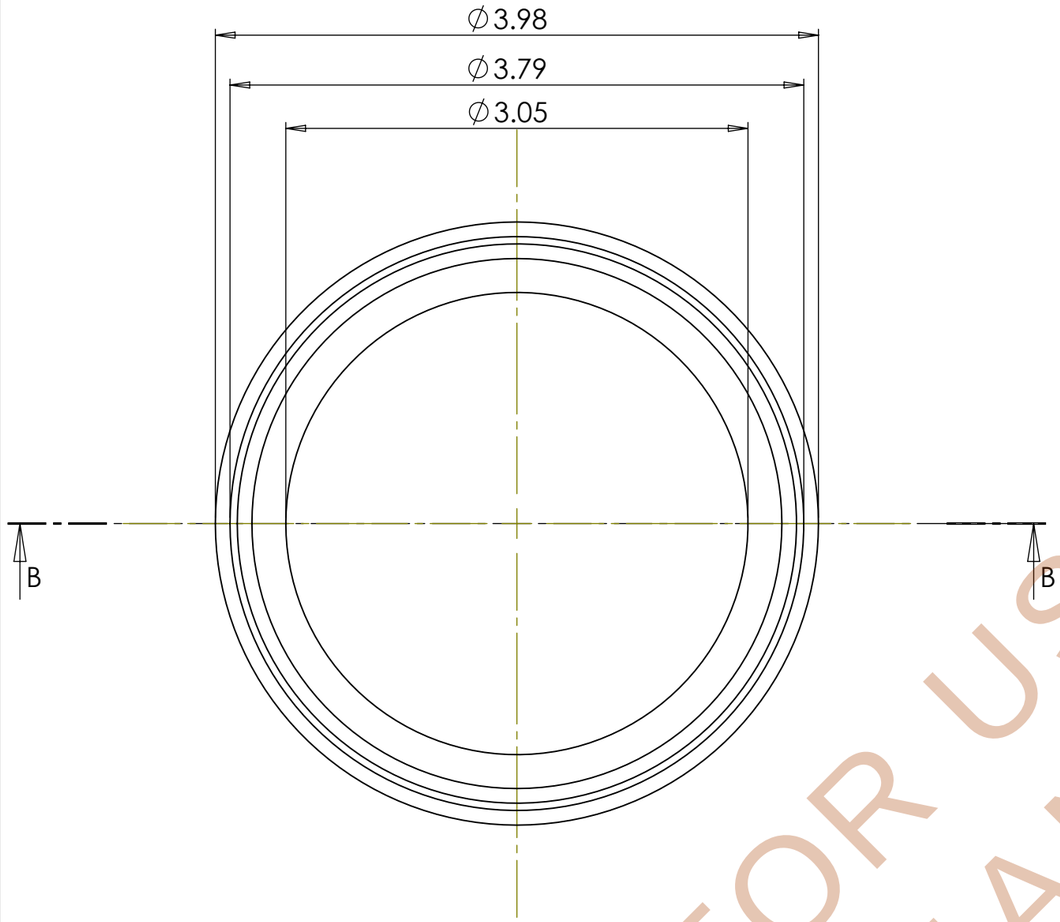
HUB SEAL

VSL P/N 02SC07602

SCALE: DO NOT SCALE

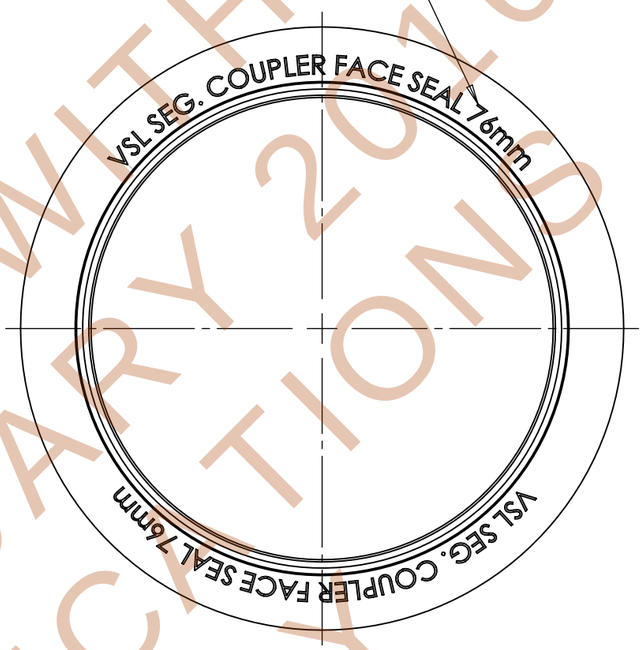
DRW NO: C647.2

SHEET: 1 of 1



PATENT PENDING

TEXT 0.020" RECESSED:
"VSL SEG. COUPLER FACE SEAL 76mm"



MATERIAL

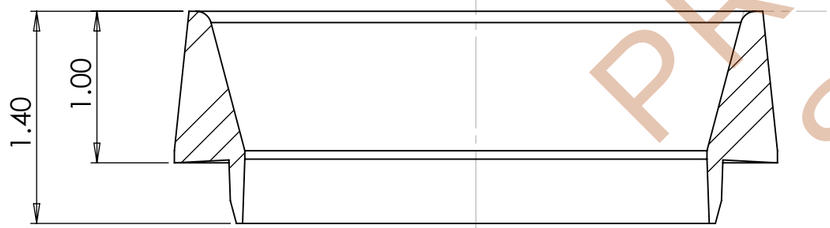
Santoprene, Black in color
(per VSL MS 8.1.091209.2)

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	.X	± .030
DECIMAL	.XX	± .010
DECIMAL	.XXX	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____ √



SECTION B-B

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
2	1/14/2010	FOR PRODUCTION		MM	GY
1	11/10/09	FOR REVIEW		MM	GY
0	10/30/09	PRELIMINARY		MM	GY

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

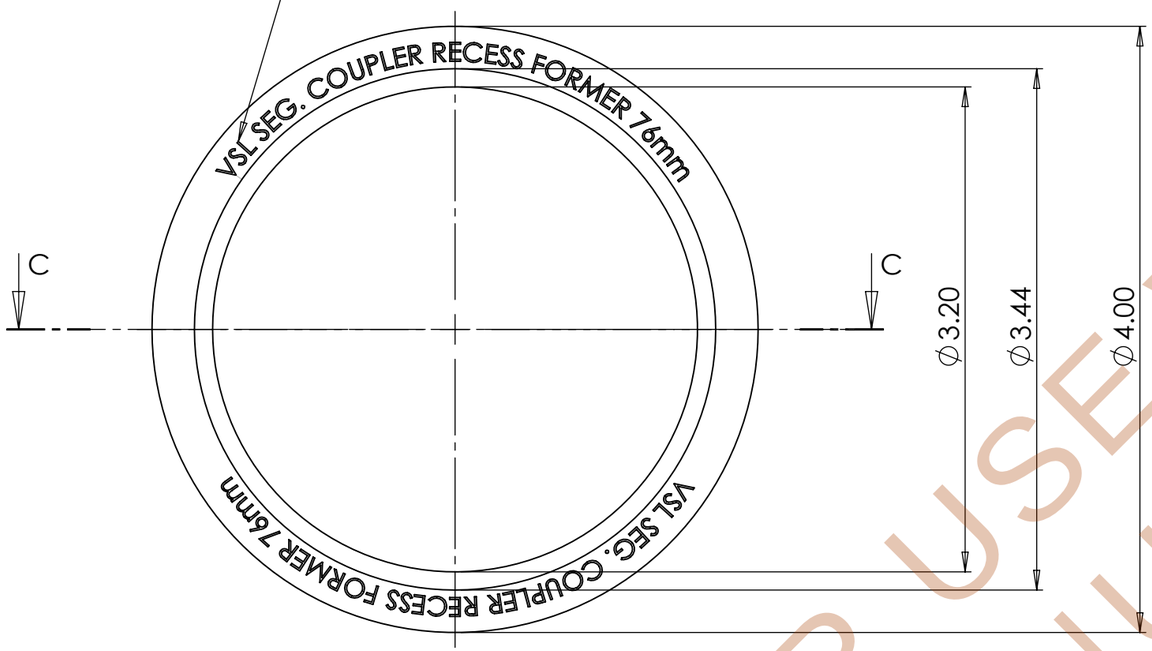
FACE SEAL

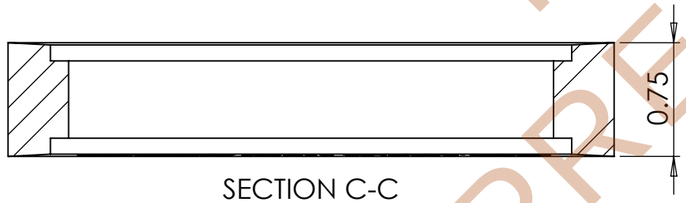
VSL P/N 02SC07603

SCALE: DO NOT SCALE
DRW NO: C648.2
SHEET: 1 of 1

PATENT PENDING

TEXT 0.020" RECESSED:
"VSL SEG. COUPLER RECESS FORMER 100mm"





SECTION C-C

MATERIAL

Santoprene, Black in color
(per VSL MS 8.1.091209.3)

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	_____ .X ____	± .030
DECIMAL	_____ .XX ____	± .010
DECIMAL	_____ .XXX __	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____

NO.	DATE	DESCRIPTION	BY	CHK
2	1/14/2010	FOR PRODUCTION	MM	GY
1	11/10/09	FOR REVIEW	MM	GY
0	10/30/09	PRELIMINARY	MM	GY
		ISSUED FOR		

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

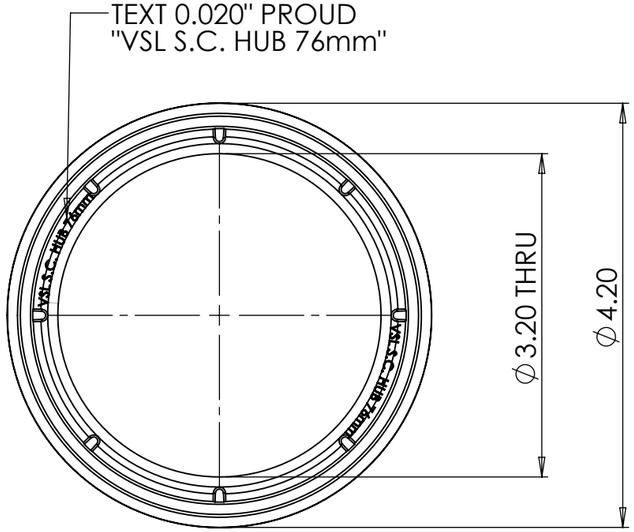
RECESS FORMER

VSL P/N 02SC07607

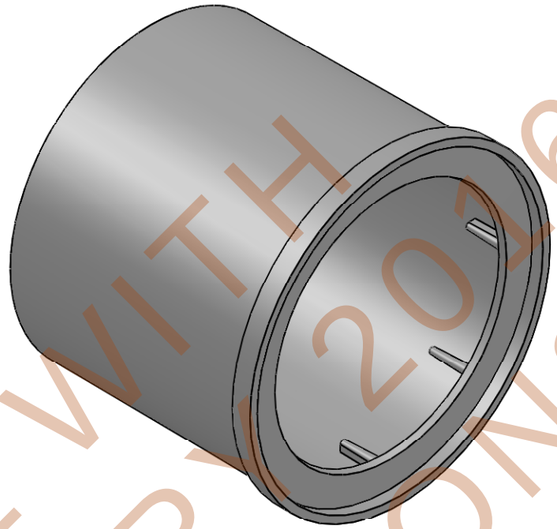
SCALE: DO NOT SCALE
DRW NO: C649.2
SHEET: 1 of 1

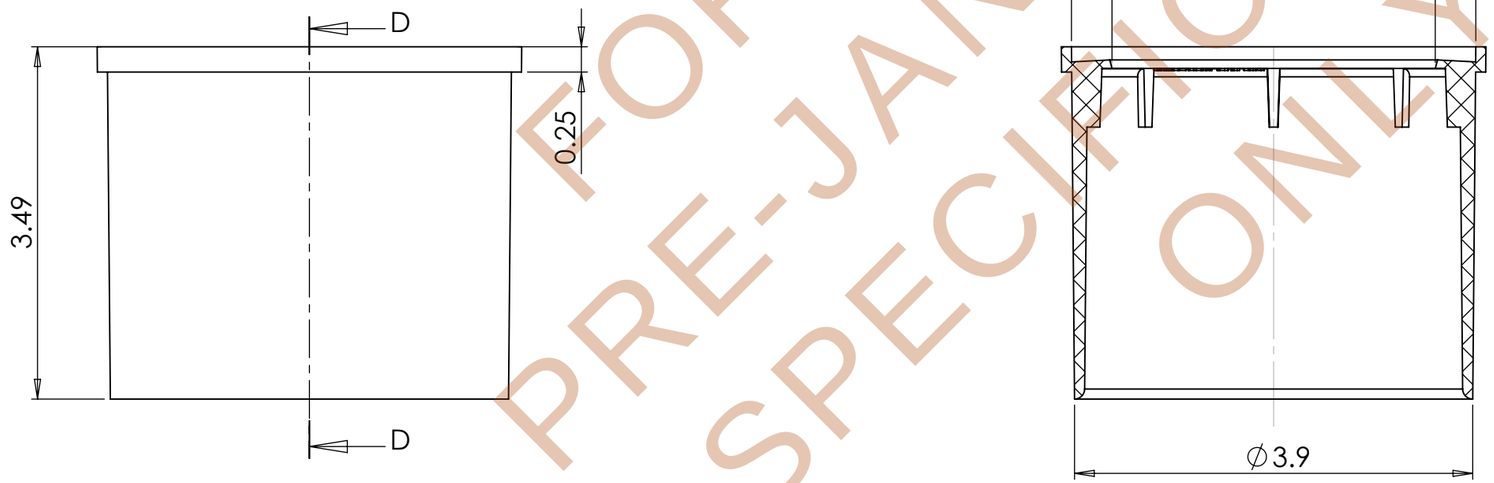
VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.



PATENT PENDING





SECTION D-D

MATERIAL

PP, White in color
(per VSL MS 8.1.091209.1)

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	_____ .X ____	± .030
DECIMAL	_____ .XX ___	± .010
DECIMAL	_____ .XXX __	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____ ✓

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
2	1/14/2010	FOR PRODUCTION		MM	GY
1	11/10/09	FOR REVIEW		MM	GY
0	10/30/09	PRELIMINARY		MM	GY

VSL
VStructural LLC
Dallas, TX Office
15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

HUB

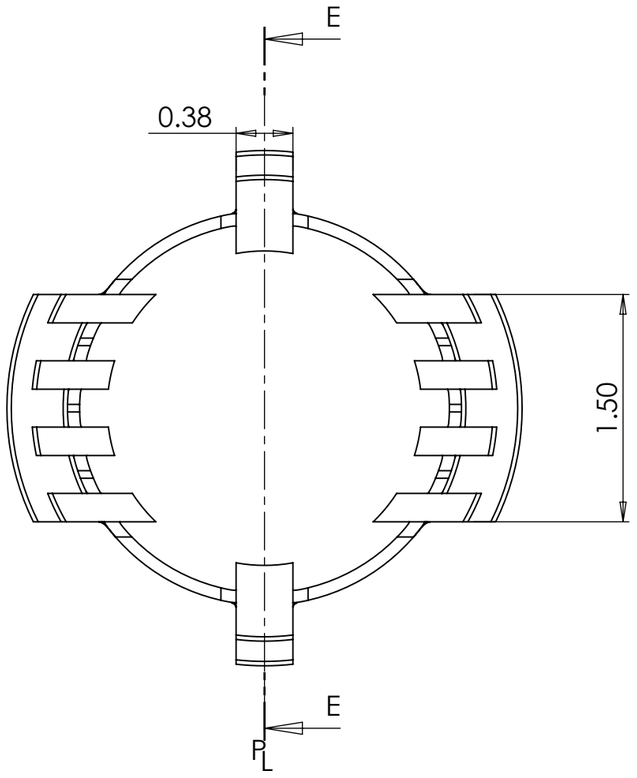
VSL P/N 02SC07601

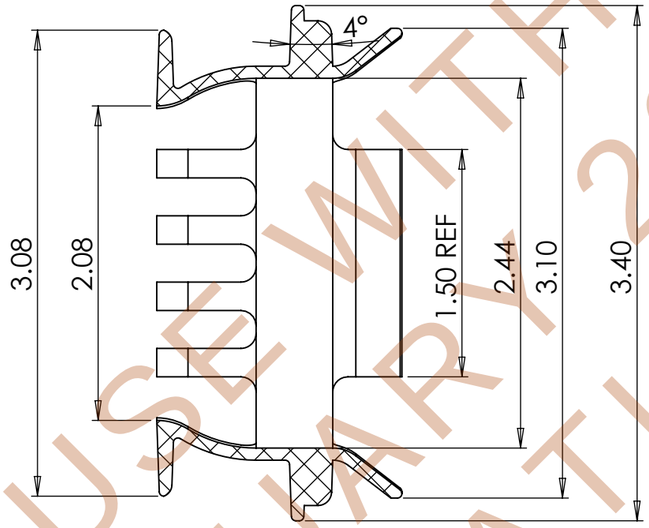
SCALE: DO NOT SCALE
DRW NO: C646.2
SHEET: 1 of 1

VStructural LLC (VSL) SHOP DRAWING

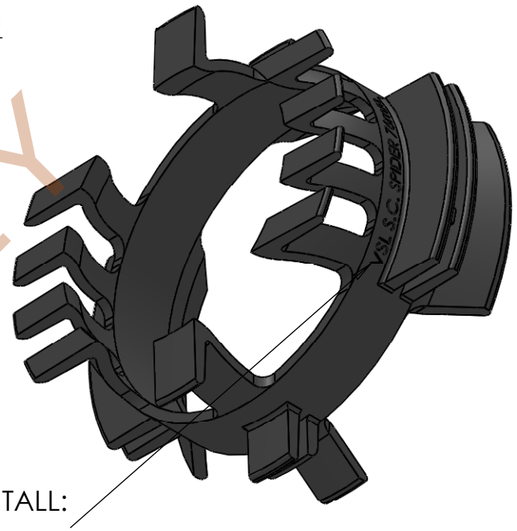
These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

PATENT PENDING





SECTION E-E



TEXT 0.020" PROUD OR RECESSED, 0.1" TALL:
"VSL S.C. SPIDER 76mm"

All Dimensions Typical, UNO

Minimum draft around Part Line: 1°, UNO

See Solid Model for Additional Details

MATERIAL

Nylon Supertough, Black in color

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	_____ .X ____	± .030
DECIMAL	_____ .XX ___	± .010
DECIMAL	_____ .XXX __	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____ ✓

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
2	1/14/2010	FOR PRODUCTION		MM	GY
1	11/10/09	FOR REVIEW		MM	GY
0	10/30/09	PRELIMINARY		MM	GY

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

SPIDER CLIP

02SC07604

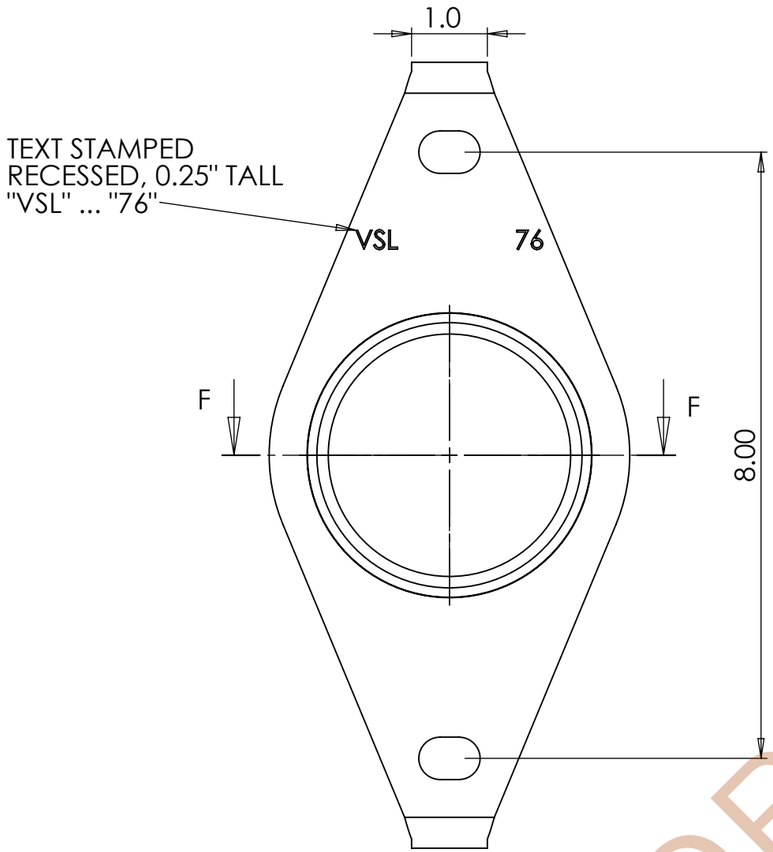
VStructural LLC (VSL) SHOP DRAWING

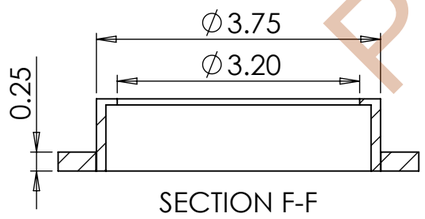
These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

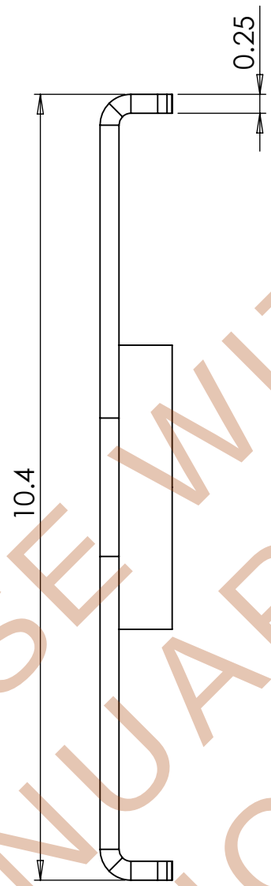
SCALE: DO NOT SCALE

DRW NO: C650.2

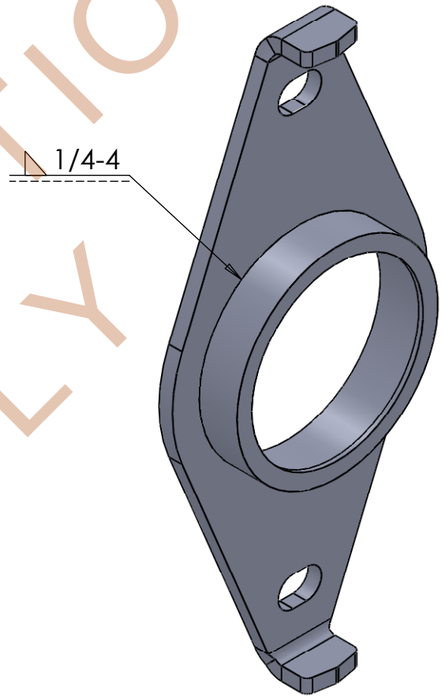
SHEET: 1 of 1







PATENT PENDING



MATERIAL

Steel, 2 pieces, bent/machined/welded

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	.X	± .030
DECIMAL	.XX	± .010
DECIMAL	.XXX	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____ ✓

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
1	1/15/2010	FOR REVIEW		MM	GY
0	1/7/2010	PRELIMINARY		MM	GY

VSL

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

76mm FORM TOOL

FOR 3/8" THICK FORMWORK ONLY

VSL P/N 02SC07605

SCALE: DO NOT SCALE

DRW NO: C651.1

SHEET: 1 of 1

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

PATENT PENDING

MATERIAL

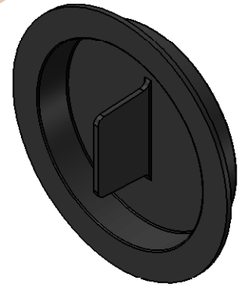
LDPE,
Black, Blue or Red in color

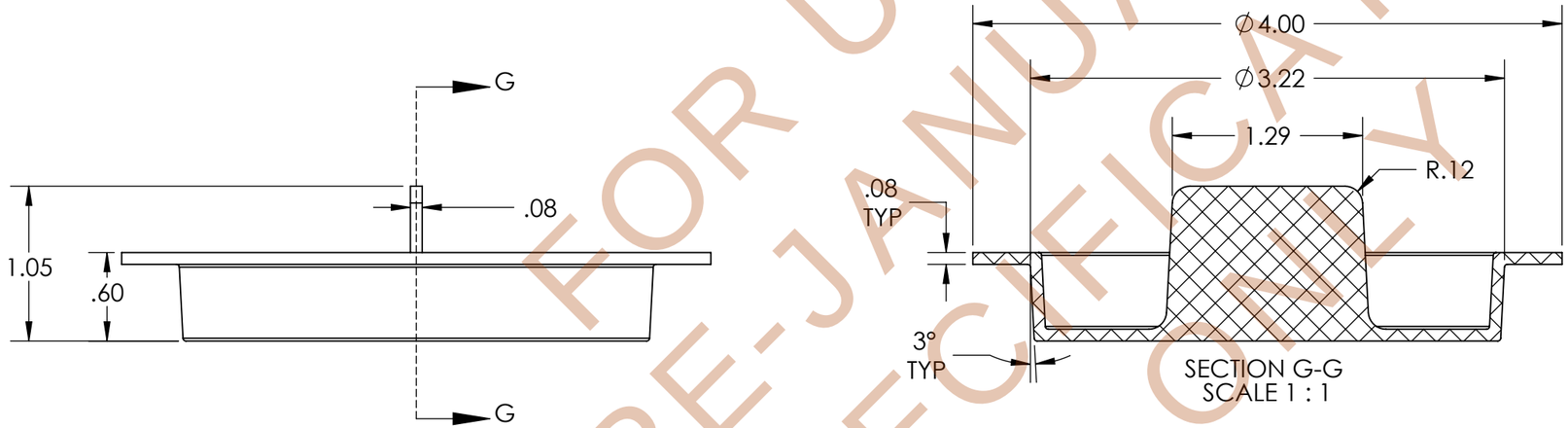
TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

FRACTIONAL	_____	± 1/64
DECIMAL	_____ .X ____	± .030
DECIMAL	_____ .XX ___	± .010
DECIMAL	_____ .XXX __	± .005
ANGULAR	_____	± 0°30'

SURFACE QUALITY _____ ✓





SECTION G-G
SCALE 1 : 1

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/7/2010	FOR PRODUCTION	MFG	MM	GY

VSL
VStructural LLC
Dallas, TX office
15600 Trinity Blvd. Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

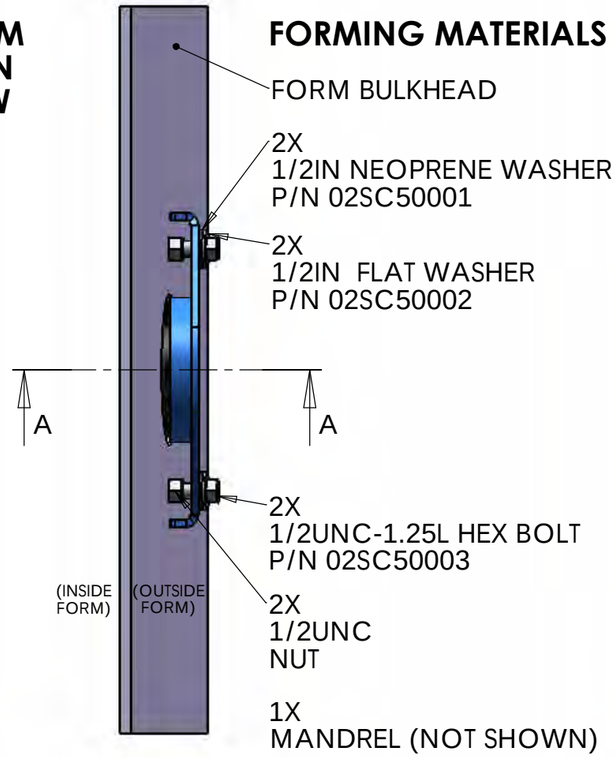
VSL 76mm SEGMENTAL DUCT COUPLER SYSTEM

76mm PROTECTIVE CAP

VSL P/N 02SC07606

SCALE: DO NOT SCALE
DRW NO: C663
SHEET: 1 of 1

FORM PLAN VIEW



FORMING MATERIALS

FORM BULKHEAD

2X
1/2IN NEOPRENE WASHER
P/N 02SC50001

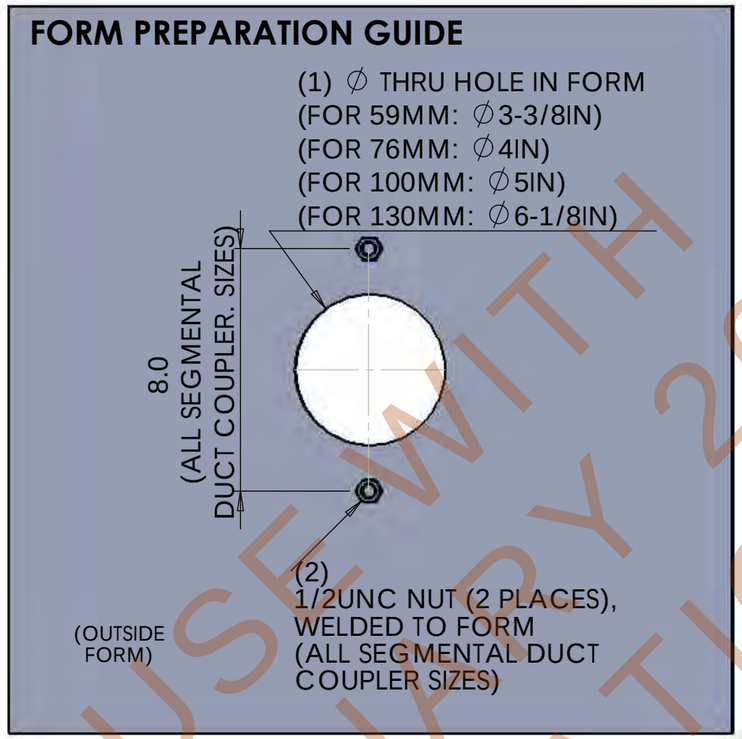
2X
1/2IN FLAT WASHER
P/N 02SC50002

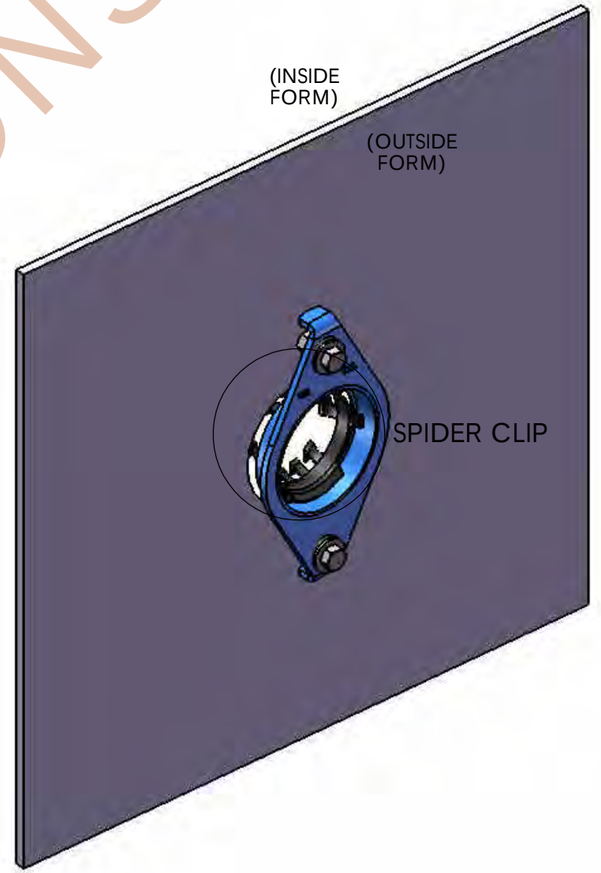
2X
1/2UNC-1.25L HEX BOLT
P/N 02SC50003

2X
1/2UNC
NUT

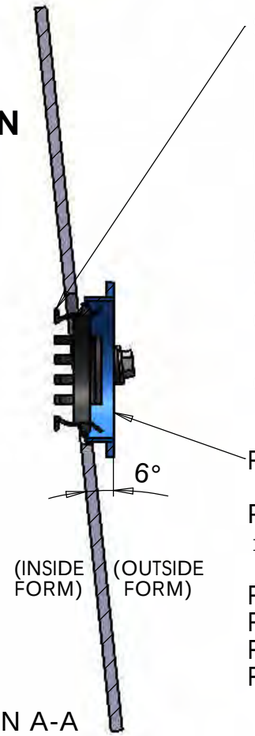
1X
MANDREL (NOT SHOWN)

FORM PREPARATION GUIDE





FORM ELEVATION VIEW



SECTION A-A

SPIDER CLIP

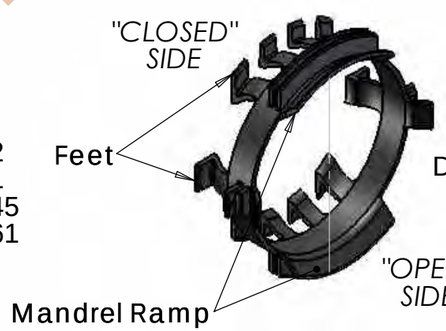
FOR 59MM, P/N 02SC05904, DRW NO. C671
FOR 76MM, P/N 02SC07604, DRW NO. C650
FOR 100MM, P/N 02SC10004, DRW NO. C643
FOR 130MM, P/N 02SC13004, DRW NO. C660

NOTES:
(1) The "open" side of the Spider Clip is manually "snapped" onto either the Hub (shown sheet 4) or the Form Tool (shown here)
(2) The "closed" side of the Spider Clip is "engaged" when the Mandrel is inserted through the Spider Clip from the "open" side (see sheet 2).
(3) The Spider Clip is used to:
(a) Secure the Form Tool to the Hub in the case of a wet cast (see sheets 1-3), and
(b) Secure the Hub of a match-cast segmentent to the Hub of a pre-cast segment (see sheets 4-6).
(4) Spider Clip should always be oriented as shown with the wide Mandrel Ramps verticle to each other.

FORM TOOL

PIVOTS ON 1/2UNC BOLTS
±6° SKEW FROM BULKHEAD

FOR 59MM, P/N 02SC05905, DRW NO. C672
FOR 76MM, P/N 02SC07605, DRW NO. C651
FOR 100MM, P/N 02SC10005, DRW NO. C645
FOR 130MM, P/N 02SC13005, DRW NO. C661



DETAIL SPIDER CLIP
SCALE 2 : 5

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VSL
VStructural LLC
Dallas, TX office
15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

SCALE: DO NOT SCALE
DRW NO: A243
SHEET: 1 of 8

VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE

WET CAST FORM

(1) Bolt the appropriate Form Tool to the Bulkhead with a Spider Clip installed in each Form Tool.

(2) Position a Recess Former between the Form Tool and the Hub.

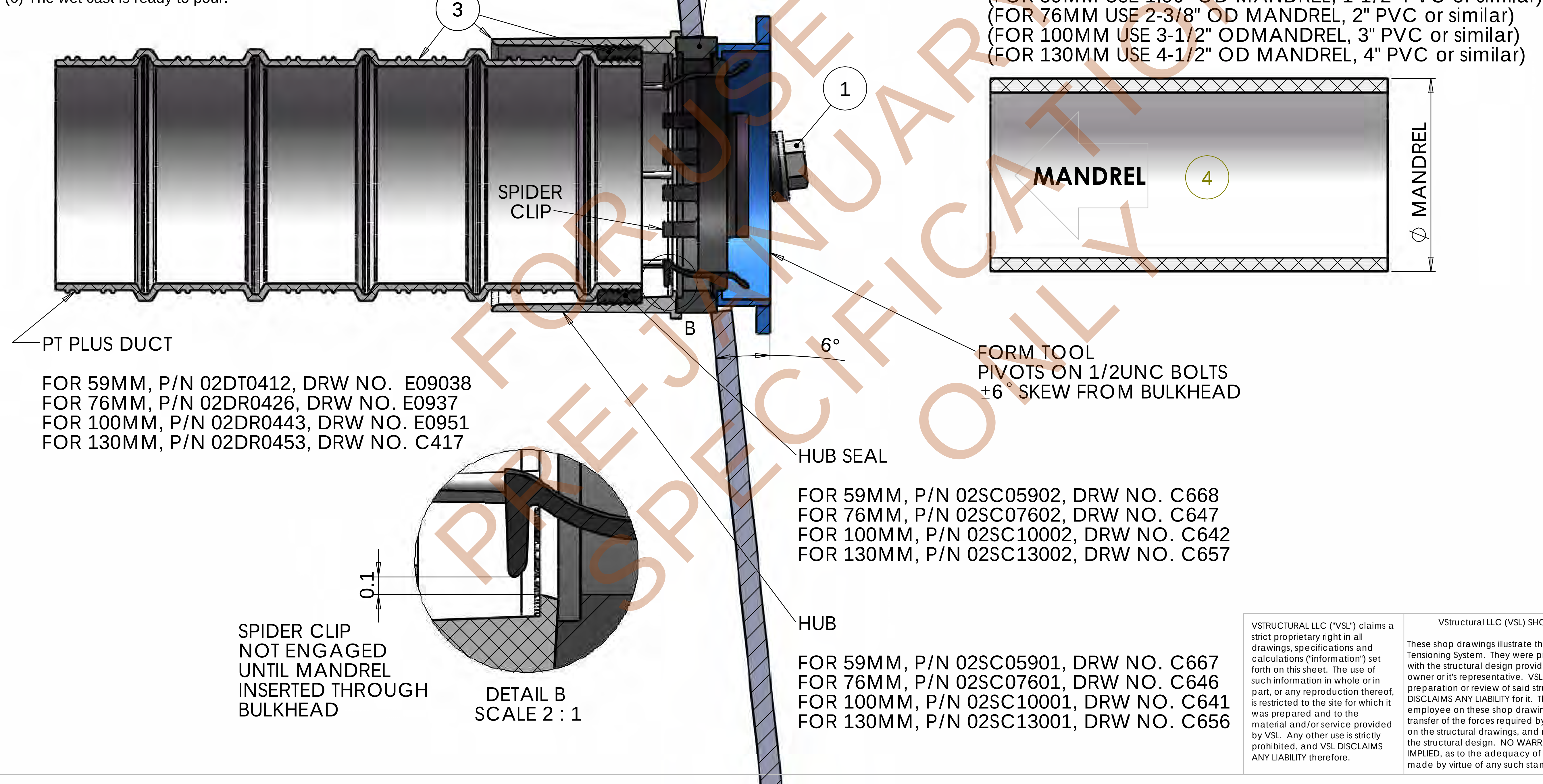
(3) (Optional) Ducts can be pre-assembled with Hub Seals and Hubs to speed the forming time. Any silicon-based or oil-based lubricant or dishwashing detergent solution acceptable to the contractor and the local DOT may be used to assist with the assembly of VSL's Segmental Duct Coupler components.

NOTE: Duct should always be cut between two major ribs. Cut length is the segment length, minus 2 inches, rounded down to the nearest cut position.

(4) Insert Mandrel through the form tool, engaging the Spider Clip and securing the Form Tool to the Hub, with a Recess Former sandwiched in-between.

(5) Note: The Spider Clip may also be installed on the Hub where the mandrel will be inserted from the opposite direction as shown. In such a case, the Spider Clip will be attached the Hub and will engage the Form Tool once the Mandrel is inserted.

(6) The wet cast is ready to pour.



VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VSL
VStructural LLC
Dallas, TX office
15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

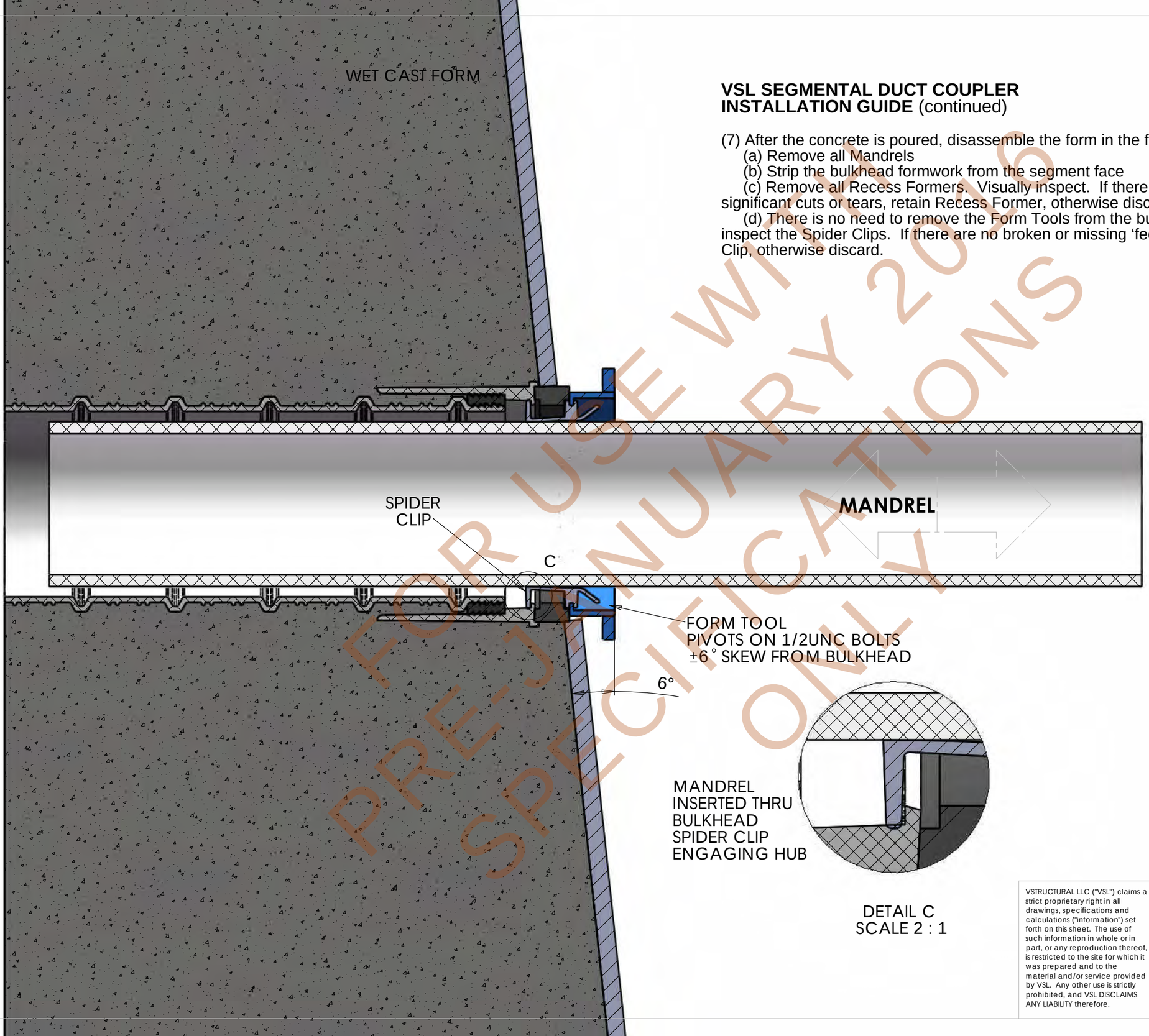
INSTALLATION GUIDE

SCALE: DO NOT SCALE

DRW NO: A243

VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(7) After the concrete is poured, disassemble the form in the following order:
(a) Remove all Mandrels
(b) Strip the bulkhead formwork from the segment face
(c) Remove all Recess Formers. Visually inspect. If there are not significant cuts or tears, retain Recess Former, otherwise discard.
(d) There is no need to remove the Form Tools from the bulkhead. Visually inspect the Spider Clips. If there are no broken or missing 'feet,' retain Spider Clip, otherwise discard.



DETAIL C
SCALE 2 : 1

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VSL
VStructural LLC
Dallas, TX office
15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

SCALE: DO NOT SCALE
DRW NO: A243
SHEET: 3 of 8

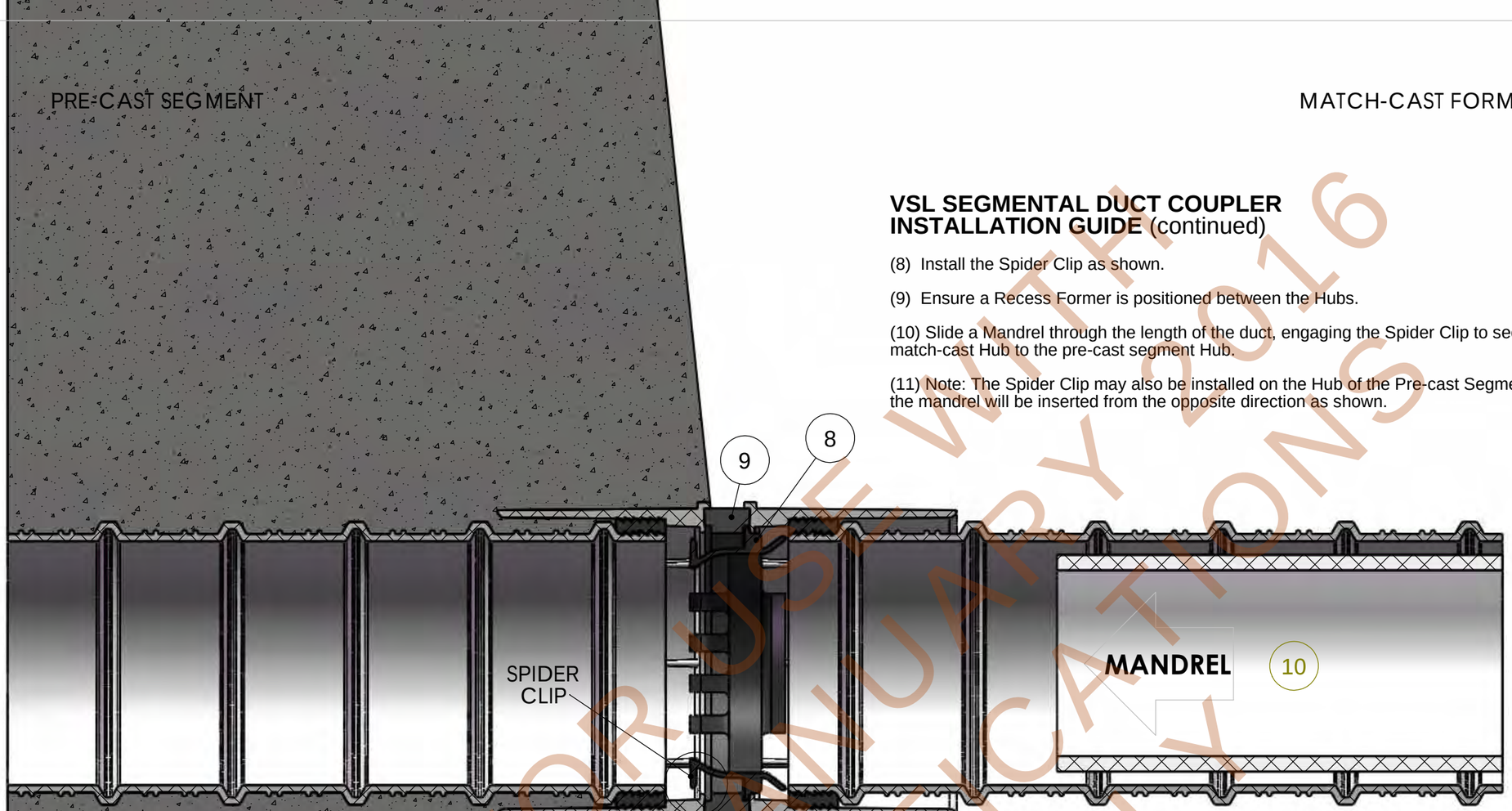
VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

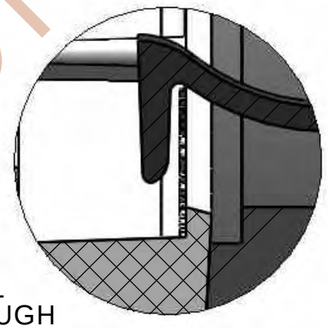
(8) Install the Spider Clip as shown.

(9) Ensure a Recess Former is positioned between the Hubs.

(10) Slide a Mandrel through the length of the duct, engaging the Spider Clip to secure the match-cast Hub to the pre-cast segment Hub.

(11) Note: The Spider Clip may also be installed on the Hub of the Pre-cast Segment where the mandrel will be inserted from the opposite direction as shown.





SPIDER CLIP NOT ENGAGED UNTIL MANDREL INSERTED THROUGH BULKHEAD

DETAIL D
SCALE 2 : 1

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VStructural LLC
Dallas, TX office
15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

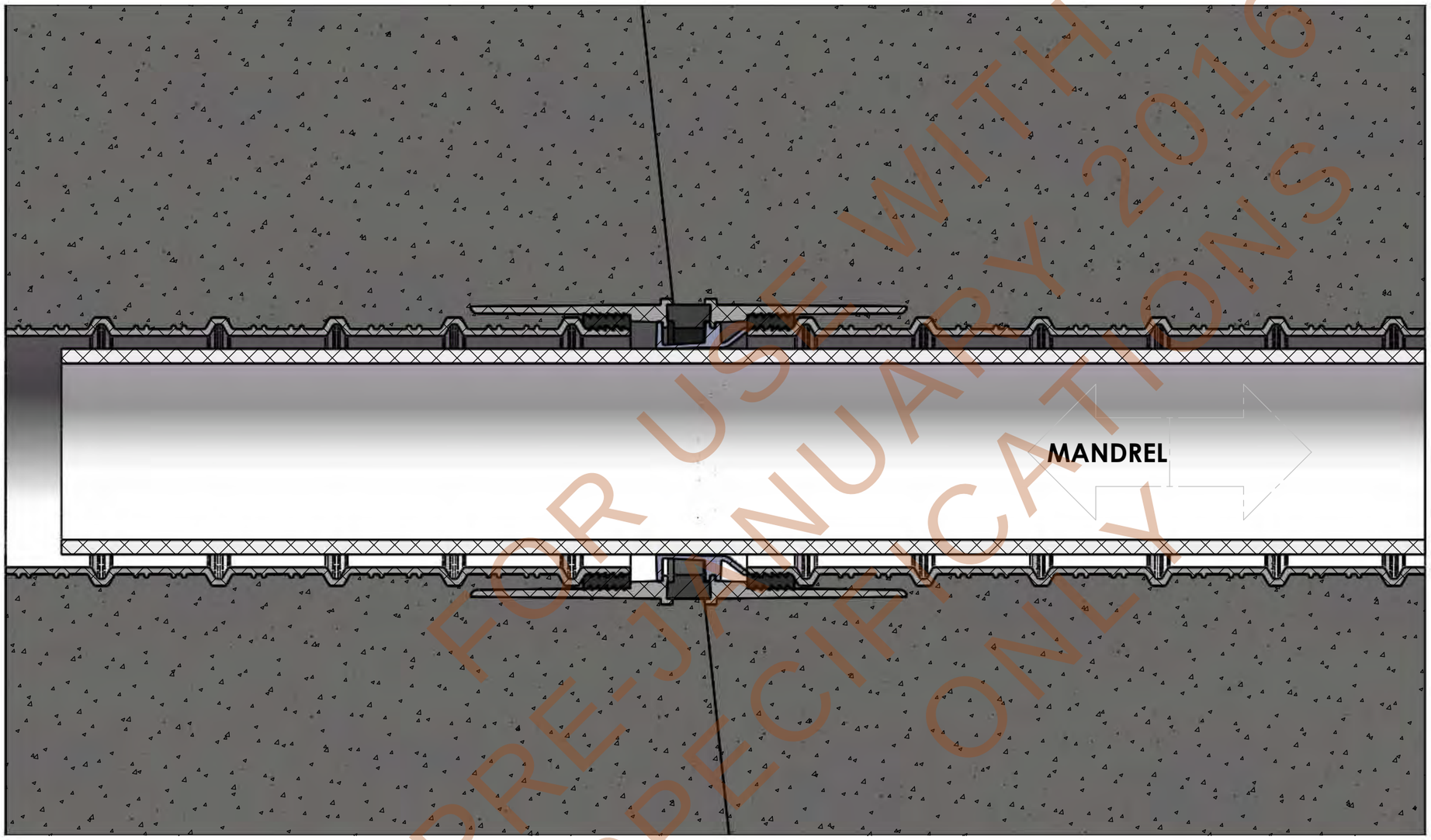
VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

SCALE: DO NOT SCALE
DRW NO: A243
SHEET: 4 of 8

PRE-CAST SEGMENT

MATCH-CAST SEGMENT



VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(12) Once the Mandrel is inserted, the Spider Clip has locked the two Hubs together, and the match-cast segment can be poured.

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VSL

VStructural LLC
Dallas, TX office

15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

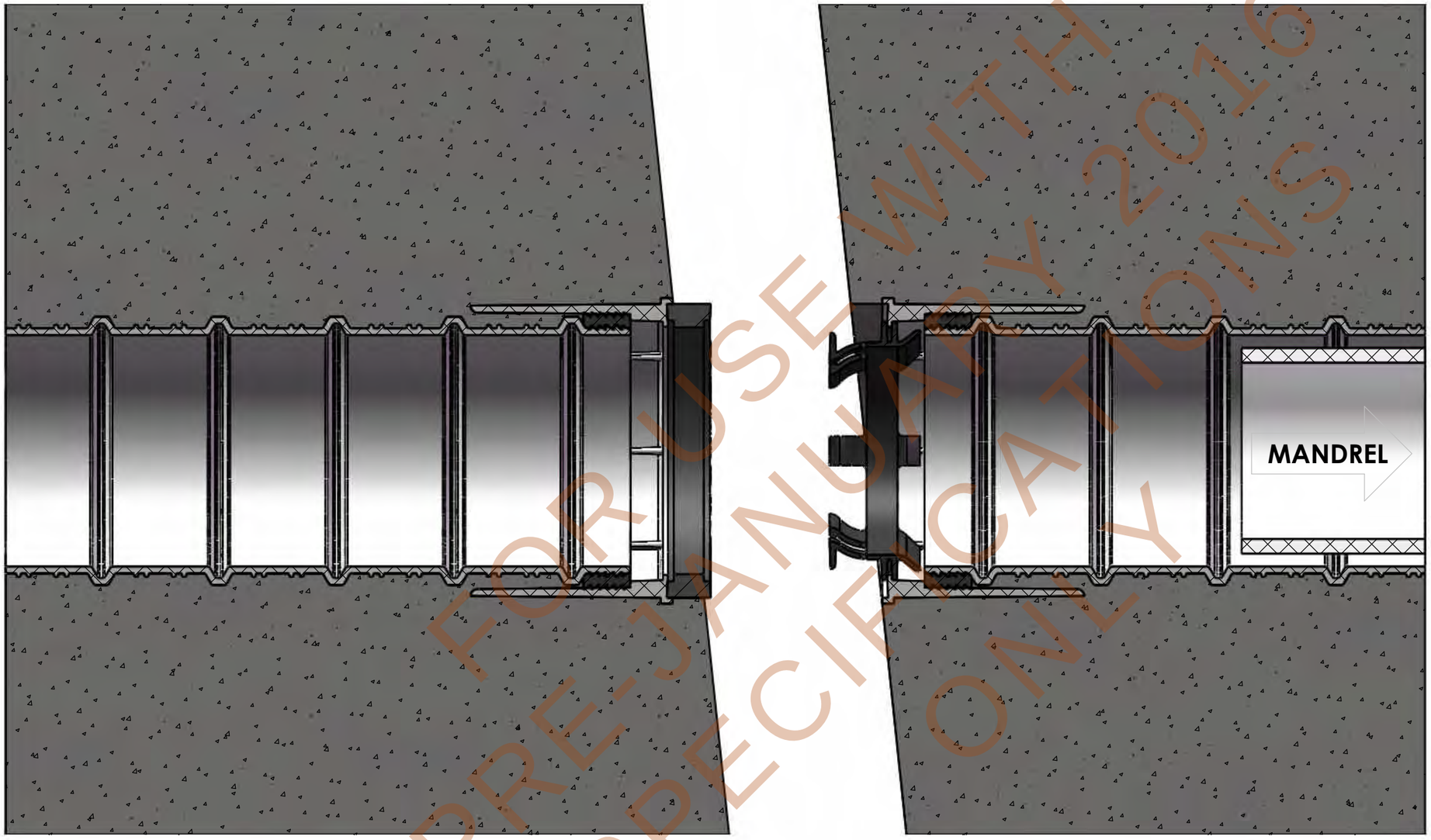
SCALE: DO NOT SCALE

DRW NO: A243

SHEET: 5 of 8

PRE-CAST SEGMENT

MATCH-CAST SEGMENT



VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(13) To separate the match-cast segment from the pre-cast segment, disassemble the form in the following steps:
- (a) Remove all Mandrels
- (b) Separate Segments
- (c) Remove all Spider Clips. Visually inspect. If there are no broken or missing 'feet,' retain Spider Clip, otherwise discard.
- (d) Note: There is no need to remove the Form Tools from the bulkhead. Visually inspect the Spider Clips as noted above.

(14) Install (OPTIONAL) Protective Caps over duct openings
(FOR 59MM, DRW NO. C673, P/N 02SC05906; FOR 76MM, DRW NO. C663, P/N 02SC07606; FOR 100MM, DRW NO. C662, P/N 02SC10006; FOR 130MM, DRW NO. 664, P/N 02SC13006).

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VSL

VStructural LLC
Dallas, TX office

15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

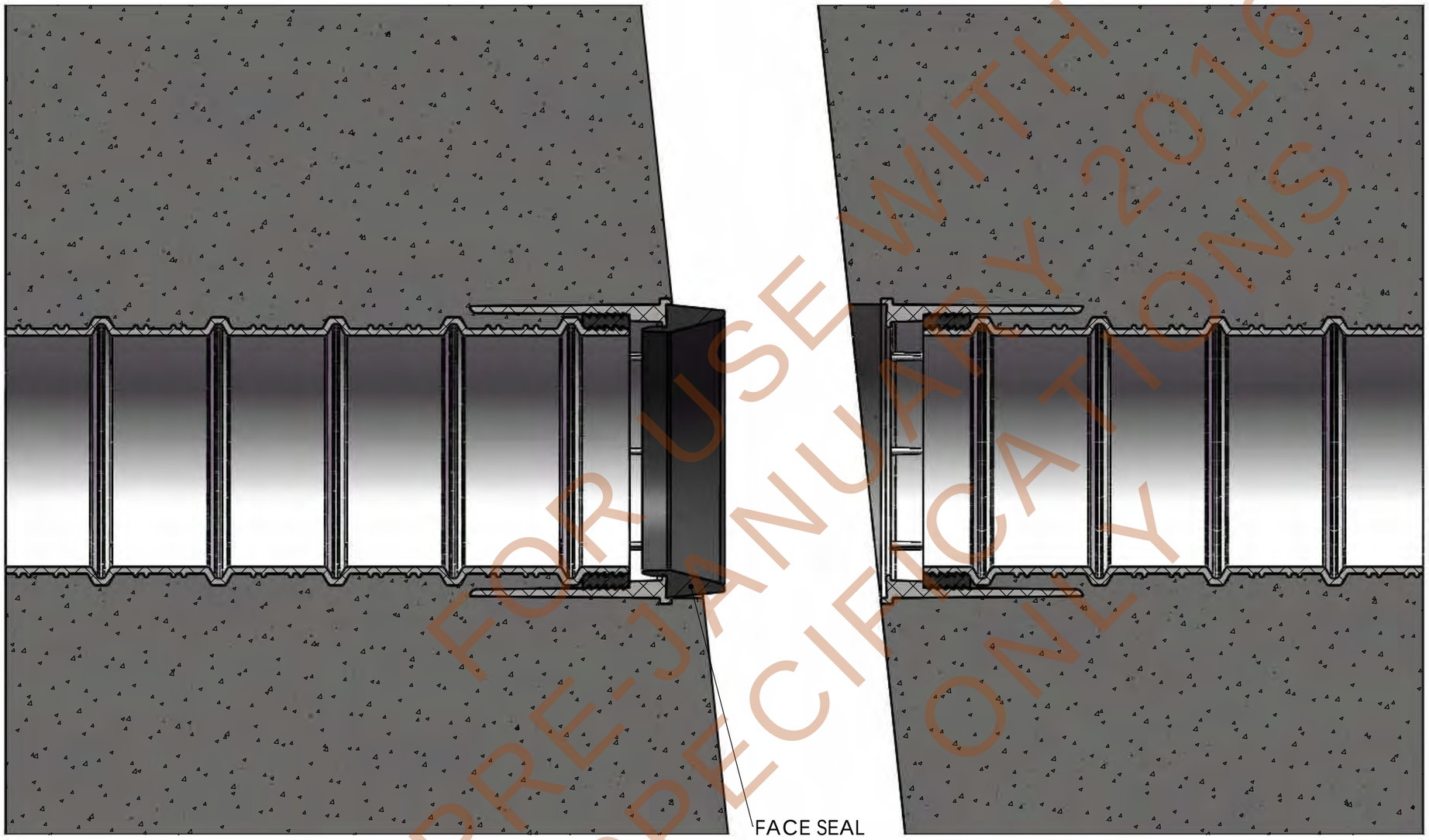
SCALE: DO NOT SCALE

DRW NO: A243

SHEET: 6 of 8

PRE-CAST SEGMENT 1

PRE-CAST SEGMENT 2



FACE SEAL

FOR 59MM, P/N 02SC05903, DRW NO. C669
FOR 76MM, P/N 02SC07603, DRW NO. C648
FOR 100MM, P/N 02SC10003, DRW NO. C640
FOR 130MM, P/N 02SC13003, DRW NO. C658

VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

Once the Segments have been transported and are ready for erection:

(15) Remove protective caps from duct openings
(16) Install Face Seals into one segment face only.
(17) Apply segmental epoxy to segment faces as required.
(Do not apply epoxy to Face Seal. Steps: 17 and 18 may be reversed at the discretion of the contractor.)
(18) Bring segments together and secure with PT bar.

VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VStructural LLC
Dallas, TX office

15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

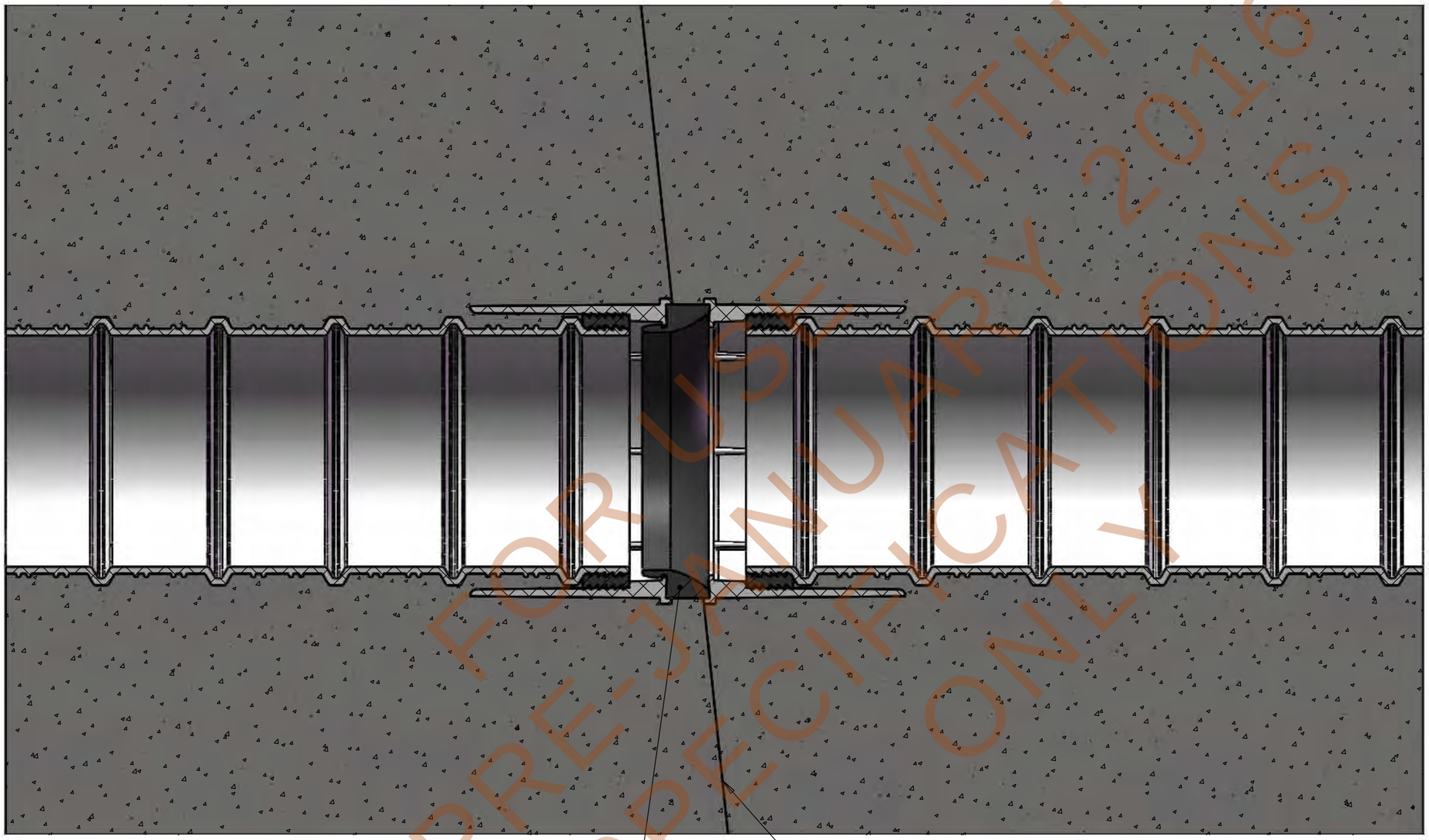
INSTALLATION GUIDE

SCALE: DO NOT SCALE
DRW NO: A243
SHEET: 7 of 8

PRE-CAST SEGMENT 1

FINAL ELEVATION SECTION-VIEW OF SEGMENTAL DUCT COUPLER JOINT

PRE-CAST SEGMENT 2



VStructural LLC (VSL) SHOP DRAWING

These shop drawings illustrate the details of the VSL Post-Tensioning System. They were prepared in conformance with the structural design provided to VSL by project owner or it's representative. VSL took no part in the preparation or review of said structural design and VSL DISCLAIMS ANY LIABILITY for it. The stamp or seal of a VSL employee on these shop drawings pertains only to the transfer of the forces required by the engineer of record on the structural drawings, and not to the adequacy of the structural design. NO WARRANTY, EXPRESSED OR IMPLIED, as to the adequacy of the structural design is made by virtue of any such stamp or seal.

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	1/26/2010	PRELIMINARY		MM	GY

VStructural LLC
Dallas, TX office

15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155

Phone: (817) 545-4807
Fax: (817) 545-4827

Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

SCALE: DO NOT SCALE

DRW NO: A243

SHEET: 8 of 8