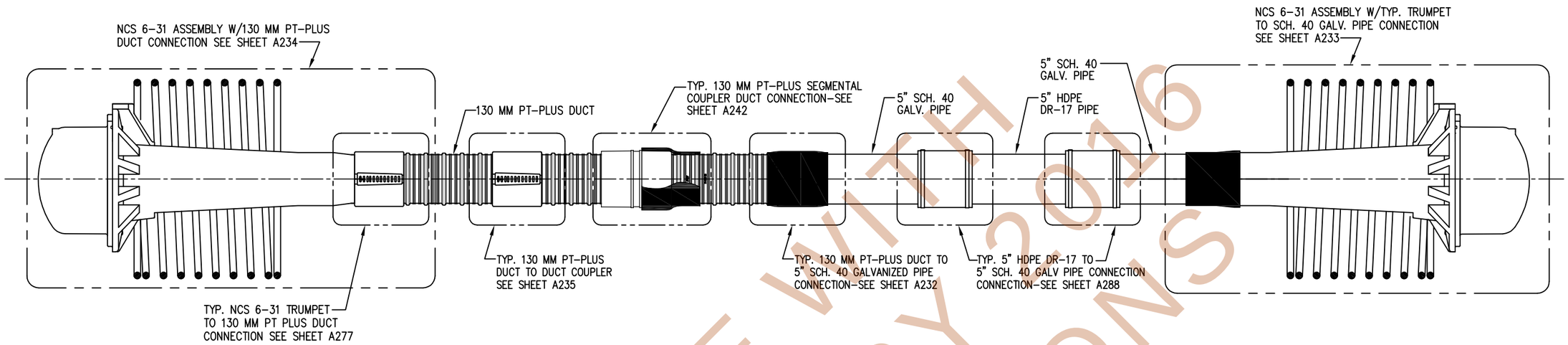
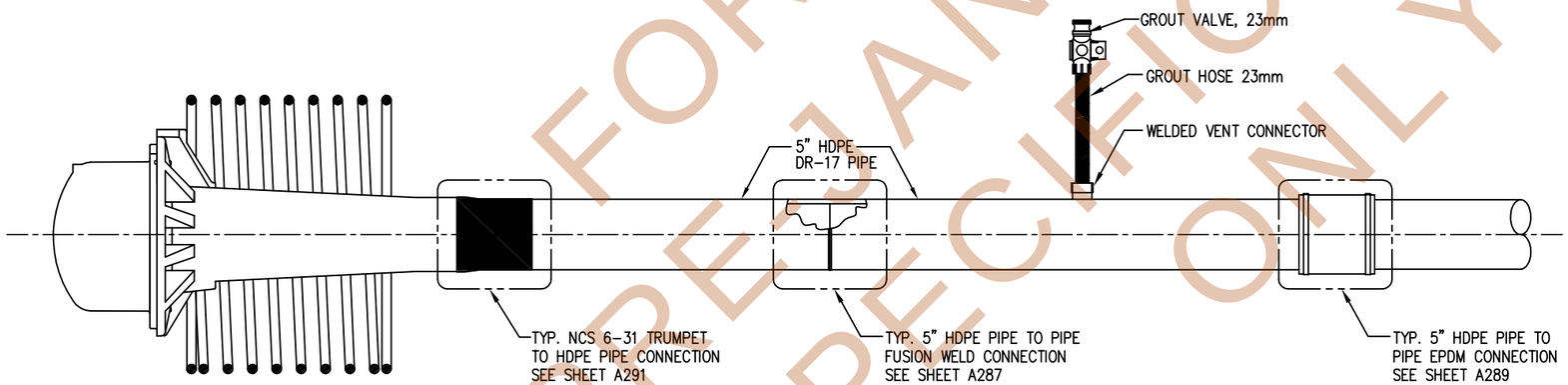




NOTE: CONNECTIONS & MATERIALS SHOWN IN EITHER CONFIGURATION CAN BE USED INTERCHANGEABLY, OMITTING ANY CONNECTIONS NOT REQUIRED FOR A PARTICULAR JOB.

NO.	DATE	DESCRIPTION	BY	CHK
1	7/6/11	REVISED SHEET REF. TO A288	TB	MM
0	5/11/11	APPROVED FOR CONSTRUCTION	GB	MM
		ISSUED FOR CONSTRUCTION / APPROVAL		

VSL
VStructural LLC
Pompano Beach, FL office:
6400 NW 12th Avenue, Suite 213
Fort Lauderdale, FL 33309
Phone: 954/489-7991
Fax: 954/489-3992
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

NCS 6-31 SYSTEM OVERVIEW
FOR INTERNAL, EXTERNAL & SEGMENAL CONSTRUCTION

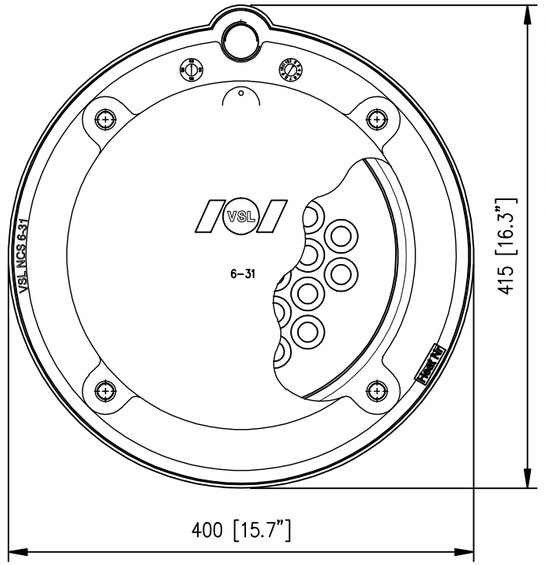
VSL
SYSTEM DRAWING

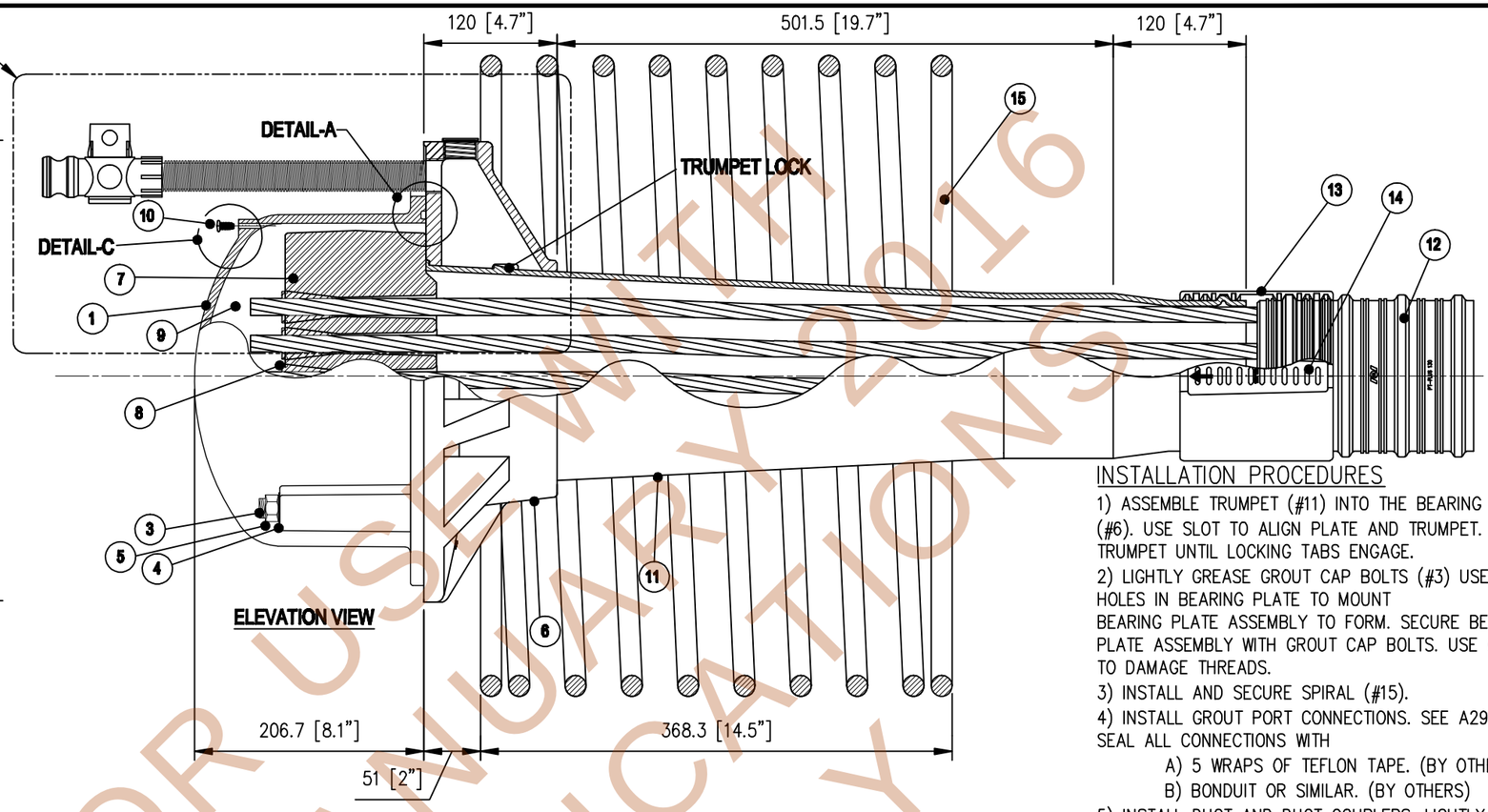
VStructural LLC (VSL) SHOP DRAWING

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: NTS
JOB NO:
SHEET: A285

FOR GROUTING CONFIGURATIONS SEE DRAWING A296
FOR GROUTING THRU DECK SEE DETAIL-B

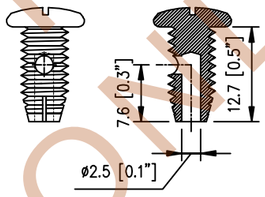




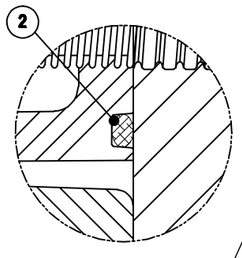
ELEVATION VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING REFERENCE	INVENTORY NUMBER
15*	1	SPIRAL, #6, DIA. 22", 2" PITCH, 9 TURNS	A615	C644	02BP0098
14	2	COUPLER CLIP, 130 mm PT-PLUS	P.P.	C625	02DT0046
13	2	COUPLER HALF, 130 mm PT-PLUS	P.P.	C449	02DT0054
12	1	DUCT, WHT PP, 130 mm PT-PLUS	P.P.	C417	02DT0453
11	1	TRUMPET	P.P.	C645	02BP4436
10	1	CAP VENT PLUG - SS SCREW	STAINLESS STEEL	THIS SHEET	02WX7001
9		GROUT	JOB SPECIFIC	-	-
8	31	1.6G WEDGE	11-L-17	C218	02WG0008
7	1	ANCHOR HEAD	A536 GR80-55-06	C614	02AH6031
6	1	BEARING PLATE GALVANIZED	A536 GR80-55-06	C638	02BP6031
5	4	5/8-11 NUT	(316L) STAINLESS	-	INC W/02WX6023
4	4	ø5/8" FLAT WASHER	(316L) STAINLESS	-	INC W/02WX6023
3	4	5/8-11NC x 7"	(316L) STAINLESS	-	02WX6023
2	1	O-RING (.275 CS X 11.475" ID # -452)	BUNA-N 70 D.	-	02WX5042
1	1	GROUT CAP	ABS LUSTRAN 633	C551	02WX5043

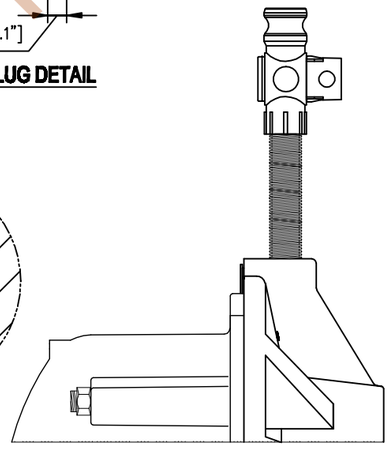
* USE ITEM 15 FOR CONCRETE WITH fc' = 3500 psi AND fc' = 5500 psi



DETAIL-C CAP VENT PLUG DETAIL



DETAIL-A



DETAIL-B GROUTING THRU DECK

FOR GROUTING CONFIGURATIONS SEE DRAWING A295 OR A296

INSTALLATION PROCEDURES

1) ASSEMBLE TRUMPET (#11) INTO THE BEARING PLATE (#6). USE SLOT TO ALIGN PLATE AND TRUMPET. INSERT TRUMPET UNTIL LOCKING TABS ENGAGE.
2) LIGHTLY GREASE GROUT CAP BOLTS (#3) USE MOUNTING HOLES IN BEARING PLATE TO MOUNT BEARING PLATE ASSEMBLY TO FORM. SECURE BEARING PLATE ASSEMBLY WITH GROUT CAP BOLTS. USE CARE NOT TO DAMAGE THREADS.
3) INSTALL AND SECURE SPIRAL (#15).
4) INSTALL GROUT PORT CONNECTIONS. SEE A296 & A295 SEAL ALL CONNECTIONS WITH
   A) 5 WRAPS OF TEFLON TAPE. (BY OTHERS) OR
   B) BONDUIT OR SIMILAR. (BY OTHERS)
5) INSTALL DUCT AND DUCT COUPLERS. LIGHTLY GREASE COUPLERS WITH ASSEMBLY GREASE TO ENSURE SEAL. (BY OTHERS)
6) SECURE DUCT SUPPORTS @ 2' MAX. INSERT MANDRELS INTO TRUMPETS.
7) SYSTEM IS NOW READY TO AIR TEST.
8) AFTER CONCRETE PLACEMENT INSTALL STRAND. LEAVE SUFFICIENT STRAND FOR STRESSING EQUIPMENT.
9) INSTALL ANCHOR HEADS (#7) MAKE SURE WEDGE CAVITIES ARE CLEAN AND RUST FREE. USE WIRE BRUSH TO CLEAN IF NECESSARY.
10) ONLY STRESS STRANDS IF CONCRETE HAS REACHED REQUIRED STRENGTH SPECIFIED ON DRAWINGS
11) ELONGATION SHOULD BE WITH IN +/- 7%
12) AFTER ENGINEERS APPROVAL STRAND TAILS MAY BE CUT.
13) AFTER FORM WORK IS REMOVED, USE MOUNTING BOLTS TO INSTALL GROUT CAP (#1). REINSTALL O-RING INTO GROUT CAP.
14) GROUT TENDON PER GROUTING SPEC.
15) IN BALANCED CANTILEVER CONSTRUCTION, THE TENDON MUST BE GROUTED AFTER EACH SEGMENT IS PLACED DUE TO THE LOCATION OF THE GROUT VENT SCREW.

REV.	DATE	REVISION	BY	CHK
4	8/12/11	REVISED SPIRAL LENGTH & DETAIL B REF.	TB	MM
3	8/1/11	REVISED BOM & GROUT PORT DETAILS	GY	MM
2	3/8/10	REVISED BOM	GY	MM
1	6/17/03	PRELIMINARY NOT FOR PRODUCTION	GDH	

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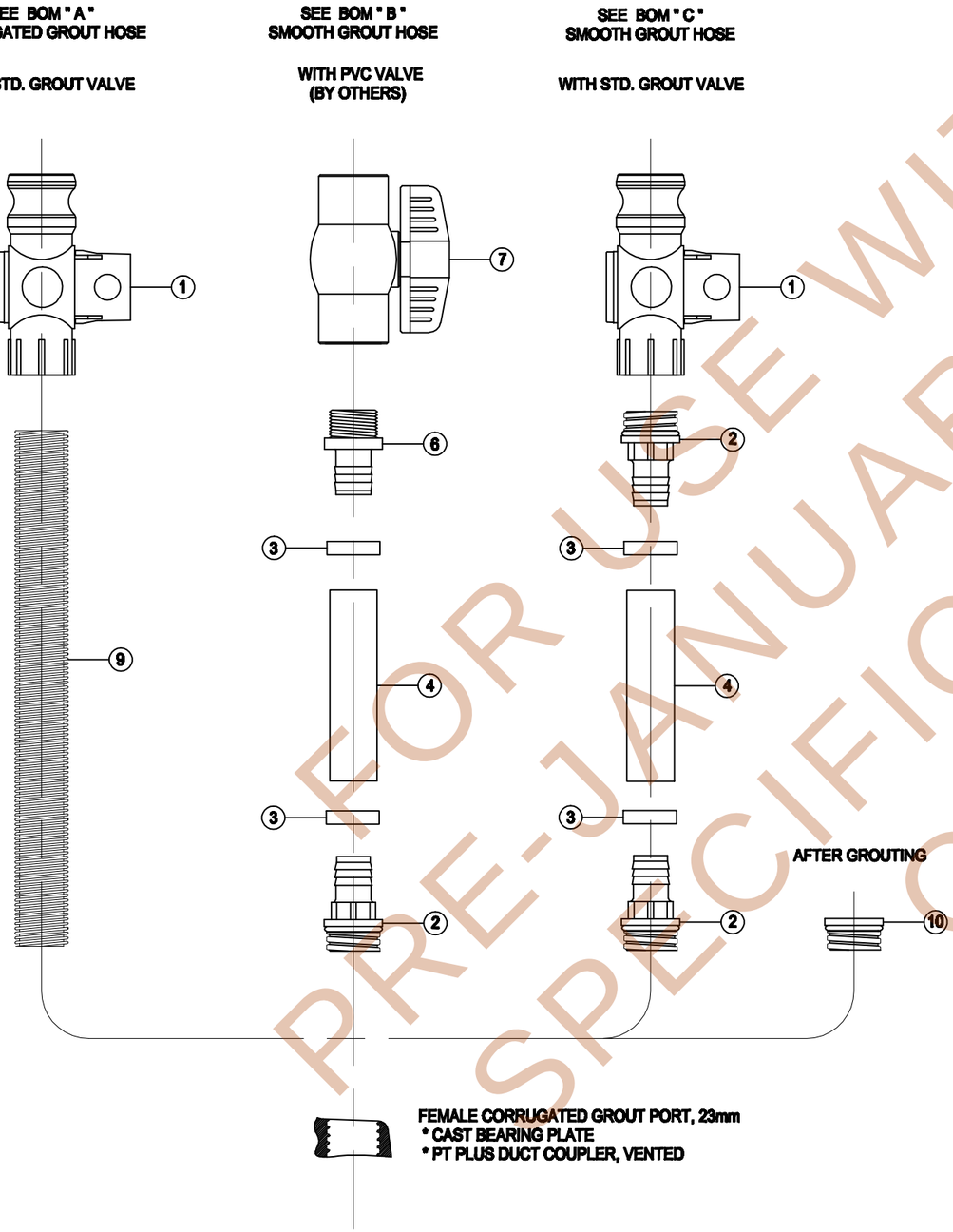
DWG. TITLE: NCS 6-31 ANCHORAGE ASSEMBLY

PROJECT: VSL SYSTEMS DRAWING

SCALE: 1/16" = 1'-0"
VSL JOB NO: 054-0000
VSL DWG. NO. A234

GROUTING CONFIGURATION FOR STANDARD CONSTRUCTION



BILL OF MATERIAL "A"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
1	1	GROUT SHUTOFF VALVE, 23mm	02DT0311	A158
9*	A/R	23MM CORRUGATED GROUT HOSE	02DT0310	C587
10**	1	23mm GROUT PLUG	02DT0341	C583

BILL OF MATERIAL "B"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
2*	1	3/4" HOSE BARB TO 23mm FITTING	2DT01903	C692
3	2	ONE EAR HOSE CLAMP ,3/4" GROUT HOSE	2DT01905	C690
4	A/R	3/4" SMOOTH GROUT HOSE	2DT01901	C685
6	1	3/4" HOSE BARB TO 3/4" MPT FITTING	2DT01908	C694
7	1	3/4" FPT PVC BALL VALVE (BY OTHERS)	-	-
10**	1	23mm GROUT PLUG	02DT0341	C583

BILL OF MATERIAL "C"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
1	1	GROUT SHUTOFF VALVE, 23mm	02DT0311	A158
2*	2	3/4" HOSE BARB TO 23mm FITTING	2DT01903	C692
3	2	ONE EAR HOSE CLAMP ,3/4" GROUT HOSE	2DT01905	C690
4	A/R	3/4" SMOOTH GROUT HOSE	2DT01901	C685
10**	1	23mm GROUT PLUG	02DT0341	C583

NOTES:

* INSTALL AND SEAL ALL THREADED CONNECTIONS WITH 5 WRAPS OF TEFLON THREAD TAPE (BY OTHERS) OR 2 PART BONDUIT EPOXY (BY OTHERS)

** BEARING PLATES WITH TWO GROUT PORTS MAY REQUIRE AN EXTRA 23mm GROUT PLUG (QTY. 2)

SEE DRAWING A295 FOR GROUTING CONFIGURATION FOR BALANCED CANTILEVER CONSTRUCTION

ALL COMPONENTS MEET OR EXCEED FDOT SPECIFICATION 462

REV.	DATE	BY	CHK
1	7/20/11	GY	MM

REVISION: RELEASED FOR PRODUCTION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
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DWG. TITLE: GROUTING CONFIGURATION FOR STANDARD CONSTRUCTION USING CORRUGATED GROUT PORT

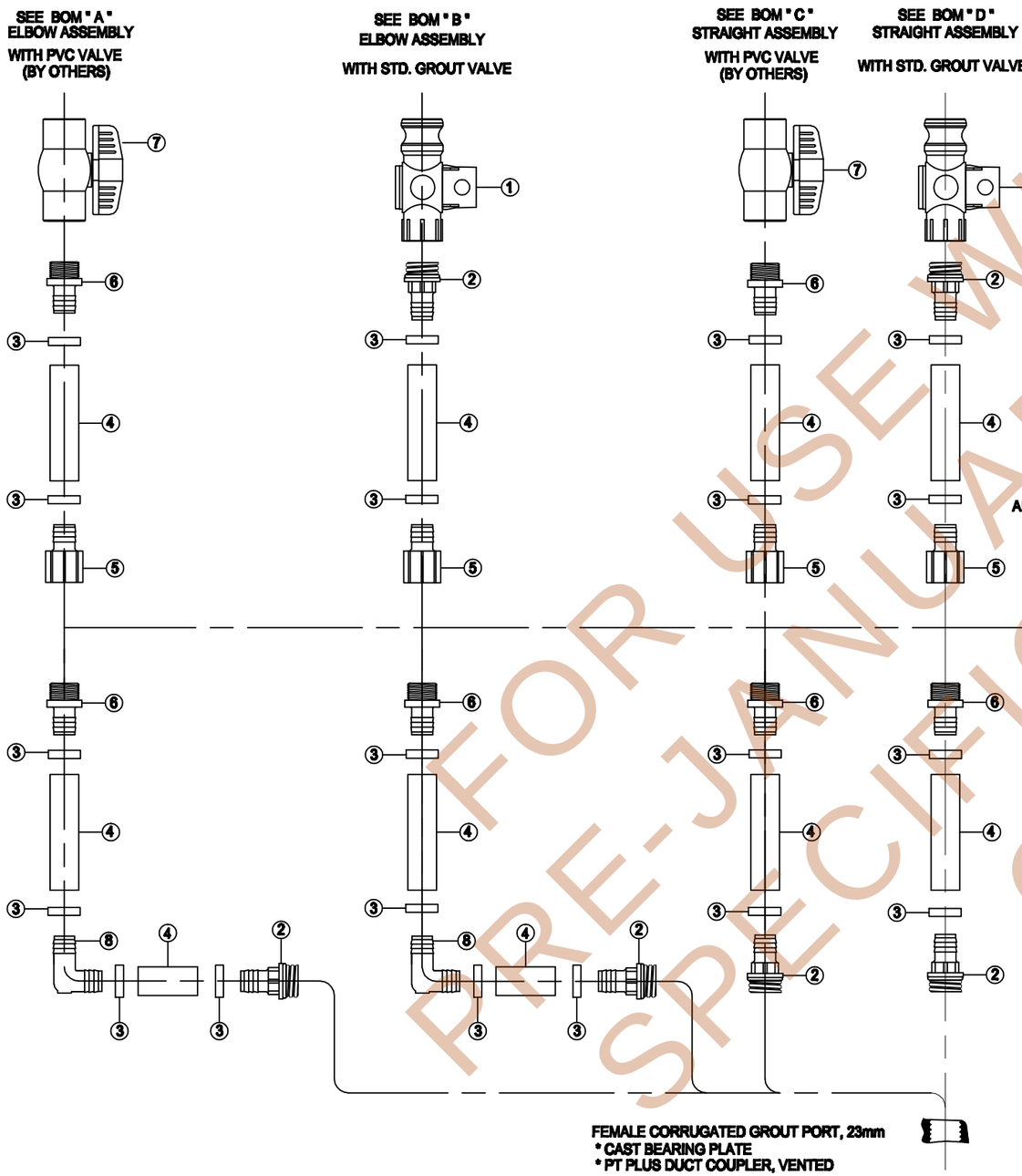
PROJECT: VSL SYSTEMS DRAWING

SCALE: N/A

VSL JOB NO: GROUTING

VSL DWG. NO. A296

GROUTING CONFIGURATION FOR BALANCED CANTILEVER CONSTRUCTION



BILL OF MATERIAL "A"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
2*	1	3/4" HOSE BARB TO 23mm FITTING	2DT01903	C692
3	6	ONE EAR HOSE CLAMP, 3/4" GROUT HOSE	2DT01905	C690
4	A/R	3/4" SMOOTH GROUT HOSE	2DT01901	C685
5	1	3/4" HOSE BARB TO 3/4" FPT FITTING	2DT01911	C695
6	2	3/4" HOSE BARB TO 3/4" MPT FITTING	2DT01908	C694
7	1	3/4" FPT PVC BALL VALVE (BY OTHERS)	-	-
8	1	3/4" X 3/4" HOSE BARB ELBOW	2DT01910	C700
9	1	3/4" FPT CAP	2DT01912	C701

BILL OF MATERIAL "B"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
1	1	GROUT SHUTOFF VALVE, 23mm	02DT0311	A158
2*	2	3/4" HOSE BARB TO 23mm FITTING	2DT01903	C692
3	6	ONE EAR HOSE CLAMP, 3/4" GROUT HOSE	2DT01905	C690
4	A/R	3/4" SMOOTH GROUT HOSE	2DT01901	C685
5	1	3/4" HOSE BARB TO 3/4" FPT FITTING	2DT01911	C695
6	1	3/4" HOSE BARB TO 3/4" MPT FITTING	2DT01908	C694
8	1	3/4" X 3/4" HOSE BARB ELBOW	2DT01910	C700
9	1	3/4" FPT CAP	2DT01912	C701

BILL OF MATERIAL "C"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
2*	1	3/4" HOSE BARB TO 23mm FITTING	2DT01903	C692
3	4	ONE EAR HOSE CLAMP, 3/4" GROUT HOSE	2DT01905	C690
4	A/R	3/4" SMOOTH GROUT HOSE	2DT01901	C685
5	1	3/4" HOSE BARB TO 3/4" FPT FITTING	2DT01911	C695
6	2	3/4" HOSE BARB TO 3/4" MPT FITTING	2DT01908	C694
7	1	3/4" FPT PVC BALL VALVE (BY OTHERS)	-	-
9	1	3/4" FPT CAP	2DT01912	C701

BILL OF MATERIAL "D"

ITEM	QTY.	DESCRIPTION	INVENTORY #	DRAWING #
1	1	GROUT SHUTOFF VALVE, 23mm	02DT0311	A158
2*	2	3/4" HOSE BARB TO 23mm FITTING	2DT01903	C692
3	4	ONE EAR HOSE CLAMP, 3/4" GROUT HOSE	2DT01905	C690
4	A/R	3/4" SMOOTH GROUT HOSE	2DT01901	C685
5	1	3/4" HOSE BARB TO 3/4" FPT FITTING	2DT01911	C695
6	1	3/4" HOSE BARB TO 3/4" MPT FITTING	2DT01908	C694
9	1	3/4" FPT CAP	2DT01912	C701

NOTES:

* INSTALL AND SEAL ALL THREADED CONNECTIONS WITH 5 WRAPS OF TEFLON THREAD TAPE (BY OTHERS) OR 2 PART BONDUIT EPOXY (BY OTHERS)

SEE DRAWING A296 FOR GROUTING CONFIGURATION FOR STANDARD CONSTRUCTION

ALL COMPONENTS MEET OR EXCEED FDOT SPECIFICATION 462

REV.	DATE	BY	CHK
1	7/20/11	GY	MM

REVISION: RELEASED FOR PRODUCTION

VSL
7455 NEW RIDGE RD.
HANOVER, MD. 21076
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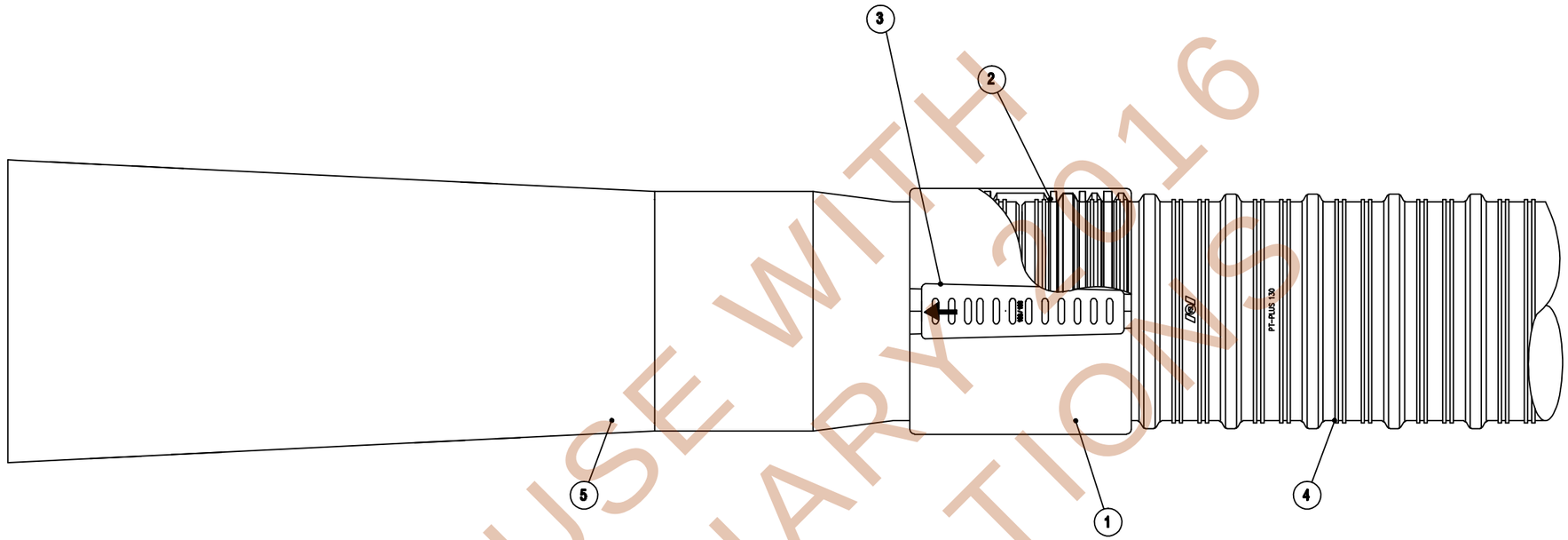
DWG. TITLE: GROUTING CONFIGURATION FOR BALANCED CANTILEVER CONSTRUCTION USING CORRUGATED GROUT PORT

PROJECT: VSL SYSTEMS DRAWING

SCALE: N/A

VSL JOB NO: GROUTING

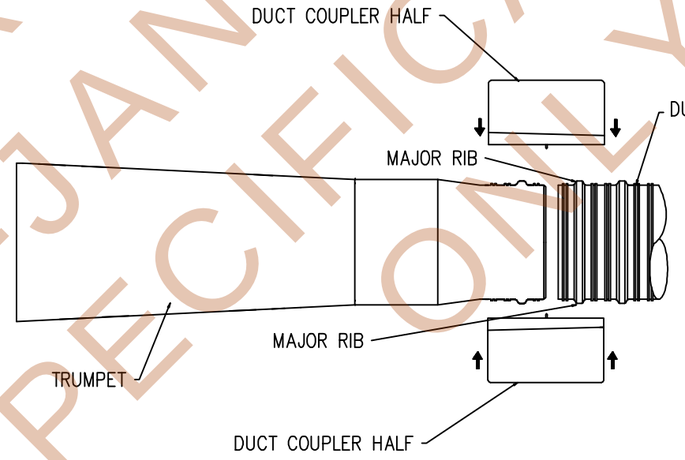
VSL DWG. NO. A295



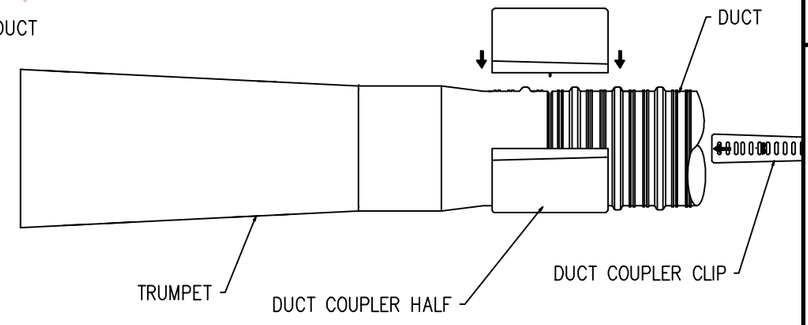
FRONT VIEW

INSTALLATION PROCEDURES

1) CUT DUCT HALF WAY BETWEEN 2 MAJOR RIBS SEE DETAIL A
2) INSTALL DUCT INTO COUPLER HALF. PLACE COUPLER HALF OVER MAJOR RIB. SEE DETAIL B
3) PLACE SECOND COUPLER HALF OVER DUCT, USING INTERLOCKING PINS TO CENTER SECOND COUPLER HALF
4) PARTIALLY INSTALL COUPLER CLIPS IN DIRECTION INDICATED BY ARROWS SHOWN ON COUPLER HALF.
5) INSURE BOTH TRUMPET AND DUCT ARE SECURED IN COUPLER.
6) FINISH INSTALLATION OF CLIPS.



DETAIL A



DETAIL B

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
5	1	NCS 6-31 TRUMPET	P.P.	C645	02BP4436
4		DUCT, WHT PP, 130 MM PT-PLUS	ASTM D4101	C417	02DT0453
3	2	COUPLER CLIP, 130 MM PT-PLUS	ASTM D4101	C625	02DT0046
2	2	SEAL (INCLUDED IN COUPLER HALF)	–	–	INCLUDED W/ ITEM 1
*1	2	COUPLER HALF, 130 MM PT-PLUS	ASTM D4101	C449	02DT0054

* SEE SHEET C449 FOR COUPLER HALF, 130 MM PT-PLUS VENTED PART NUMBER 02DT0055

REV.	DATE	REVISION	BY	CHK
2	7/06/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
1	6/08/10	APPROVED FOR CONSTRUCTION	SAN	MM

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HANOVER, MD. 21076
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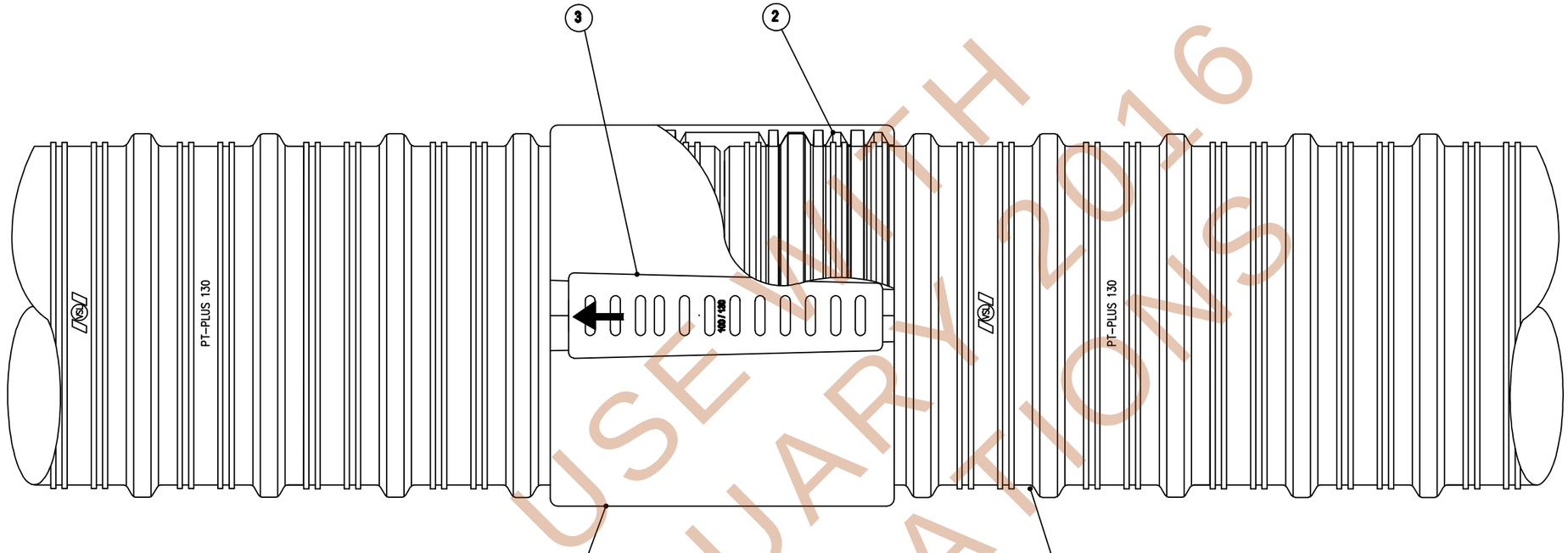
DWG. TITLE: TYPICAL NCS 6-31 TRUMPET TO 130 MM PT PLUS DUCT CONNECTION

PROJECT: VSL SYSTEMS DRAWING

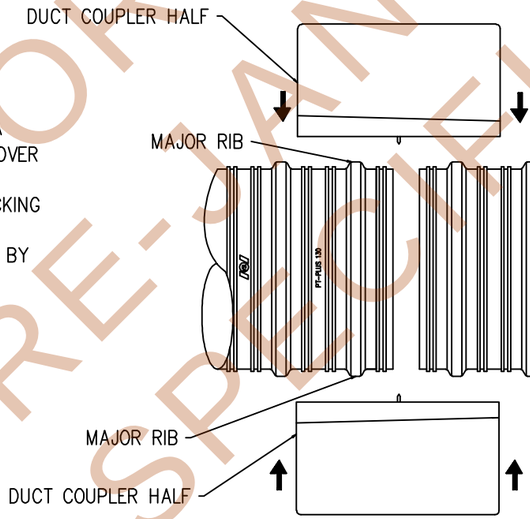
SCALE: 1:2

VSL JOB NO:

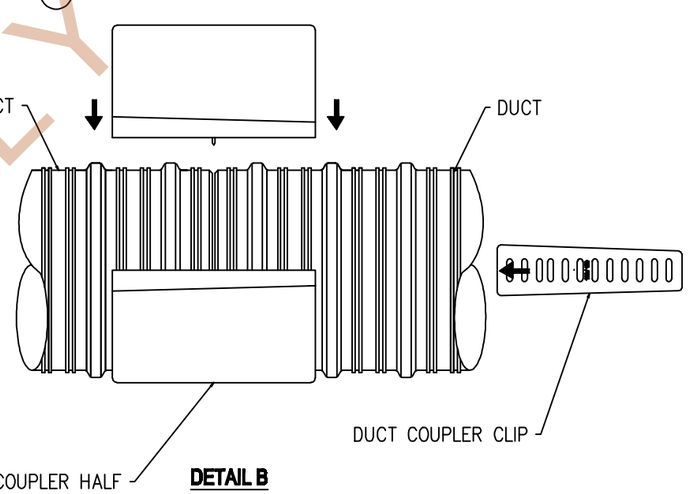
VSL DWG. NO. A277



FRONT VIEW



DETAIL A



DETAIL B

INSTALLATION PROCEDURES

1) CUT DUCT HALF WAY BETWEEN 2 MAJOR RIBS SEE DETAIL A
2) INSTALL DUCT INTO COUPLER HALF. PLACE COUPLER HALF OVER MAJOR RIB. SEE DETAIL B
3) PLACE SECOND COUPLER HALF OVER DUCT, USING INTERLOCKING PINS TO CENTER SECOND COUPLER HALF
4) PARTIALLY INSTALL COUPLER CLIPS IN DIRECTION INDICATED BY ARROWS SHOWN ON COUPLER HALF.
5) INSURE BOTH DUCTS ARE SECURED IN COUPLER.
6) FINISH INSTALLATION OF CLIPS.

BILL OF MATERIAL WITHOUT VENT

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
4		DUCT, WHT PP, 130 MM PT-PLUS	ASTM D4101	C417	02DT0453
3	2	COUPLER CLIP, 130 MM PT-PLUS	ASTM D4101	C625	02DT0046
2	2	SEAL (INCLUDED IN COUPLER HALF)	–	–	INCLUDED W/ ITEM 1
1	2	COUPLER HALF, 130 MM PT-PLUS	ASTM D4101	C449	02DT0054

BILL OF MATERIAL WITH VENT

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
4		DUCT, WHT PP, 130 MM PT-PLUS	ASTM D4101	C417	02DT0453
3	2	COUPLER CLIP, 130 MM PT-PLUS	ASTM D4101	C625	02DT0046
2	2	SEAL (INCLUDED IN COUPLER HALF)	–	–	INCLUDED W/ ITEM 1
1	1	COUPLER HALF VENTED, 130 MM PT-PLUS	ASTM D4101	C449	02DT0055
	1	COUPLER HALF, 130 MM PT-PLUS	ASTM D4101	C449	02DT0054

REV.	DATE	REVISION	BY	CHK
3	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
2	5/26/10	APPROVED FOR CONSTRUCTION	GDH	MM
1	6/30/09	ISSUED FOR REVIEW	GDH	??

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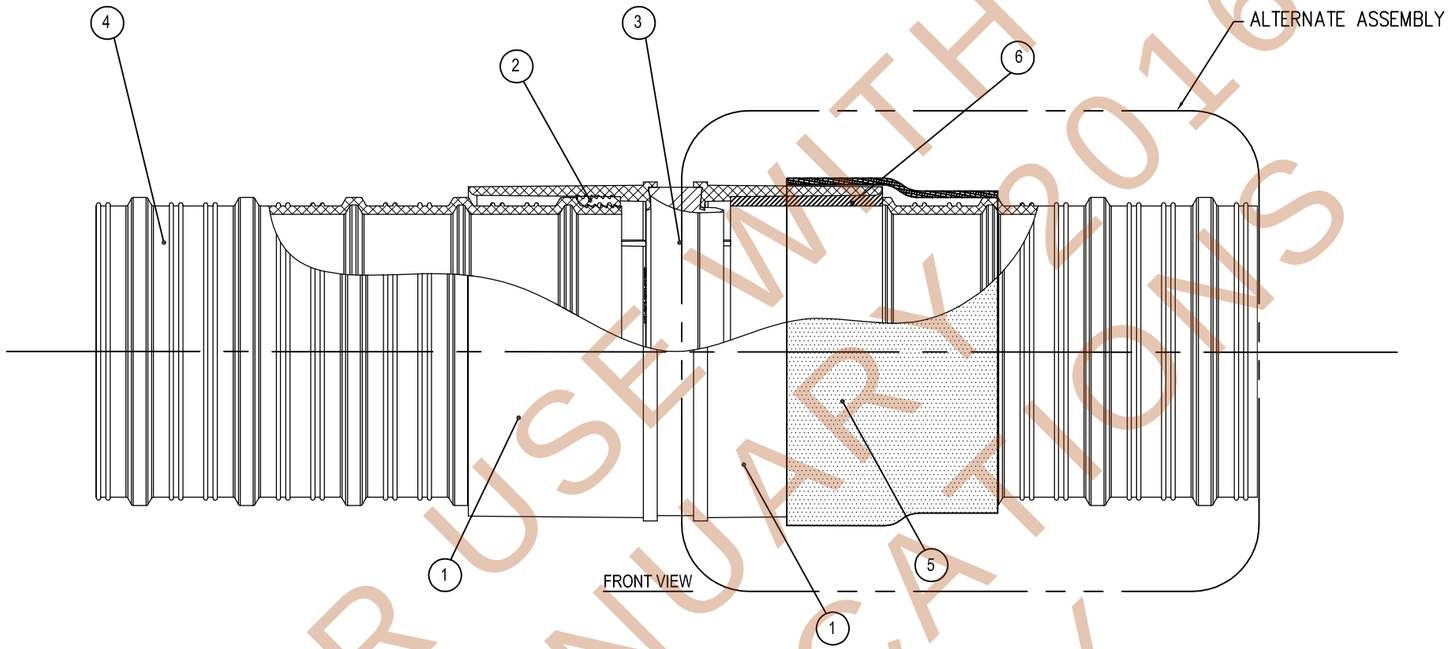
DWG. TITLE: TYPICAL 130 MM PT-PLUS DUCT TO DUCT CONNECTION

PROJECT: VSL SYSTEMS DRAWING

SCALE: 1:2

VSL JOB NO:

VSL DWG. NO. A235



ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
6	1	INSERT	HDPE	THIS SHEET	02SC13009
5	1	HEAT SHRINK	POLYOLEFIN	–	CANUSA PLA-125-YE
4	--	DUCT, WHT PP, 130 MM PT-PLUS	PP	C417	02DT0453
3	1	130 MM SEG. COUP. FACE SEAL	SANTOPRENE	C658	02SC13003
2	1	130 MM SEG. COUP. HUB SEAL	SANTOPRENE	C657	02SC13002
1	2	130 MM SEG. COUP. HUB	PP	C656	02SC13001

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

REV.	DATE	REVISION	BY	CHK
3	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
2	6/1/10	APPROVED FOR CONSTRUCTION	SAN	MM
1	3/4/10	APPROVED FOR CONSTRUCTION	SAN	MM

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7455 NEW RIDGE RD.
HANOVER, MD. 21076
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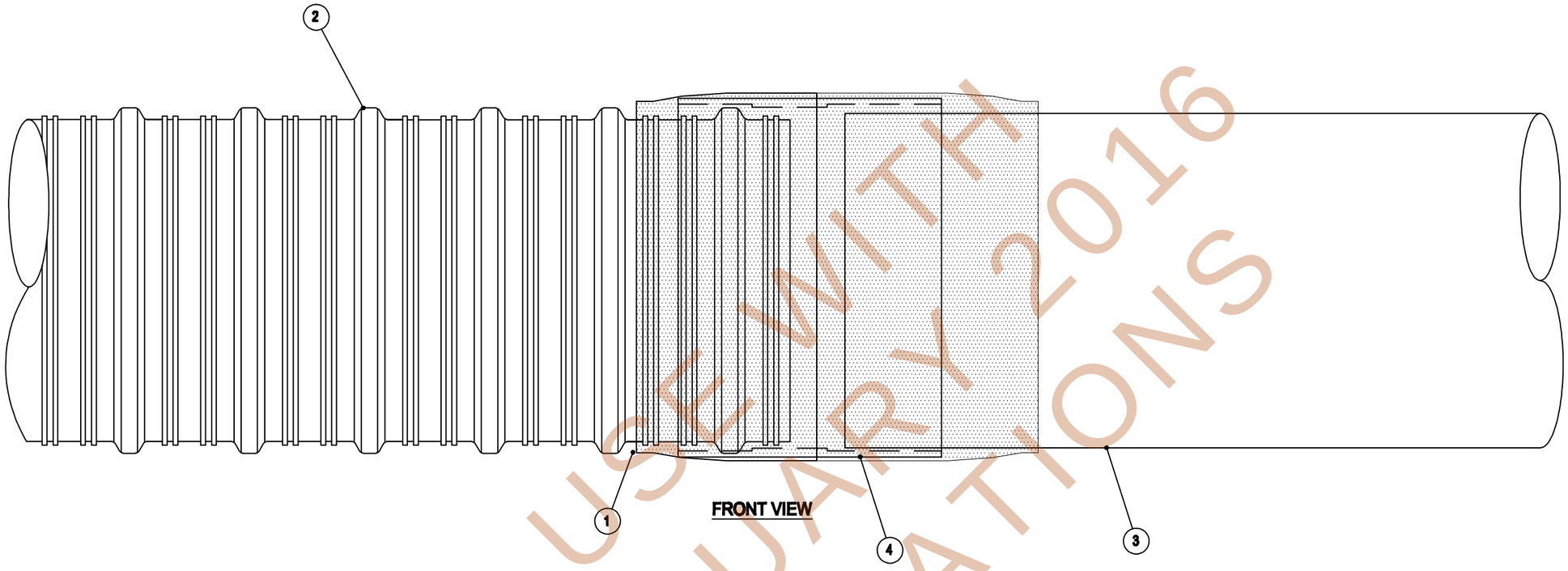
DWG. TITLE: TYPICIAL 130MM PT PLUS SEGMENTAL DUCT COUPLER CONNECTION

PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

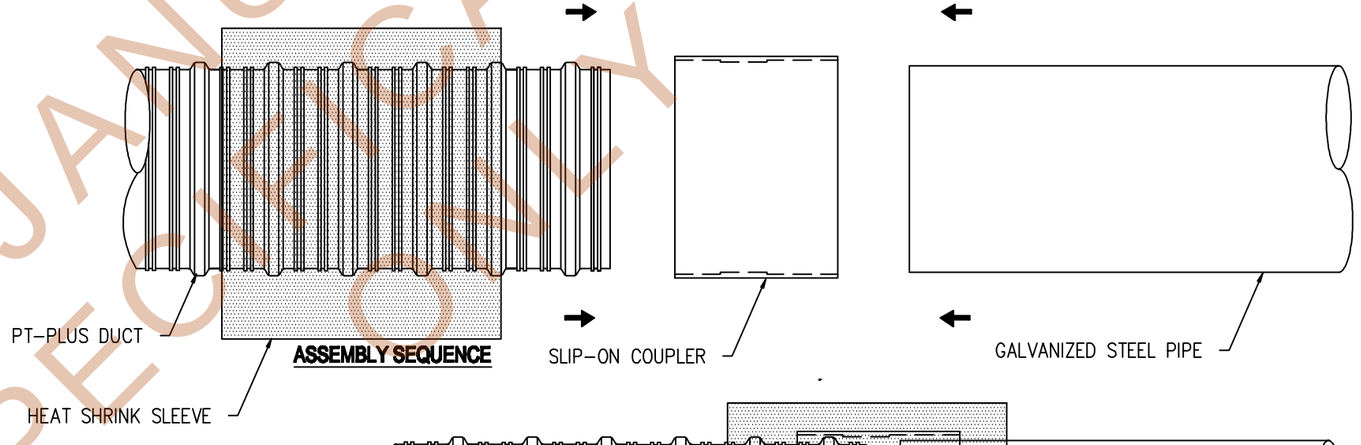
VSL DWG. NO.
A242



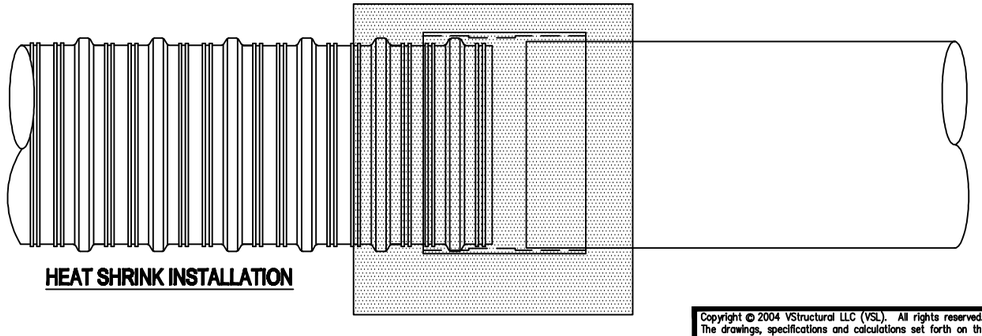
FRONT VIEW

INSTALLATION PROCEDURES

1) CUT DUCT HALF WAY BETWEEN 2 MAJOR RIBS.
2) INSTALL DUCT INTO SLIP ON COUPLER.
3) PLACE STEEL PIPE INTO OPPOSITE HALF OF SLIP–ON COUPLER
4) SLIDE HEAT SHRINK SLEEVE OVER SLIP–ON COUPLER. OVERLAP DUCT AND PIPE BY 2 INCHES MIN.
5) USING HEAT GUN OR BUTANE TORCH APPLY HEAT TO HEAT SHRINK SLEEVE STARTING AT ONE END AND MOVING TO THE OPPOSITE END. EVENLY DISTRIBUTE HEAT AROUND THE SLEEVE. FULL RECOVERY IS ACHIEVED WHEN ADHESIVE IS VISIBLE AROUND THE SLEEVE.
6) ENSURE BOTH DUCT AND PIPE ARE SECURED IN COUPLER.



ASSEMBLY SEQUENCE



HEAT SHRINK INSTALLATION

HEAT SLEEVE STARTING FROM ONE SIDE TO THE OPPOSITE SIDE

ITEM	QTY	DESCRIPTION	MATERIAL	DRAWING NUMBER	INVENTORY NUMBER
4	1	SLIP ON COUPLER	PP	–	02GT13001
3	–	GALVANIZED 5" SCHEDULE 40 PIPE	ASTM A53	–	–
2	–	DUCT, WHT PP, 130 MM PT–PLUS	ASTM D4101	C417	02DT0453
1	1	HEAT SHRINK SLEEVE (12" LONG)	POLYOLEFIN	–	(CANUSA) PLA–125–YE

REV.	DATE	REVISION	BY	CHK
3	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
2	4/4/11	APPROVED FOR CONSTRUCTION	GB	MM
1	6/30/09	ISSUED FOR REVIEW	GDH	ZK

VSL
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HANOVER, MD. 21076
WWW.VSL.NET

TYPICAL NCS 8-31
130 MM PT-PLUS DUCT TO PIPE CONNECTION

DWG. TITLE:

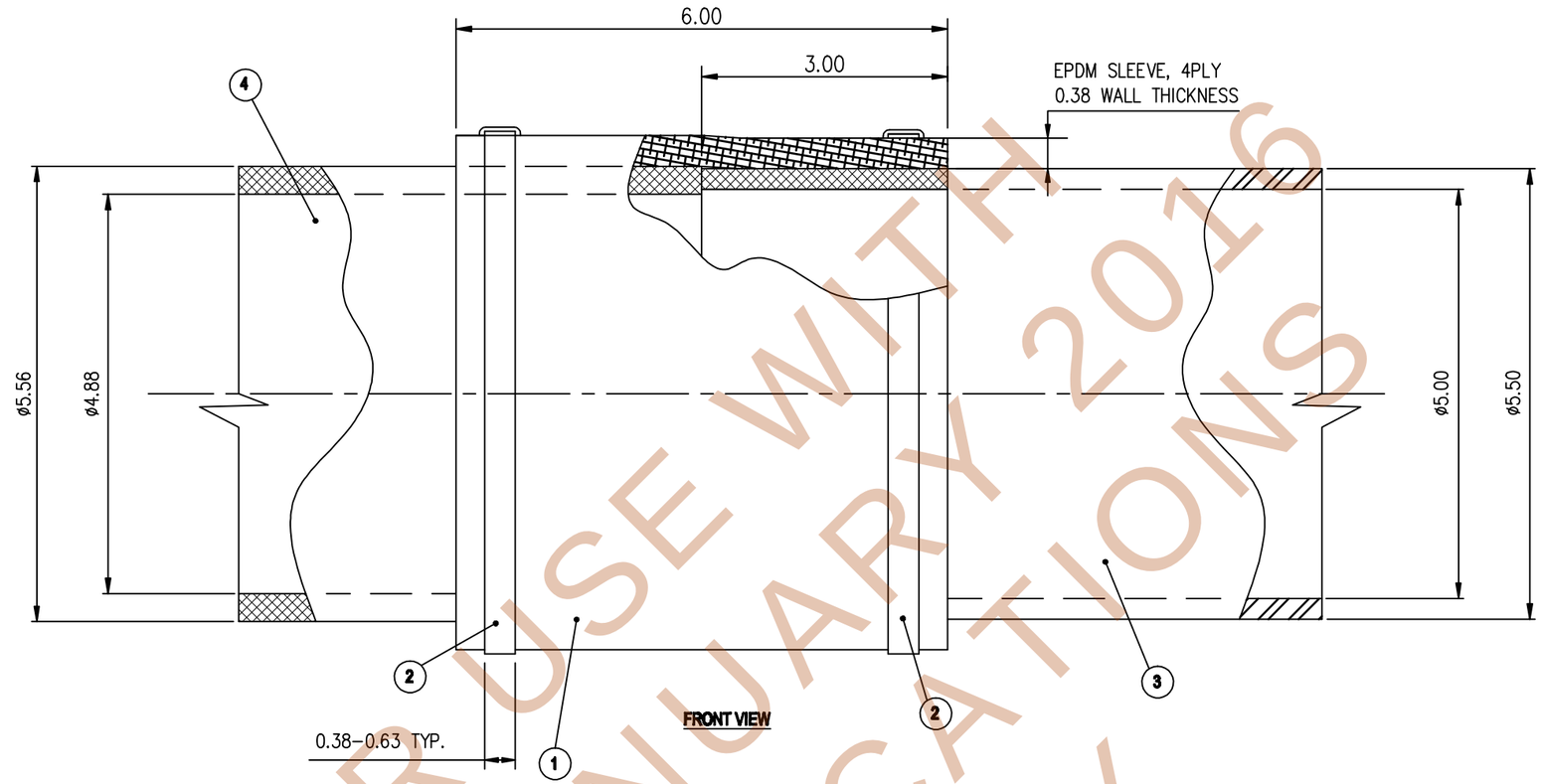
VSL
SYSTEMS DRAWING

PROJECT:

SCALE: 1:2

VSL JOB NO:

VSL DWG. NO.
A232



FRONT VIEW

ITEM	QTY	DESCRIPTION	MATERIAL
4	1	5" HDPE PIPE DR-17	ASTM D3350
3	1	5" SCH. 40 PIPE GALVANIZED	ASTM A53
2	2	STAINLESS STEEL PUNCH LOCK BANDS	ASTM A240 316L
1	1	EPDM SLEEVE	EPDM ASTM D 1171

NOTE:
1) INSTALL 6" EPDM SLEEVE
2) INSTALL 2 SS BAND CLAMPS
3) CENTER EPDM SLEEVE OVER THE JOINT
4) APPLY 80 TO 120 LBS SEATING FORCE PER BAND CLAMP.
5) EPDM SLEEVE HAS NO TEXT OR MARKINGS. EPDM IS BLACK IN COLOR.
6) HDPE PIPE RUNNING LABEL READS: 5" IPS/DR17/DRISCOPLEX 4100/PE4710/PE3408.

REV.	DATE	REVISION	BY	CHK
1	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
0	4/4/11	APPROVED FOR CONSTRUCTION	GB	MM

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7455 NEW RIDGE RD.
HANOVER, MD. 21076
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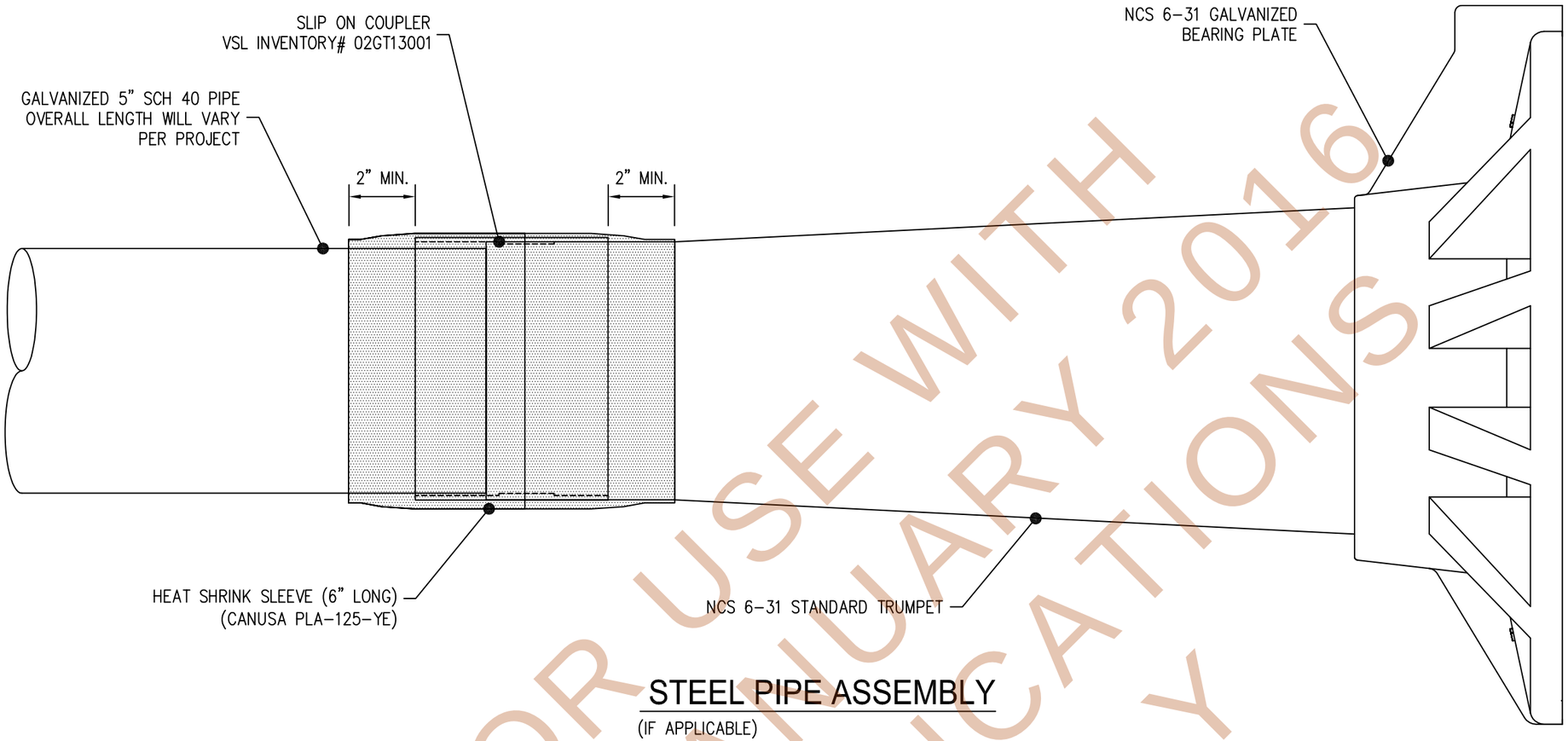
DWG. TITLE:
TYPICAL 5" HDPE PIPE TO 5" GALVANIZED SCHEDULE 40 STEEL PIPE - EPDM CONNECTION

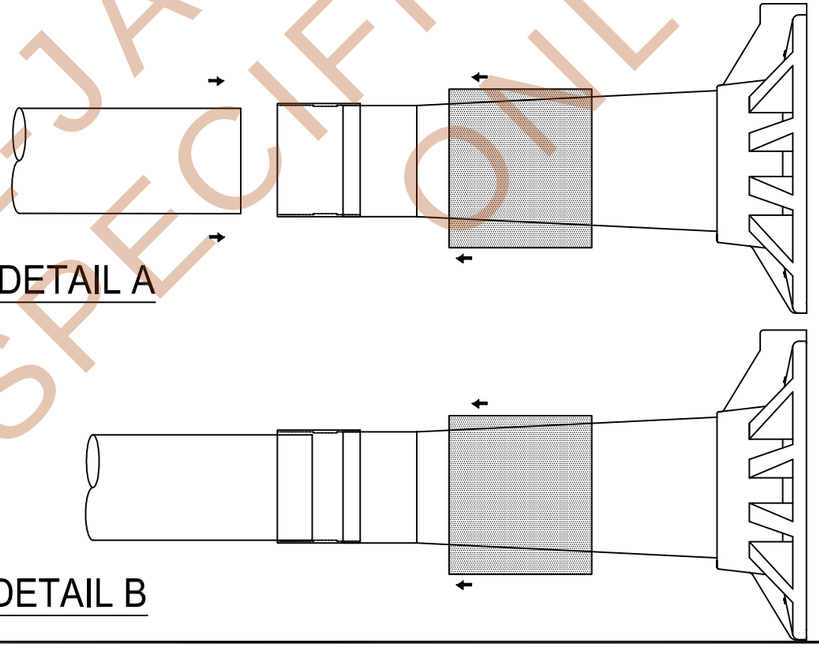
PROJECT:
VSL SYSTEMS DRAWING

SCALE: NONE
VSL JOB NO:
VSL DWG. NO.
A288



STEEL PIPE ASSEMBLY

(IF APPLICABLE)



DETAIL A

DETAIL B

INSTALLATION PROCEDURES

1) ASSEMBLE TRUMPET INTO THE BEARING PLATE. USE SLOT TO ALIGN PLATE AND TRUMPET. INSERT TRUMPET TILL LOCKING TABS ENGAGE.
2) INSTALL TRUMPET INTO SLIP ON COUPLER. SEE DETAIL A
3) PLACE STEEL PIPE INTO OPPOSITE HALF OF SLIP ON COUPLER
4) SLIDE HEAT SHRINK SLEEVE OVER SLIP ON COUPLER. OVERLAP DUCT AND PIPE BY 2 INCHES MIN. SEE DETAIL B
5) USING HEAT GUN OR BUTANE TORCH APPLY HEAT TO HEAT SHRINK SLEEVE STARTING AT ONE END AND MOVING TO THE OPPOSITE END. EVENLY DISTRIBUTE HEAT AROUND THE SLEEVE. FULL RECOVERY IS ACHIEVED WHEN ADHESIVE IS VISIBLE AROUND THE SLEEVE.
6) ENSURE BOTH TRUMPET AND PIPE ARE SECURED IN COUPLER.

REV.	DATE	BY	CHK	REVISION
3	7/6/11	TB	MM	REVISED AS NOTED FOR CONSTRUCTION
2	4/4/11	GB	MM	APPROVED FOR CONSTRUCTION
1	6/30/09	QDH		ISSUED FOR REVIEW

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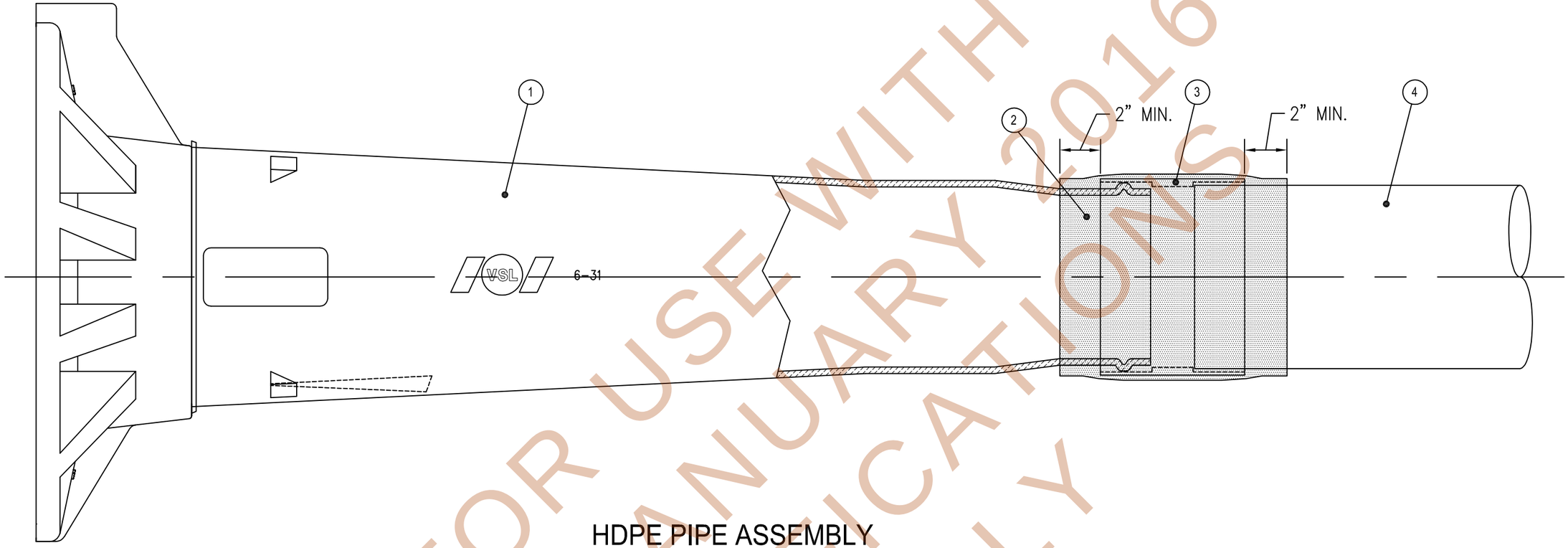
DWG. TITLE: NCS 6-31 INTERNAL TENDON WITH STEEL PIPE ASSEMBLY

PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

VSL DWG. NO. A233



HDPE PIPE ASSEMBLY

INSTALLATION PROCEDURES

1) ASSEMBLE TRUMPET INTO THE BEARING PLATE. USE SLOT TO ALIGN PLATE AND TRUMPET. INSERT TRUMPET TILL LOCKING TABS ENGAGE.
2) INSTALL TRUMPET INTO SLIP ON COUPLER.
3) PLACE HDPE PIPE INTO OPPOSITE HALF OF SLIP ON COUPLER
4) SLIDE HEAT SHRINK SLEEVE OVER SLIP ON COUPLER. OVERLAP DUCT AND PIPE BY 2 INCHES MIN.
5) USING HEAT GUN OR BUTANE TORCH APPLY HEAT TO HEAT SHRINK SLEEVE STARTING AT ONE END AND MOVING TO THE OPPOSITE END. EVENLY DISTRIBUTE HEAT AROUND THE SLEEVE. FULL RECOVERY IS ACHIEVED WHEN ADHESIVE IS VISIBLE AROUND THE SLEEVE.
6) ENSURE BOTH TRUMPET AND PIPE ARE SECURED IN COUPLER.

ITEM	QTY	DESCRIPTION	MATERIAL	DWG REF.	INVENTORY#
4	–	5" HDPE PIPE (DR-17)	HDPE	–	–
3	1	SLIP-ON COUPLER	HDPE	–	2GT13001
2	1	HEAT SHRINK SLEEVE (6" LONG)	PE	–	PLA-125-YE
1	1	NCS 6-31 TRUMPET	HDPE	C645	02BP4436

REV.	DATE	REVISION	BY	CHK
1	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
0	4/4/11	APPROVED FOR CONSTRUCTION	GB	MM

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HANOVER, MD. 21076
WWW.VSL.NET

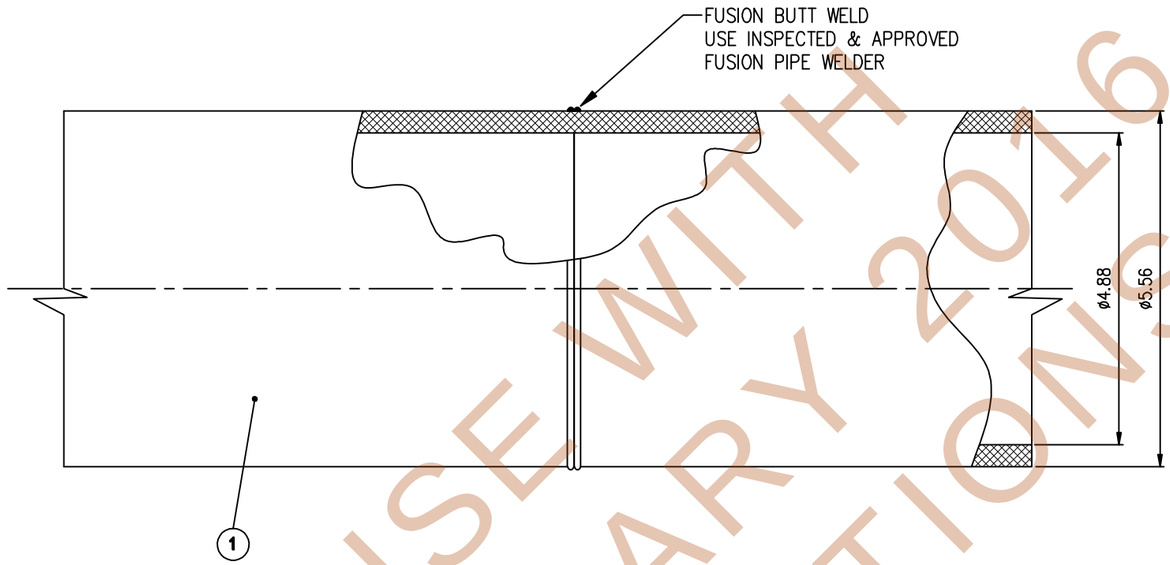
DWG. TITLE: TYPICAL NCS 6-31 TRUMPET TO HDPE PIPE CONNECTION

PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

VSL DWG. NO. A291



ELEVATION VIEW

ITEM	QTY	DESCRIPTION	MATERIAL
1	2	5" PLASTIC HDPE PIPE DR-17	HDPE ASTM D 3350

NOTE: 1.) HDPE PIPE RUNNING LABEL READS: 5" IPS/DR17/DRISCOPLEX 4100/PE4710/PE3408.

2.) SEE VSL BUTT-WELDING PROCEDURE

REV.	DATE	REMSION	BY	CHK
0	4/4/11	APPROVED FOR CONSTRUCTION	GB	MM

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WWW.VSL.NET

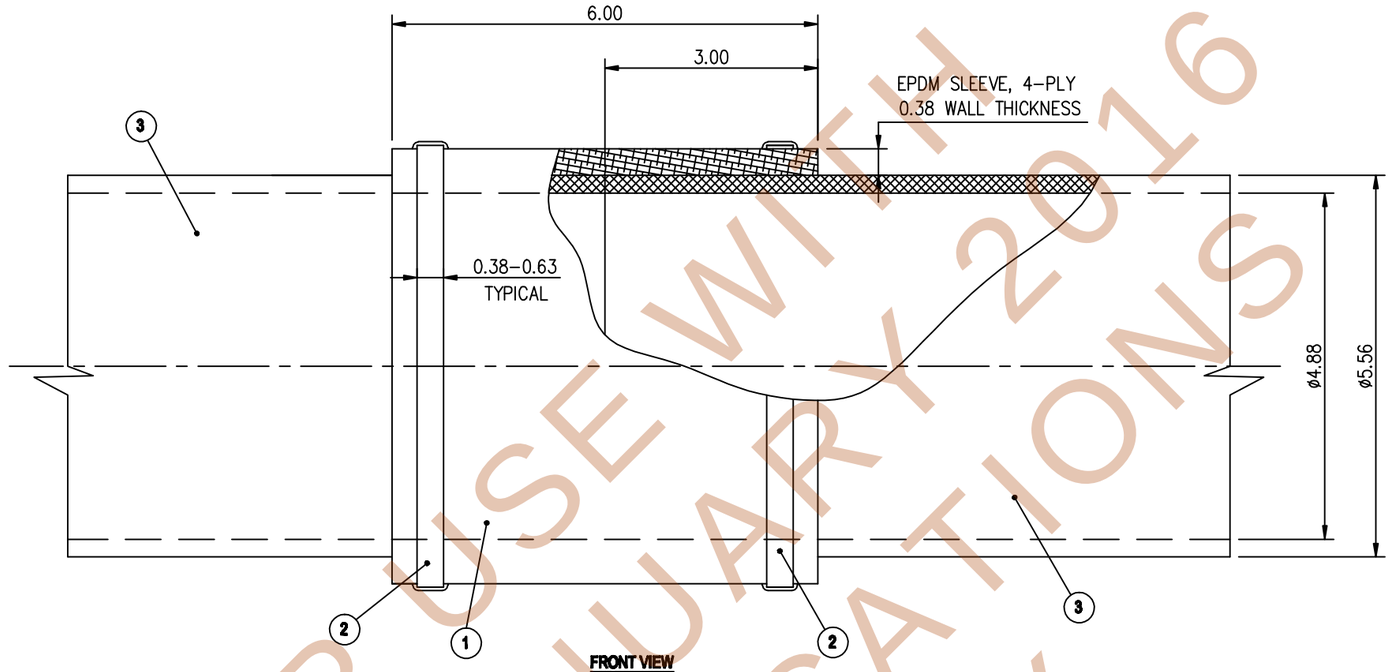
DWG. TITLE: **TYPICAL 5" HDPE PIPE TO 5" HDPE PIPE FUSION WELDED CONNECTION**

PROJECT: **VSL SYSTEMS DRAWING**

SCALE: NONE

VSL JOB NO:

VSL DWG. NO. **A287**



FRONT VIEW

ITEM	QTY	DESCRIPTION	MATERIAL
3	1	5" HDPE PIPE DR–17	ASTM D3350
2	2	STAINLESS STEEL BAND CLAMPS	ASTM A240 316
1	1	EPDM SLEEVE	EPDM ASTM D 1171

NOTE:
1) INSTALL 6" EPDM SLEEVE
2) INSTALL 2 SS BAND CLAMPS
3) CENTER EPDM SLEEVE OVER THE JOINT
4) APPLY 80 TO 120 LBS SEATING FORCE PER BAND CLAMP.
5) EPDM SLEEVE HAS NO IDENTIFYING TEXT OR MARKINGS.
   EPDM IS BLACK IN COLOR.
6) HDPE PIPE RUNNING LABEL READS: 5" IPS/DR17/DRISCOPLEX/4100/PE4710/PE3408

REV.	DATE	REVISION	BY	CHK
4	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
3	4/4/11	APPROVED FOR CONSTRUCTION	GB	MM
2	5/8/06	APPROVED FOR CONSTRUCTION	GDH	ZX
1	5/11/04	APPROVED FOR CONSTRUCTION	GDH	NDS

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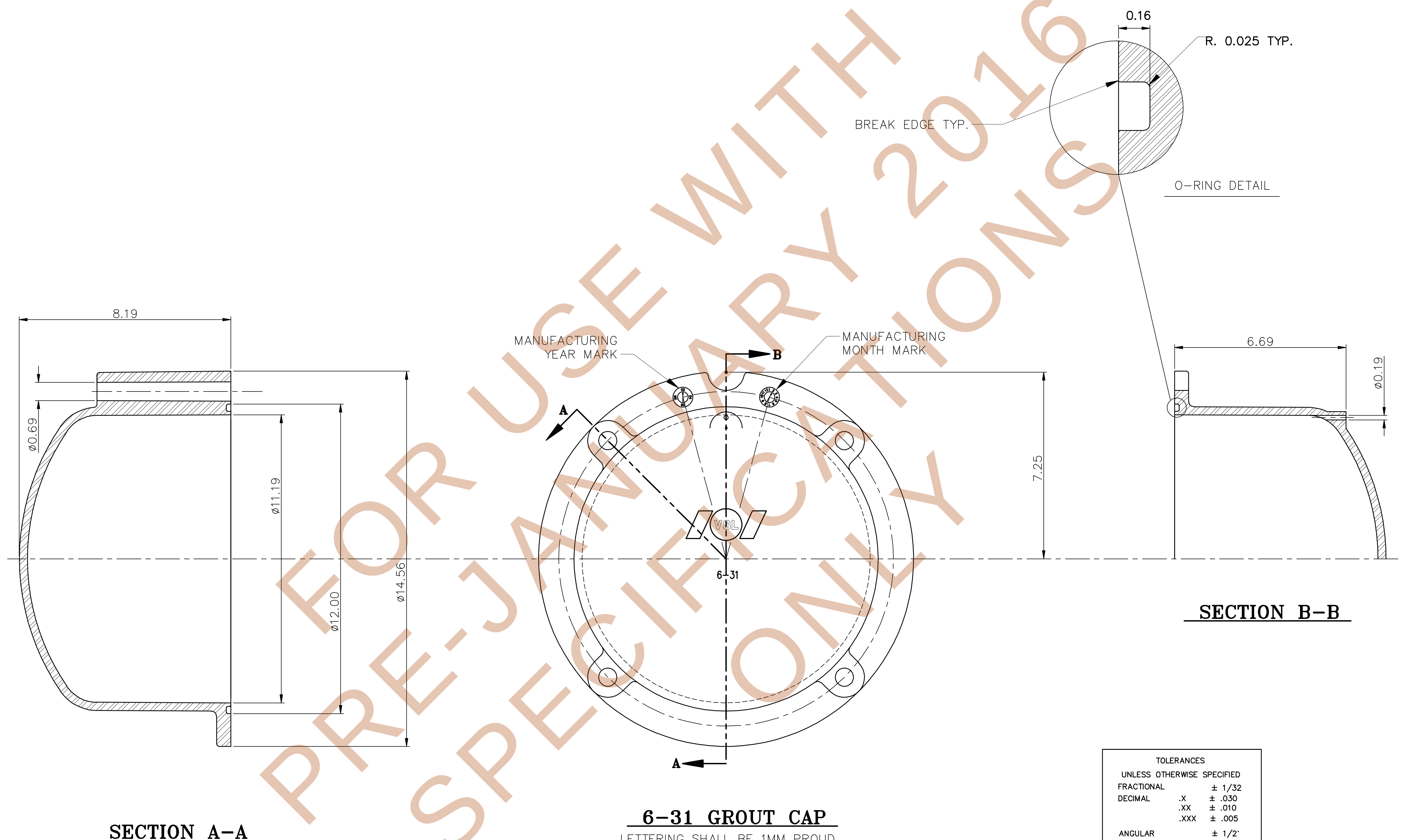
DWG. TITLE: TYPICAL 5" HDPE PIPE TO PIPE EPDM CONNECTION

PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

VSL DWG. NO. A289



TOLERANCES
UNLESS OTHERWISE SPECIFIED

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

NOTES:
1) DIMENSIONS ARE IN INCHES
2) MATERIAL: ABS LUSTRAN 633
3) INVERTORY #: 02WX5043

REV.	DATE	REVISION	BY	CHK
3	7/6/11	CHANGE DIMENSIONS FROM MM TO INCH	TB	MM
2	3/8/10	ADDED O-RING DETAIL (APPROVED FOR CONSTRUCTION)	GY	MM
1	1/19/04	ADD MANUFACTURING DATE MARKS	LS	

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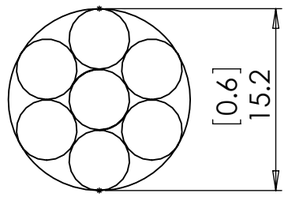
DWG. TITLE: 6-31 GROUT CAP

PROJECT: VSL SPRINGFIELD

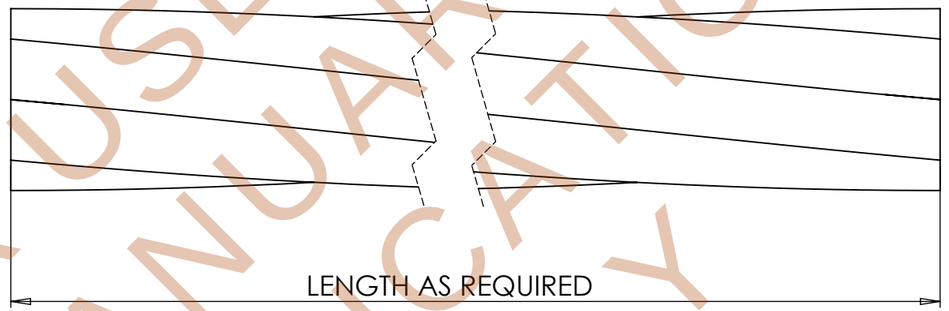
SCALE: 1 : 4

VSL JOB NO:

VSL DWG. NO. C551



ASTM A416
Grade 270
Low-Relaxation Strand



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.

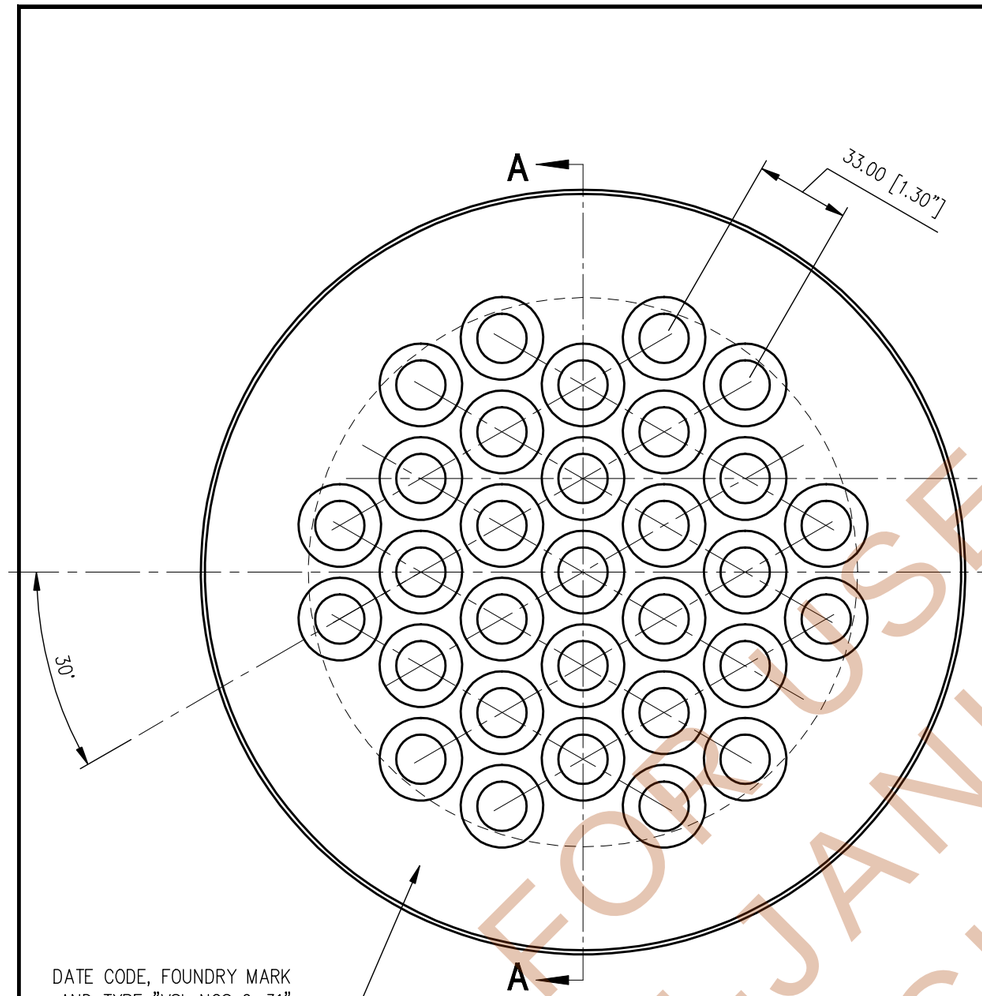
NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
0	2/24/2010	FOR FDOT		MM	

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

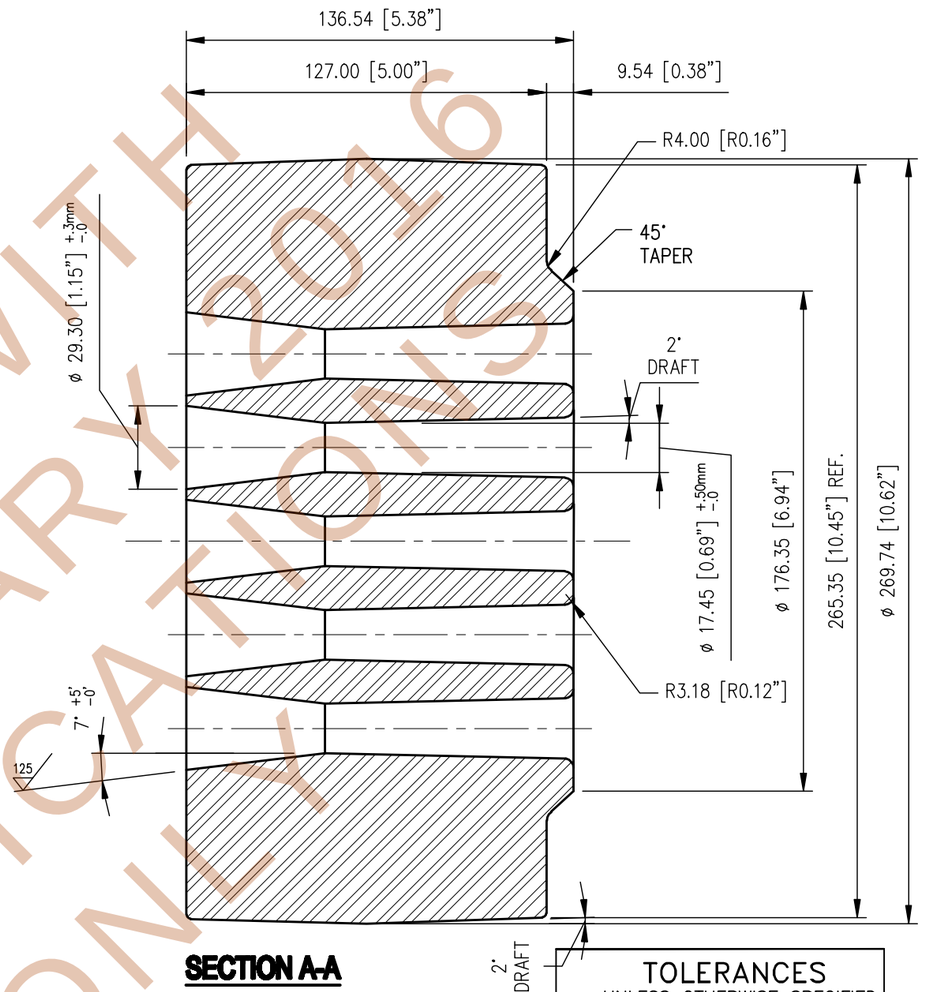
VSL POST TENSIONING 0.6" BARE STRAND ASTM A416, 270KSI

P/N: 01SD0002 (COMMERCIAL)
P/N: 01SD0013 (DOMESTIC)

SCALE: DO NOT SCALE
DRW NO: C674
SHEET: 1 OF 1



PLAN VIEW



SECTION A-A

ANCHORHEAD NCS 6-31

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 1.1.010
4) MANUFACTURERS IDENTIFICATION AND BATCH No.
   MUST BE CLEARLY VISIBLE ON CASTING
5) SCALE: DRAWING NOT TO SCALE
6) WEIGHT: 106# est.

INVENTORY No. 02AH6031

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	CHK
1	9/03/08	GDH	

PRELIMINARY NOT FOR PRODUCTION

REVISION

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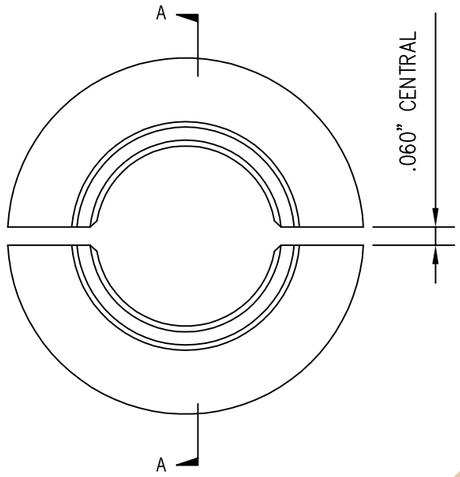
DWG. TITLE: NCS 6-31 ANCHOR HEAD

PROJECT: VSL SYSTEMS DRAWING

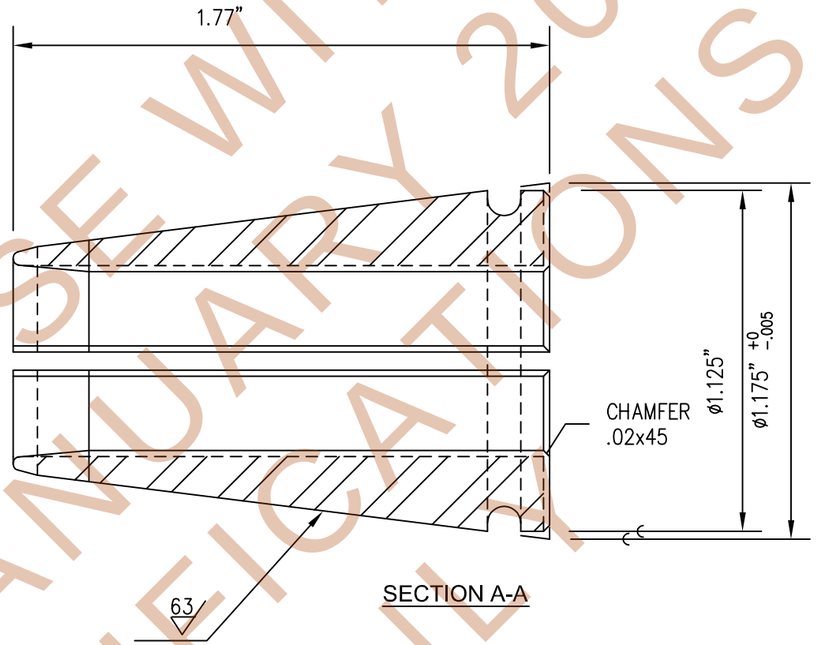
SCALE: 1:2

VSL JOB NO:

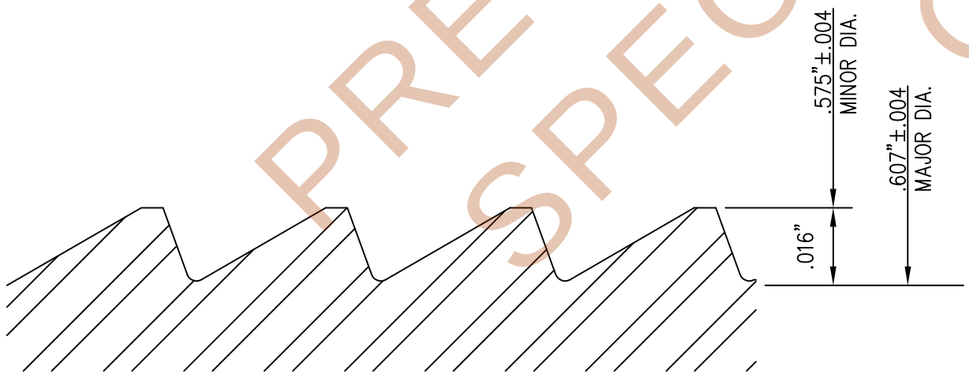
VSL DWG. NO.
C614



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 (11–L–17)
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. 02WG0008

REV.	DATE	REVISION	BY	CHK
4	7/6/11	REVISE AS NOTED FOR CONSTRUCTION	TB	MM
3	4/29/04	UPDATED BORDER	GDH	NDS
2	1/1/89	ADDED INVENTORY NUMBER	TKW	
1	1/1/89	ISSUED FOR PRODUCTION	BB	

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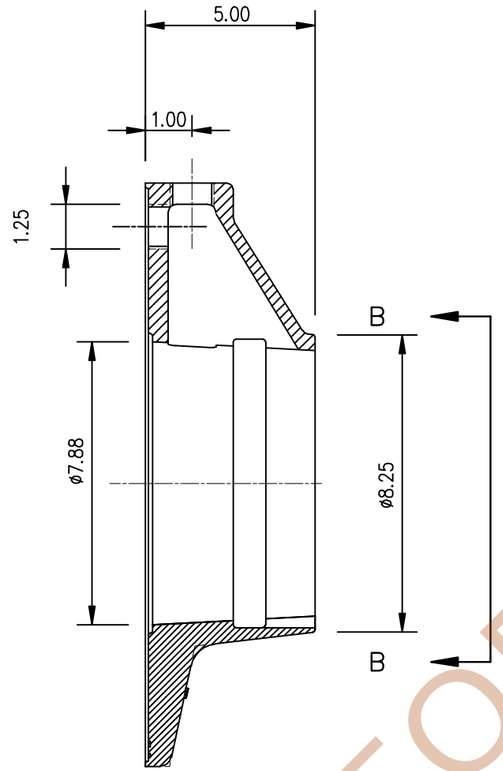
DWG. TITLE: 0.6" MULTIWEDGE TYPE 1.6G

PROJECT: VSL SYSTEM DRAWING

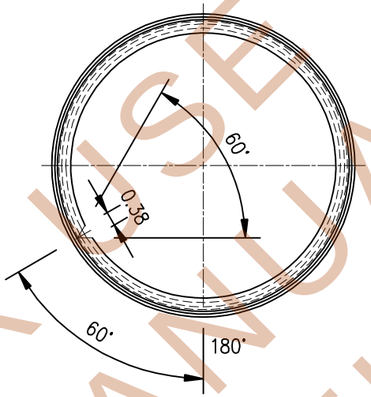
SCALE: 2:1
VSL JOB NO:
VSL DWG. NO.
C218

GENERAL CASTING NOTES

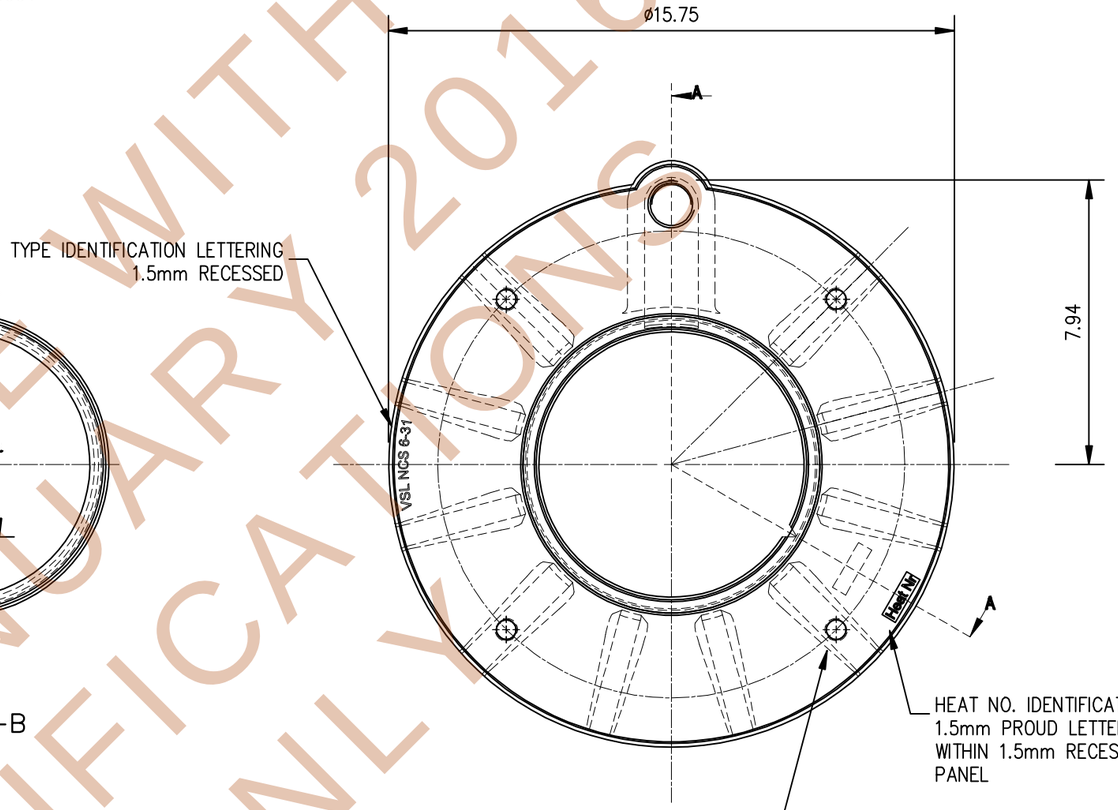
1) ALL HOLES TO BE FREE FROM BURRS
2) ALL RADII 6mm UNO
3) MATERIAL : VSL MS 1.1.010
4) MANUFACTURERS IDENTIFICATION AND BATCH No. MUST BE CLEARLY VISIBLE ON CASTING
5) VSL INVENTORY# 02BP6031



SECTION A-A



SECTION B–B



REV.	DATE	REMSION	BY	CHK
4	7/6/11	SHOW DIMENSIONS IN INCHES (FOR CONSTRUCTION)	GB	MM
3	5/23/11	REVISED MATERIAL SPECIFICATION	GB	MM
2	3/8/10	REVISED SPELLING & ADDED CUTTING PLANE LINE	GY	
1	6/17/09	PRELIMINARY NOT FOR PRODUCTION	GH	

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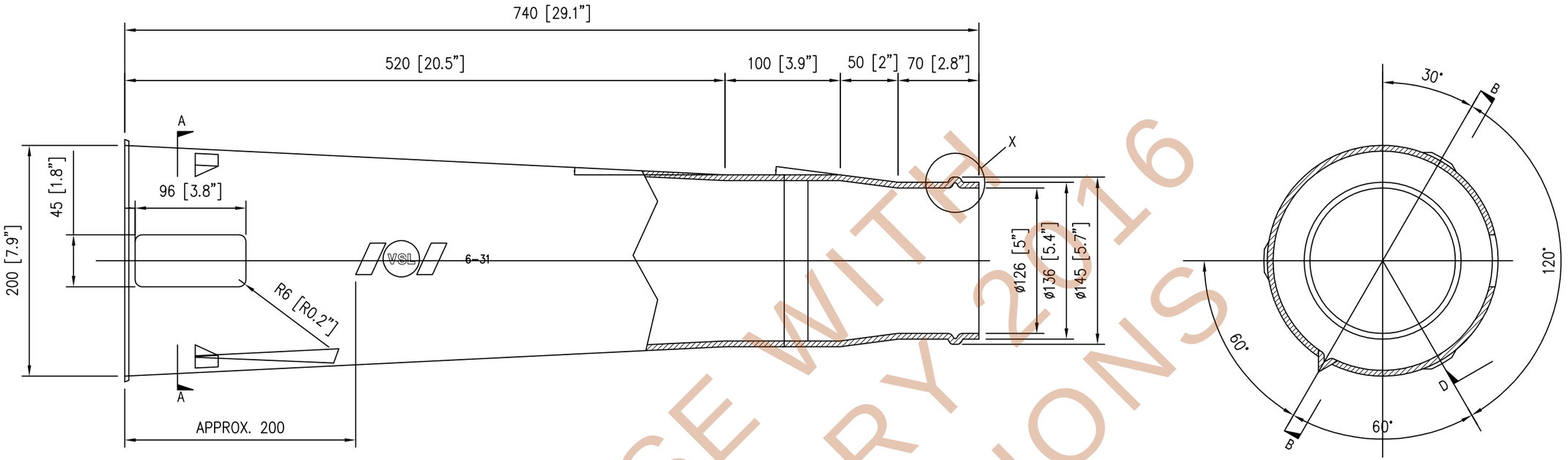
DWG. TITLE: NCS 6-31 BEARING PLATE

PROJECT: VSL SYSTEMS DRAWING

SCALE: NONE

VSL JOB NO:

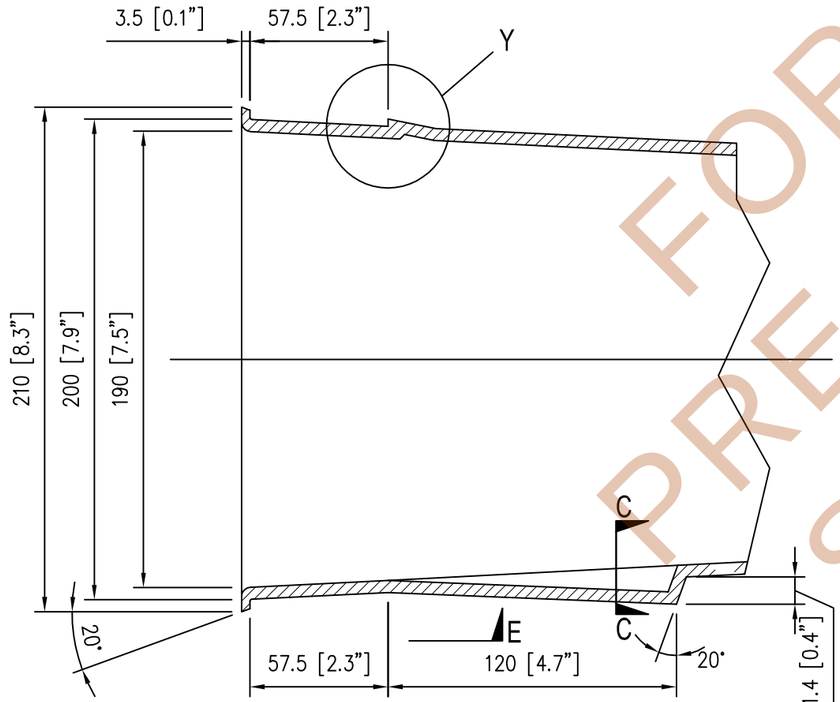
VSL DWG. NO. C-638



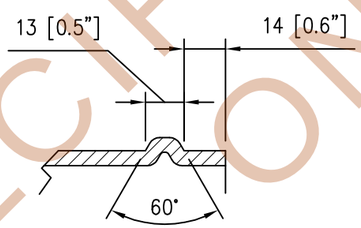
SECTION A-A

VIEW D

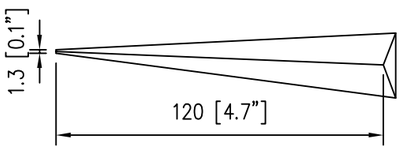
SECTION C-C



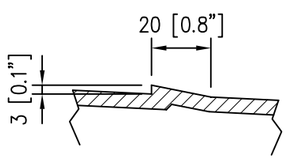
SECTION B-B



DETAIL X



VIEW E



DETAIL Y

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) DIMENSIONS SHOWN THUS "(XX)" ARE IN MILLIMETERS.
5) DIMENSIONS IN MM SHALL CONFORM TO DIN 1685 GTB16 TOLERANCES
6) MATERIAL: POLYPROPYLENE (BLACK)
7) INVENTORY #: 02BP4436

REV.	DATE	REVISION	BY	CHK
2	7/6/11	ADD TOLERANCES AND NOTES	TB	MM
1	10/27/09	ISSUED FOR CONSTRUCTION	JE	

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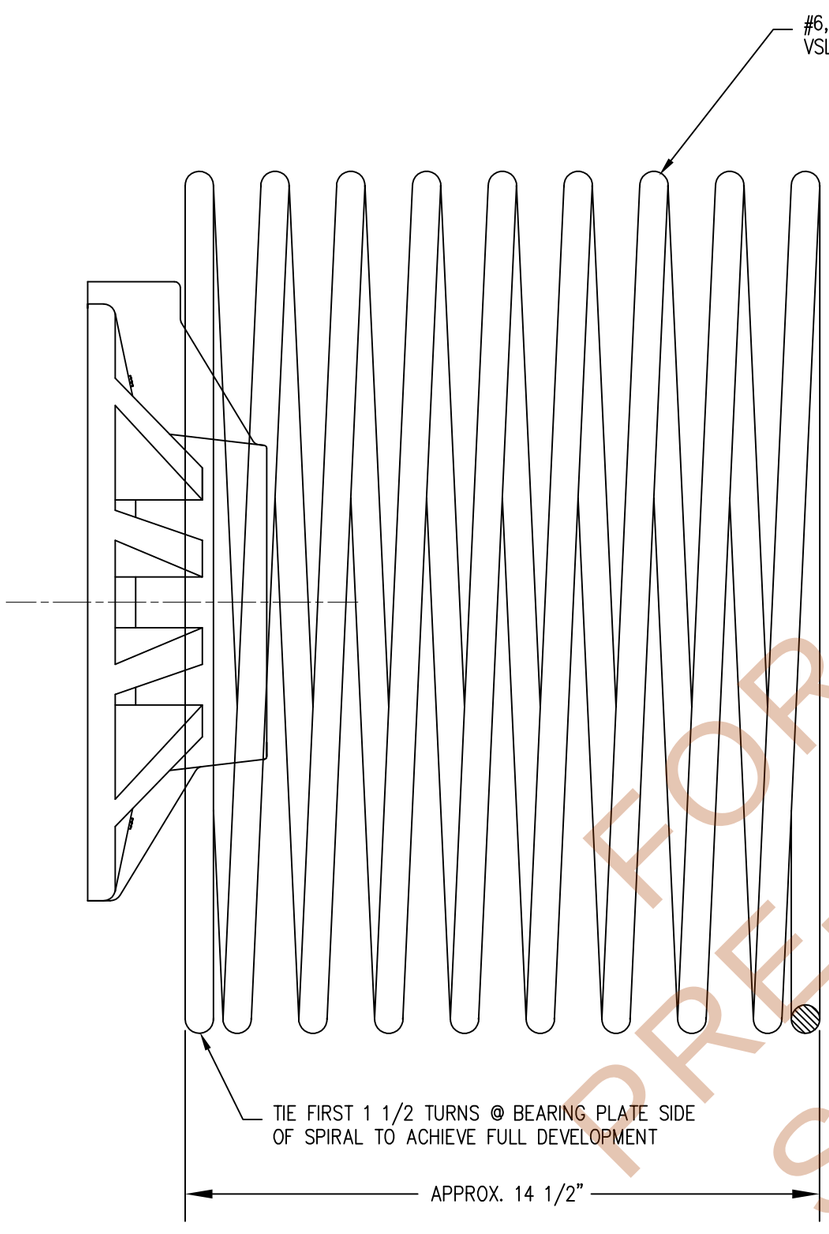
DWG. TITLE: NCS 6-31 TRUMPET ASSEMBLY

PROJECT: VSL SYSTEMS DRAWING

SCALE: 1/16" = 1'-0"

VSL JOB NO: 054-0000

VSL DWG. NO. C645



PLAN VIEW
SCALE 1:4

TOP VIEW
SCALE 1:4

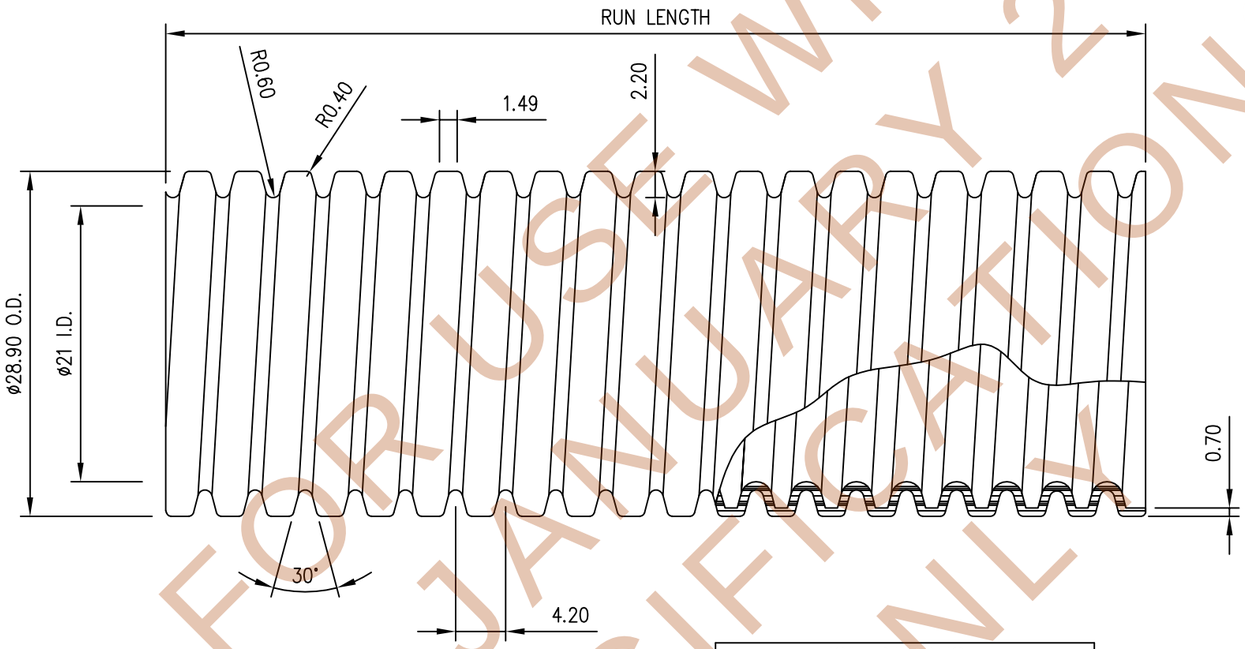
REV.	DATE	REVISION	BY	CHK
2	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
1	9/24/09	RELEASED FOR CONSTRUCTION	GDH	GY

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

DWG. TITLE: NCS 6-31 SPIRAL
FOR 5500 PSI OR 3500 PSI CONCRETE

PROJECT: VSL
SYSTEMS DRAWING

SCALE: 1:4
VSL JOB NO:
VSL DWG. NO.
C644



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: POLYPROPYLENE BLACK (PP)

INVENTORY No. 02DT0310

REV.	DATE	REVISION	BY	CHK
2	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
1	4/26/04	RELEASED FOR PRODUCTION	GDH	NDS

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

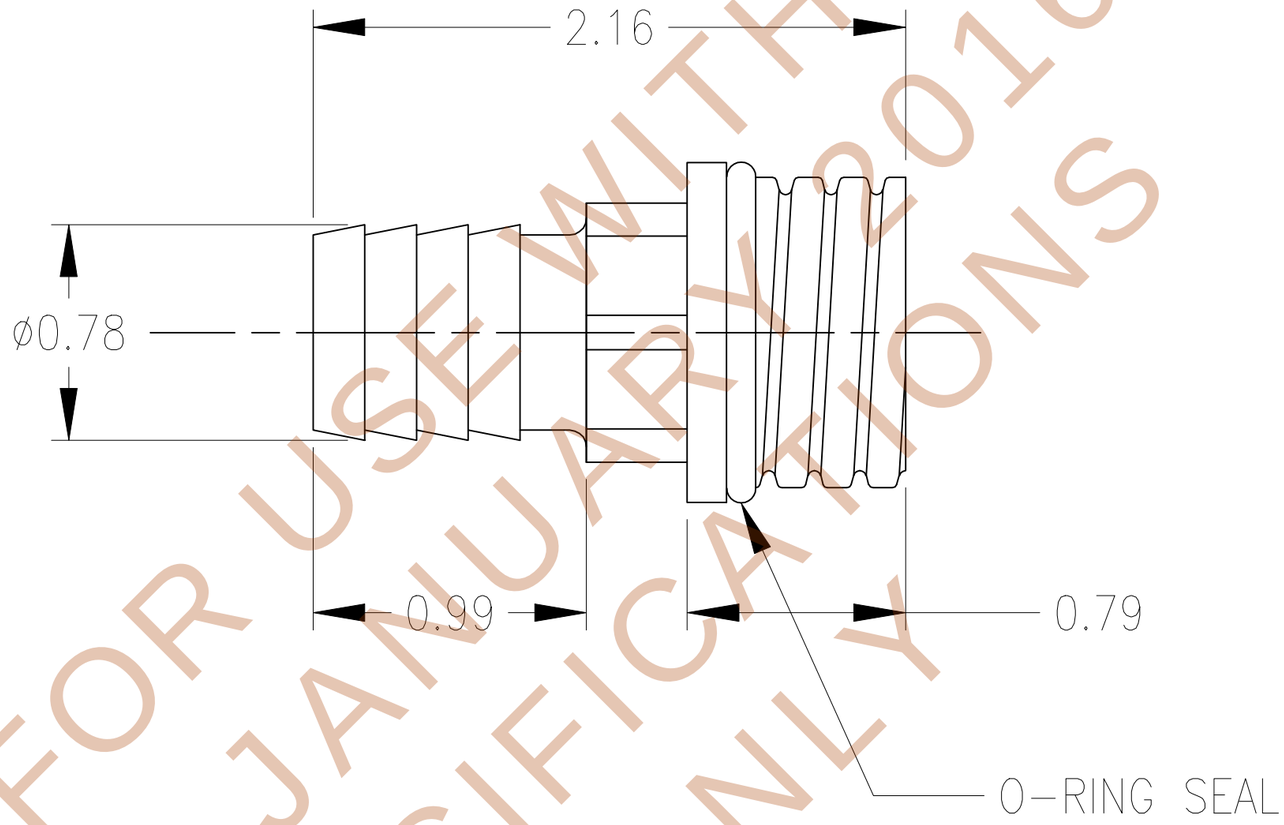
DWG. TITLE: 23MM GROUT HOSE FABRICATION

PROJECT: VSL SYSTEMS DRAWING

SCALE: 2:1

VSL JOB NO:

VSL DWG. NO.
C587



MATERIAL: POLYPROPYLENE BLACK
MEETS OR EXCEEDS FDOT SPECIFICATION 462-4.2.3

REV.	DATE	BY	CHK
1	3/7/11	GY	MM

RELEASED FOR PRODUCTION

REVISION

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

DWG. TITLE: 3/4" HOSE BARB TO 23MM FITTING FABRICATION

PROJECT: VSL
Inventory Number: 20101903

SCALE: NONE

VSL JOB NO:

VSL DWG. NO.
C892

MATERIAL: HDPE BLACK
MATERIAL MEETS OR EXCEEDS FDOT SPECIFICATION 462-4.2.3

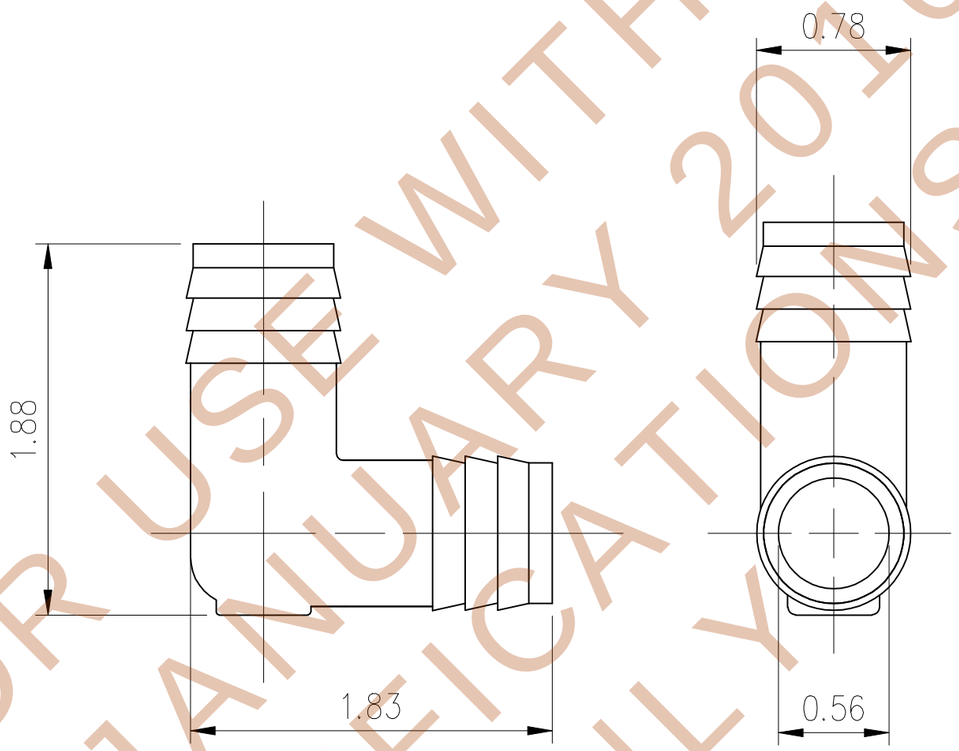
REV.	DATE	REVISION	BY	CHK
2	8/12/11	REVISED INVENTORY NUMBER	TB	MM
1	3/7/11	RELEASED FOR PRODUCTION	GY	MM

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

DWG. TITLE: 3/4" SMOOTH GROUT HOSE FABRICATION

PROJECT: VSL
Inventory Number: 23701901

SCALE: NONE
VSL JOB NO:
VSL DWG. NO.
C685



MATERIAL: POLYPROPYLENE BLACK

MATERIAL MEETS OR EXCEEDS FDOT SPECIFICATION 462-4.2.3

REV.	DATE		BY	CHK
1	7/20/11	RELEASED FOR PRODUCTION	GY	MM

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

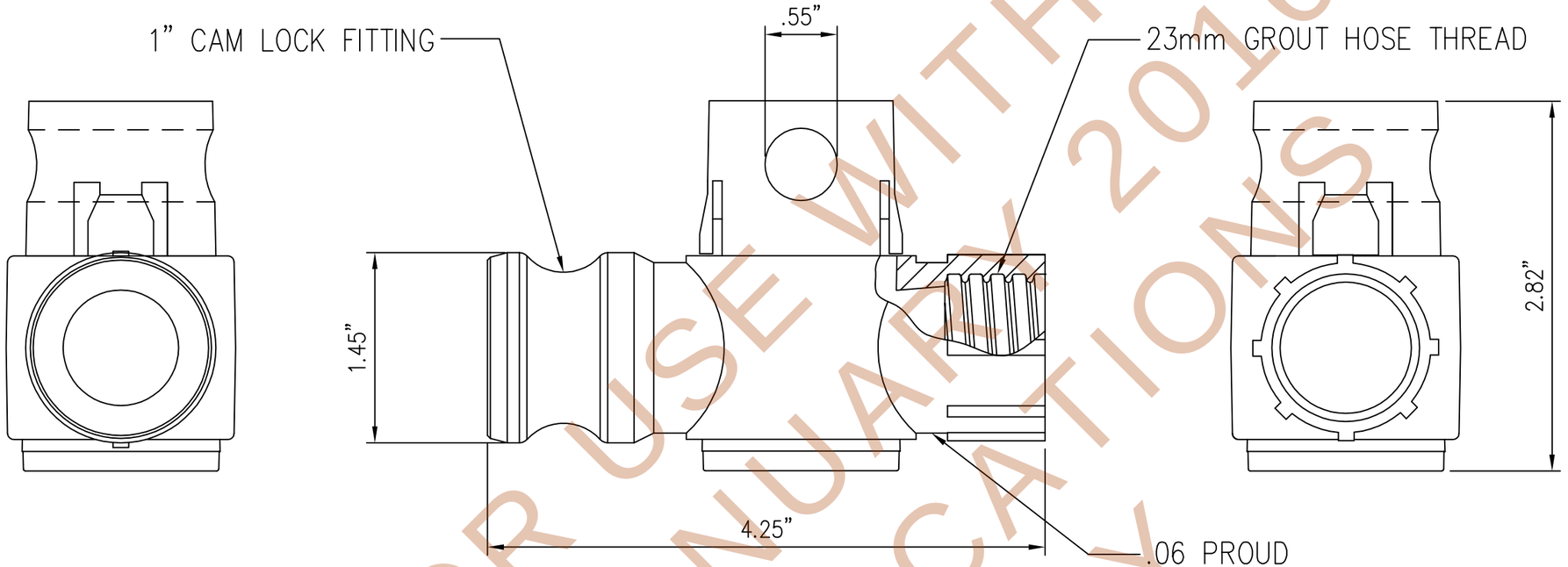
DWG. TITLE: 3/4" x 3/4" HOSE BARB ELBOW PLASTIC

PROJECT: VSL
Inventory Number: 20701910

SCALE: N/A

VSL JOB NO:

VSL DWG. NO.
C700



GROUT SHUT-OFF VALVE, 23MM

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) MATERIAL: POLYSTYRENE COLOR BLACK
5) INVENTORY: 02DT0311

REV.	DATE	REVISION	BY	CHK
2	7/6/11	ADDED TOLERANCES AND NOTES (FOR CONSTRUCTION)	TB	MM
1	3/16/11	RELEASED FOR PRODUCTION	GY	MM

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

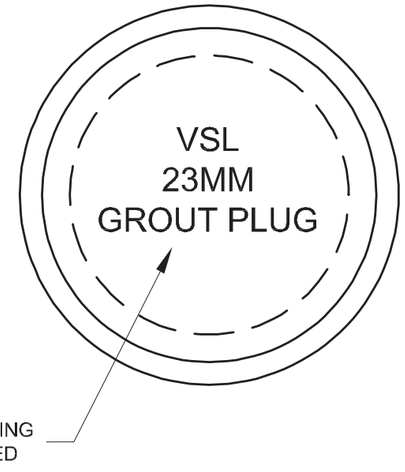
DWG. TITLE: GROUT SHUT-OFF VALVE, 23mm ASSEMBLY

PROJECT: VSL SYSTEMS DRAWING

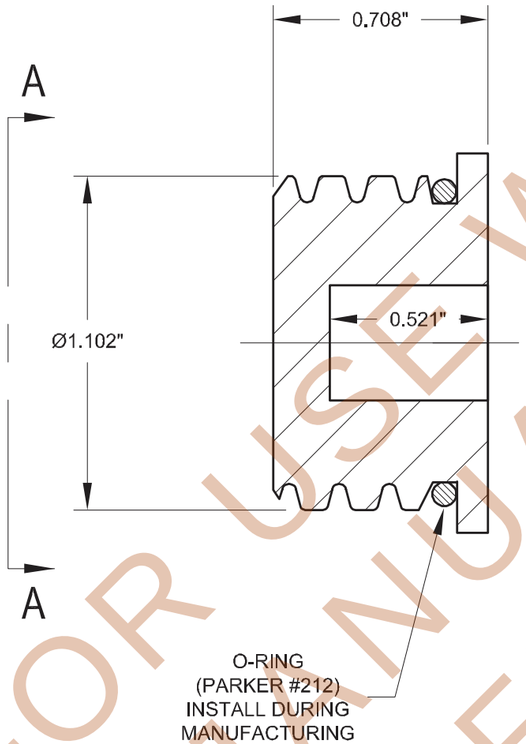
SCALE: NONE

VSL JOB NO:

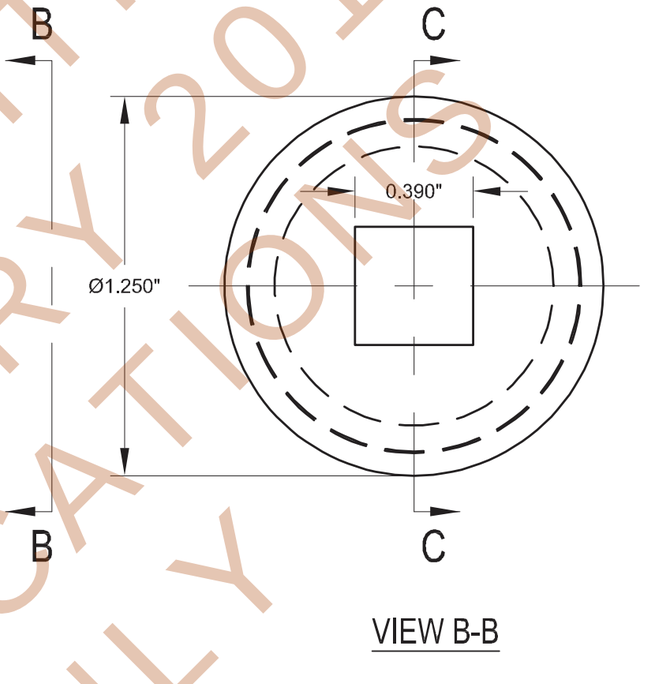
VSL DWG. NO. A158



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

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

DWG. TITLE: 23MM GROUT PLUG FABRICATION

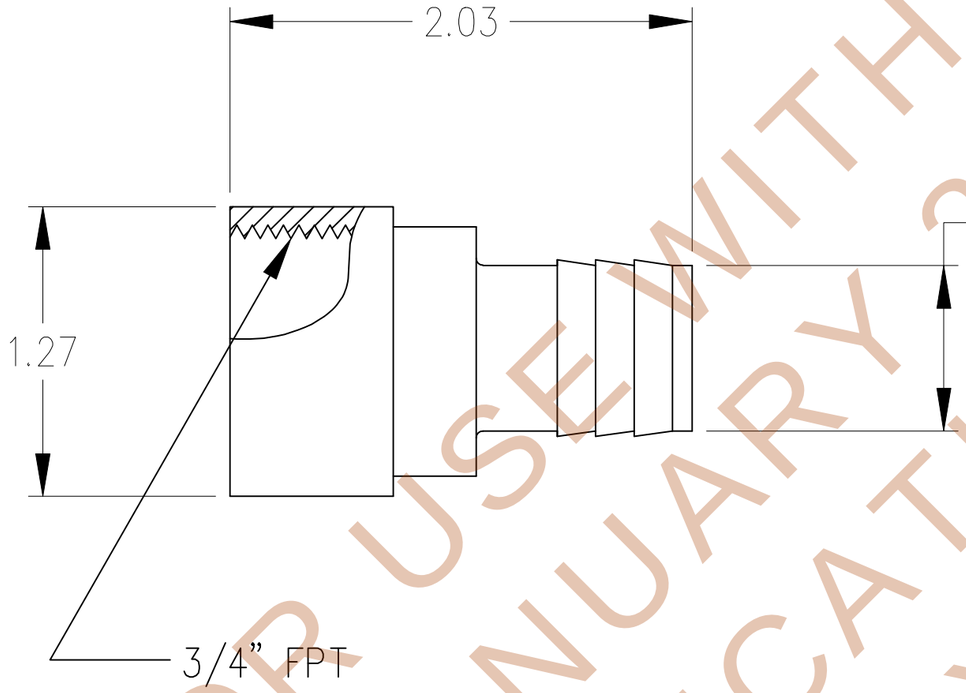
PROJECT: VSL SYSTEMS DRAWING

SCALE: 2:1

VSL JOB NO:

VSL DWG. NO.

C583



MATERIAL: POLYPROPYLENE BLACK

MATERIAL MEETS OR EXCEEDS FDOT SPECIFICATION 462-4.2.3

REV.	DATE	REVISION	BY	CHK
1	3/7/11	RELEASED FOR PRODUCTION	GY	MM

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

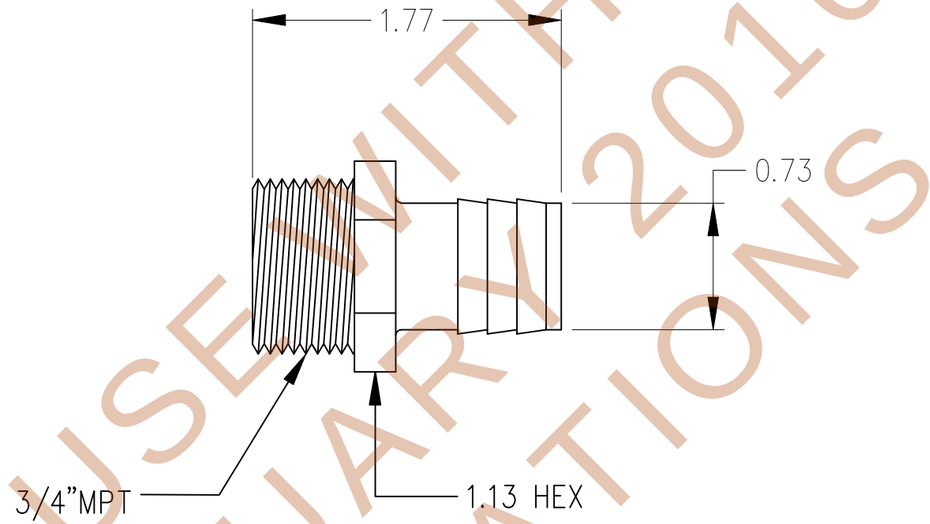
DWG. TITLE: 3/4" HOSE BARB TO 3/4" FPT FITTING FABRICATION

PROJECT: VSL
Inventory Number: 20101811

SCALE: NONE

VSL JOB NO:

VSL DWG. NO.
C895



MATERIAL: POLYPROPYLENE BLACK

MATERIAL MEETS OR EXCEEDS FDOT SPECIFICATION 462-4.2.3

REV.	DATE	REVISION	BY	CHK
2	8/12/11	REVISED INVENTORY NUMBER	TB	MM
1	3/7/11	RELEASED FOR PRODUCTION	GY	MM

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

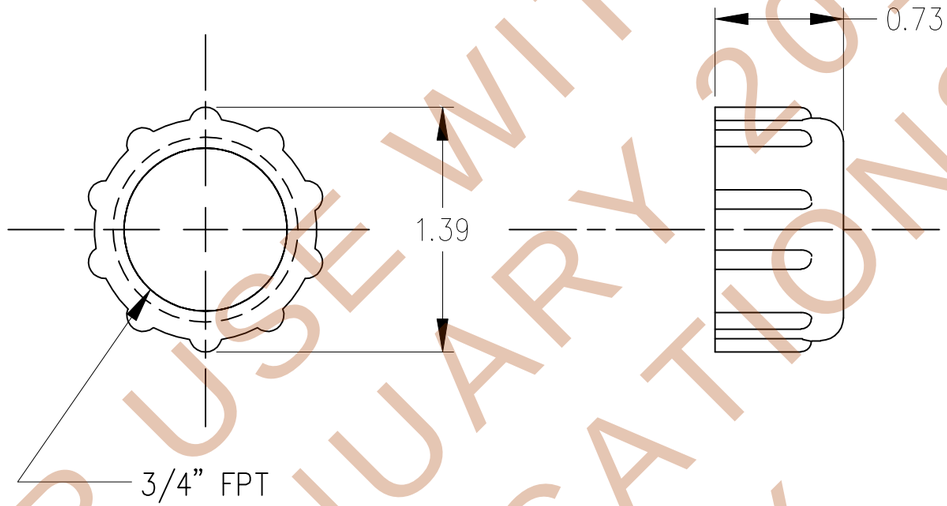
DWG. TITLE: **3/4" HOSE BARB TO 3/4" MPT FITTING FABRICATION**

PROJECT: **VSL**
Inventory Number: 2DT01908

SCALE: NONE

VSL JOB NO:

VSL DWG. NO.
C694



MATERIAL: POLYPROPYLENE BLACK

MATERIAL MEETS OR EXCEEDS FDOT SPECIFICATION 462-4.2.3

REV.	DATE	BY	CHK
1	3/7/11	GY	MM

RELEASED FOR PRODUCTION

REVISION

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

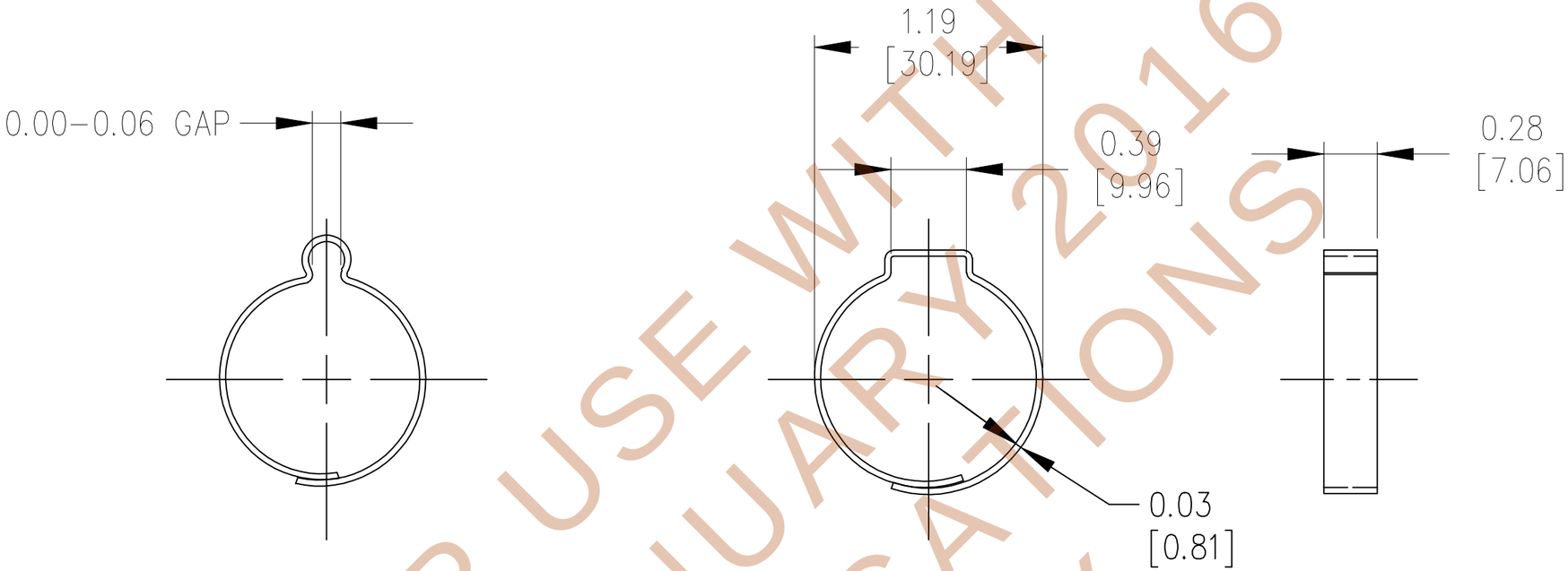
DWG. TITLE: 3/4" FPT CAP

PROJECT: VSL
Inventory Number: 20701912

SCALE: NONE

VSL JOB NO: GROUTING

VSL DWG. NO.
C701



INSTALLED
[AFTER CRIMPING]

OPEN
[AS SUPPLIED]

INSTALLATION INSTRUCTIONS:

1. SLIDE BAND OVER HOSE AND ALIGN OVER BARBS ON FITTING
2. CRIMP EAR ON BAND WITH PLIERS USING EITHER DIAGONAL CUTTERS OR END NIPPERS

MATERIAL: 316 STAINLESS STEEL

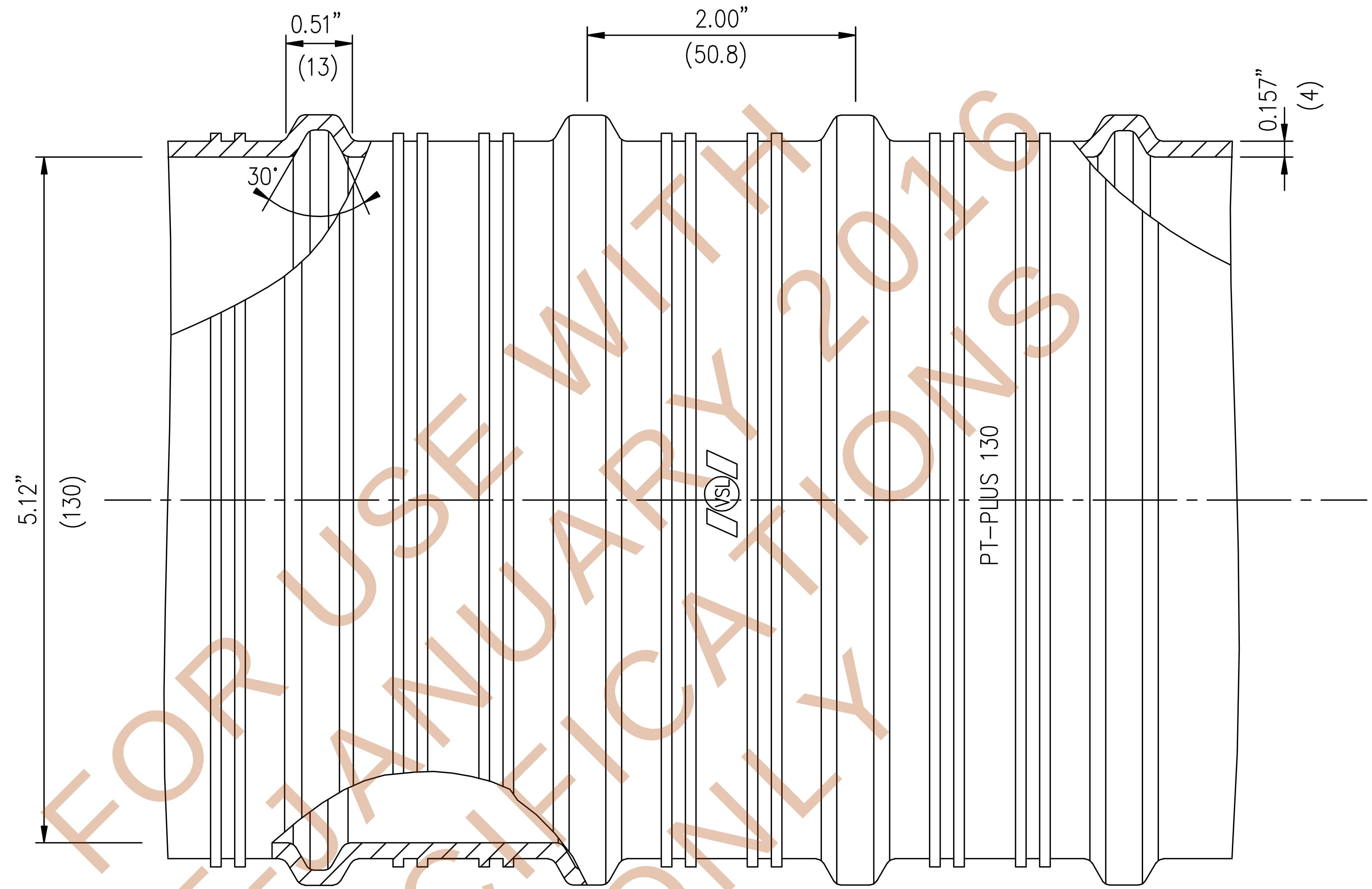
REV.	DATE	REVISION	BY	CHK
1	3/7/11	RELEASED FOR PRODUCTION	GY	MM

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

DWG. TITLE: ONE EAR BAND CLAMP, 3/4" GROUT HOSE FABRICATION

PROJECT: VSL
Inventory Number: 20170805

SCALE: NONE
VSL JOB NO:
VSL DWG. NO.
C690



INVENTORY No. 02DT0453

ITEM	QTY	DESCRIPTION	MATERIAL	REMARKS
1	1	DUCT PT PLUS 130	PP	WHITE

MATERIAL: ASTM D4101 POLYPROPYLENE
CELL CLASS PP0340B-44541 TO PP0340B-67884
MINIMUM BENDING RADIUS: 25'

VSL
PT-PLUS 130
MARKING EVERY 2M

NOTE:
DUCT MAY CONTAIN RUNNING LABEL INCLUDING: "VSL", "PT-PLUS DUCT", "130MM", 'DATE', 'BATCH'.

NO.	DATE	REVISION	BY	CHK
5	8-12-11	REV. INV. NO. (FOR CONSTRUCTION)	TB	MM
4	7-6-11	REV. AS NOTED (FOR CONSTRUCTION)	TB	MM
3	10-6-97	ADD MATERIAL TYPE NOTE	TKW	
2	2-18-97	ADD INVENTORY No.	RDC	

DRN. 12-16-94 DMH
DES.
CHK. 12-16-94 BB

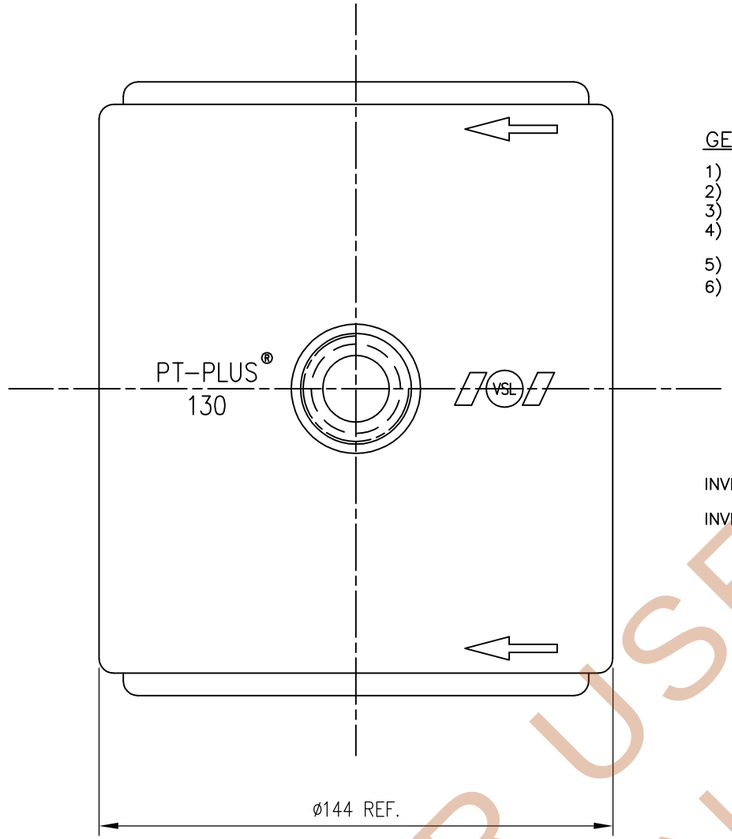
VSL CORPORATION
TECHNICAL CENTER
2840 Plaza Place, Suite 200
Raleigh, NC. 27612
Telephone: (919) 781-6272
Fax: (919) 781-4969

ATLANTA, GA / DALLAS, TX / MIAMI, FL / PHILADELPHIA, PA
RALEIGH, NC (CORPORATE OFFICE) / SAN JOSE, CA / SPRINGFIELD, VA

DWG. TITLE: DUCT PT PLUS 130

PROJECT: VSL CORPORATION SYSTEM DRAWINGS

SCALE:
TCNA NO:
VSL JOB NO: –
VSL DWG. NO. C417

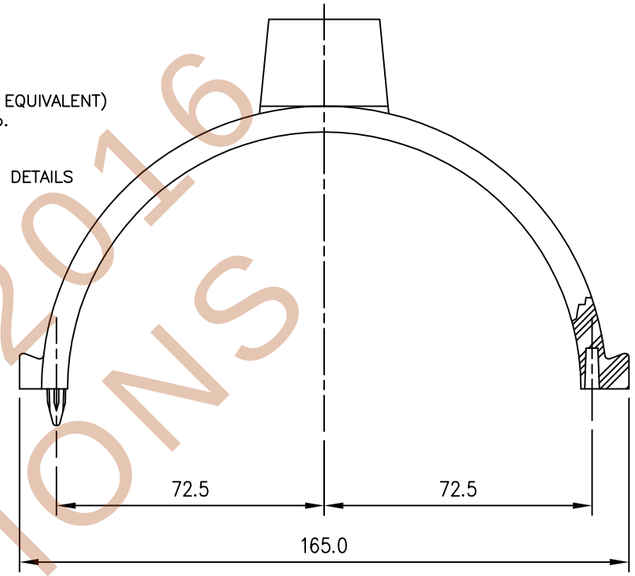


GENERAL NOTES

1) ALL HOLES TO BE FREE FROM BURRS
2) ALL RADII 1mm UNO
3) MATERIAL POLYPROPYLENE ELTEX PRS210 (OR EQUIVALENT)
4) MANUFACTURERS IDENTIFICATION AND BATCH No. MUST BE CLEARLY VISIBLE
5) SCALE: DRAWING NOT TO SCALE
6) SEE DRAWING A235 FOR ADDITIONAL ASSEMBLY DETAILS

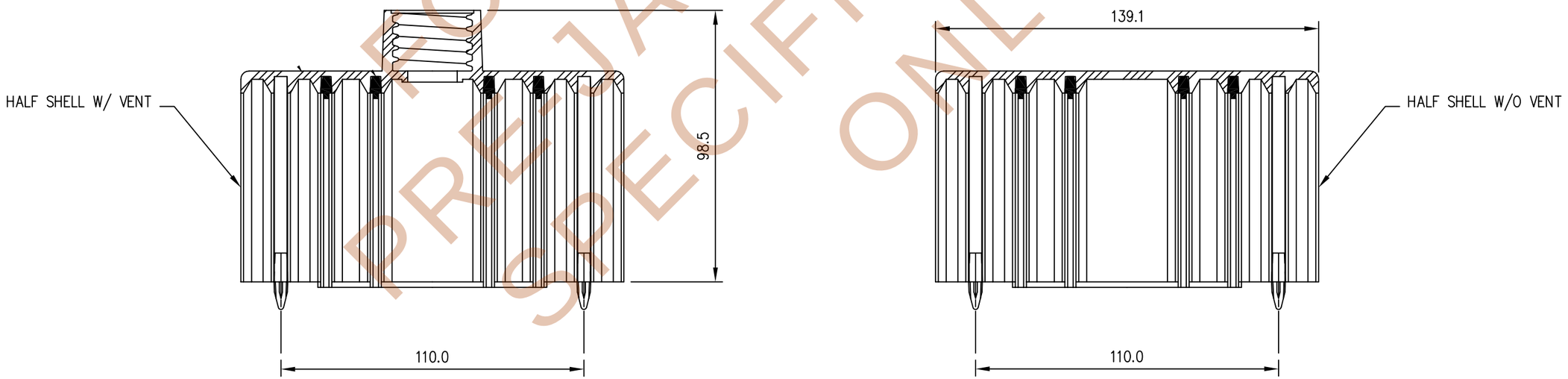
INVENTORY No. 02DT0054 WITHOUT VENT

INVENTORY No. 02DT0055 WITH VENT



USE TWO HALF-SHELLS W/O VENT (P/N 02DT0054) FOR STANDARD DUCT COUPLING

USE ONE HALF SHELL W/O VENT (P/N 02DT0054) AND ONE HALF SHELL W/ VENT (P/N 02DT0055) FOR DUCT COUPLING WHERE A GROUT VENT IS NEEDED



REV.	DATE	REVISION	BY	CHK
7	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
6	6/8/10	ISSUED FOR CONSTRUCTION	SAN	MM
5	3/8/10	ADDED OUTSIDE DIAMETER DIM.	GY	
4	10/29/09	NEW BORDER ADDED	GDH	

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

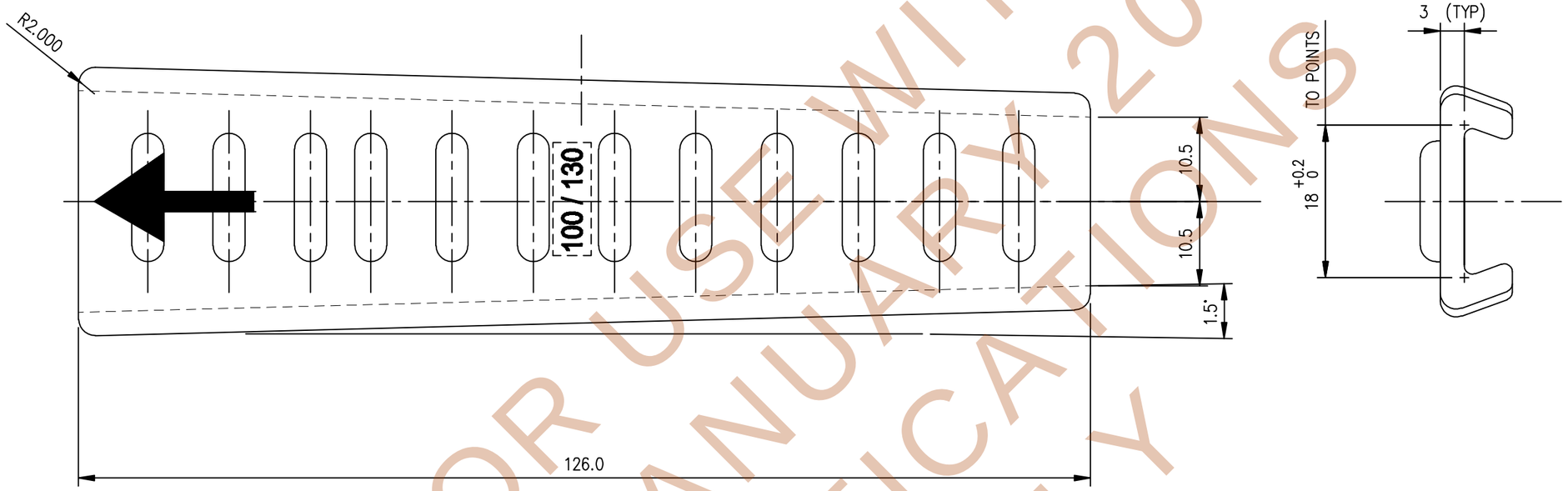
DWG. TITLE: COUPLER ASSEMBLY DRAWING
PT-PLUS 130

PROJECT: VSL SYSTEMS DRAWING

SCALE: 1/16" = 1'-0"

VSL JOB NO: 054-0000

VSL DWG. NO. C449



GENERAL NOTES

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

INVENTORY No. 02DT0046

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

REV.	DATE	REVISION	BY	CHK
2	7/6/11	REVISED AS NOTED FOR CONSTRUCTION	TB	MM
1	6/17/03	PRELIMINARY NOT FOR PRODUCTION	GDH	

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

DWG. TITLE: 100 / 130 MM PT-PLUS CLIP FABRICATION

PROJECT: VSL SYSTEMS DRAWING

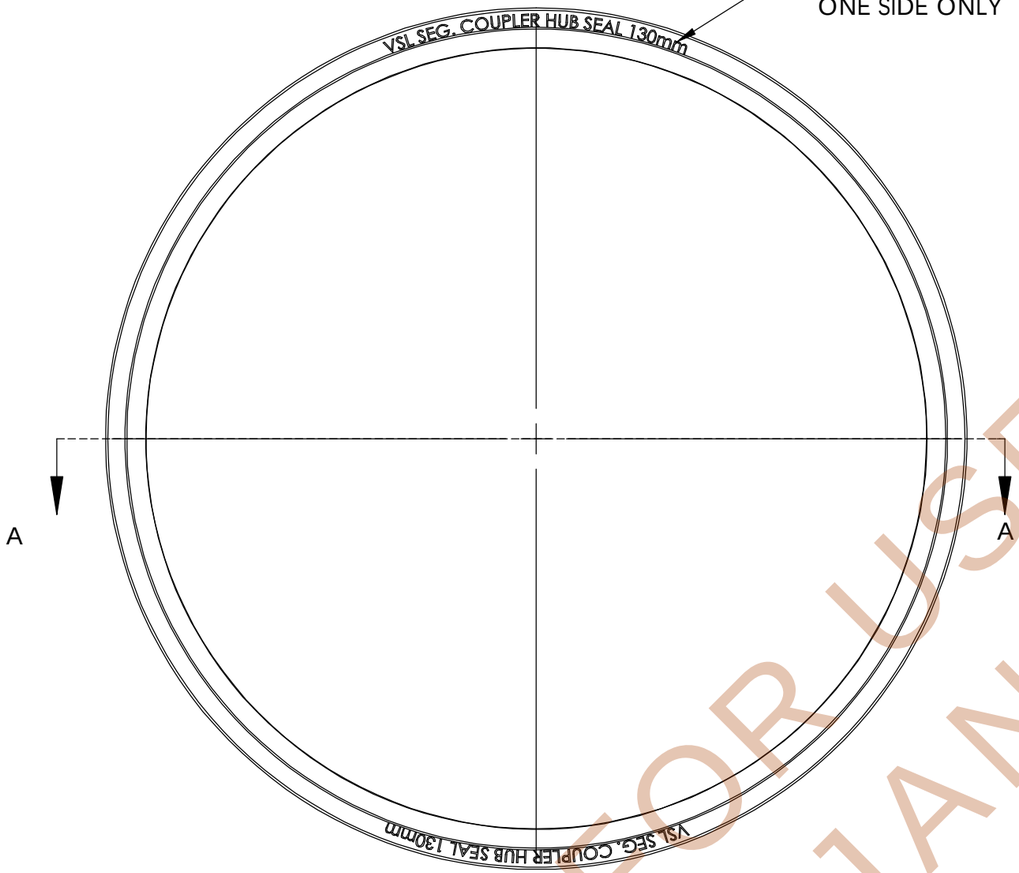
SCALE: 1:10

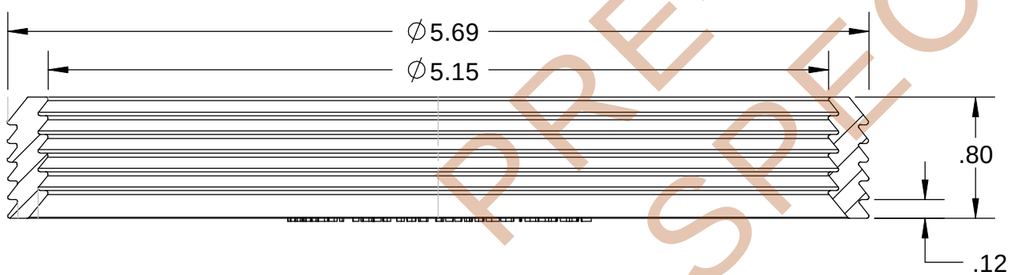
VSL JOB NO:

VSL DWG. NO. C625

PATENT PENDING

TEXT 0.020" PROUD:
"VSL SEG. COUPLER HUB SEAL 130mm"
ONE SIDE ONLY





SECTION A-A

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 _____

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
1	3/26/2010	FOR PRODUCTION		MM	GY
0	1/21/2010	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 130mm SEGMENTAL DUCT COUPLER SYSTEM

HUB SEAL

VSL P/N 02SC13002

SCALE: DO NOT SCALE
DRW NO: C657
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

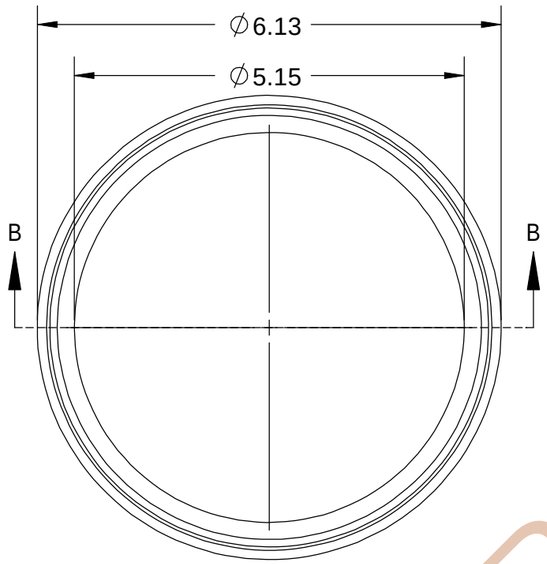
MATERIAL

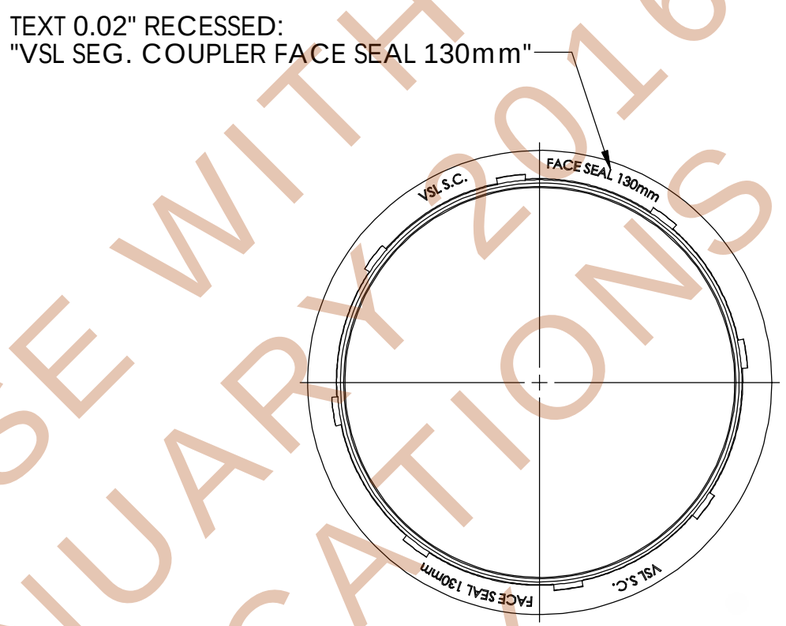
Santoprene, Black in color
(per VSL MS 8.1.091209.2)

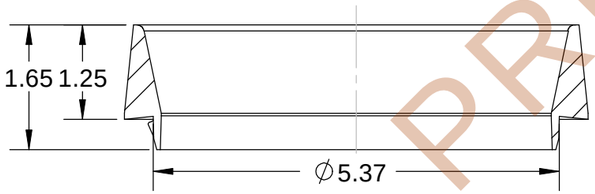
TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

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







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
1	3/26/2010	FOR PRODUCTION		MM	GY
0	1/21/2010	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 130mm SEGMENTAL DUCT COUPLER SYSTEM

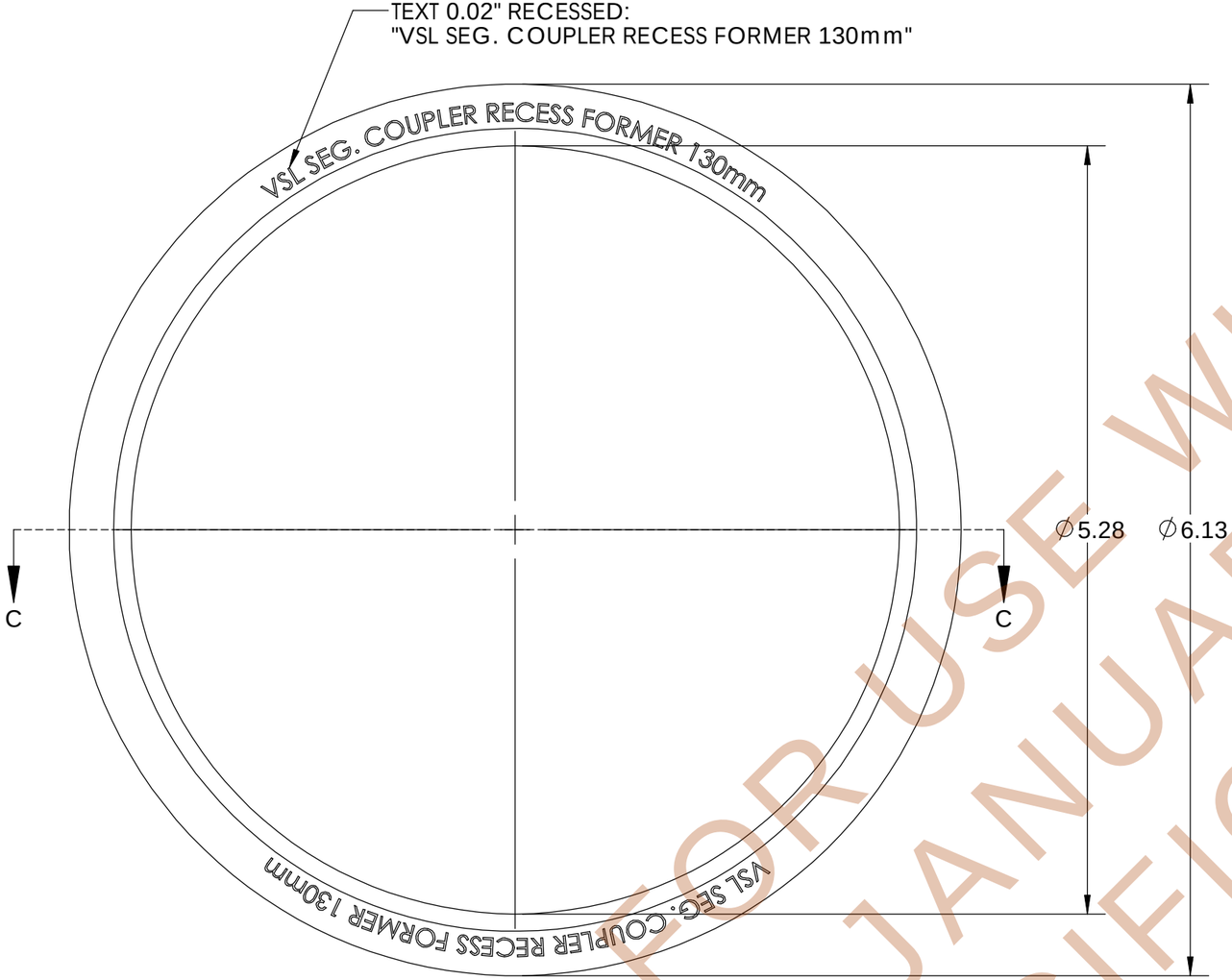
FACE SEAL

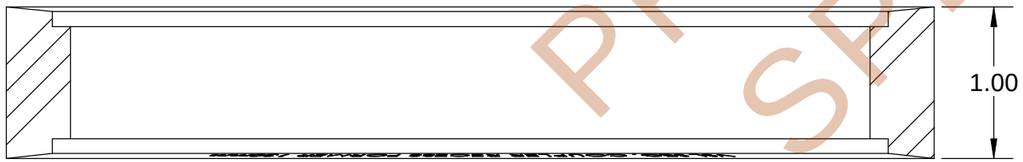
VSL P/N 02SC13003

SCALE: DO NOT SCALE

DRW NO: C658

SHEET: 1 of 1





SECTION C-C

PATENT PENDING

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	3/26/2010	FOR PRODUCTION	MM	GY
0	1/21/2010	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 130mm SEGMENTAL DUCT COUPLER SYSTEM

RECESS FORMER

VSL P/N 02SC13007

SCALE: DO NOT SCALE
DRW NO: C659
SHEET: 1 of 1

VStructural LLC (VSL) SHOP DRAWING

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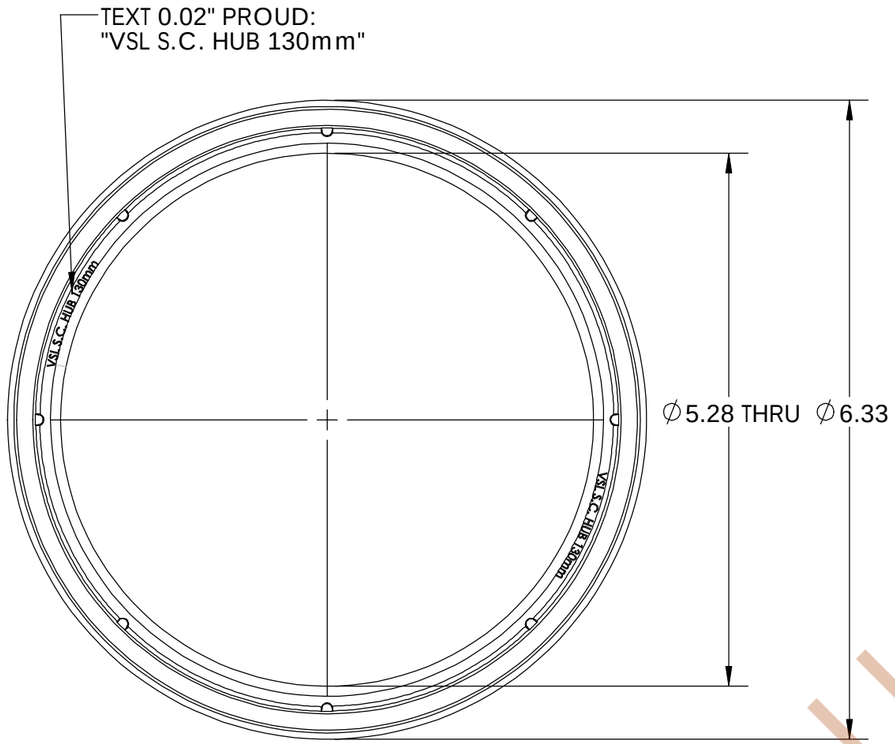


MATERIAL

PP, White in color
(per VSL MS 8.1.091209.1)

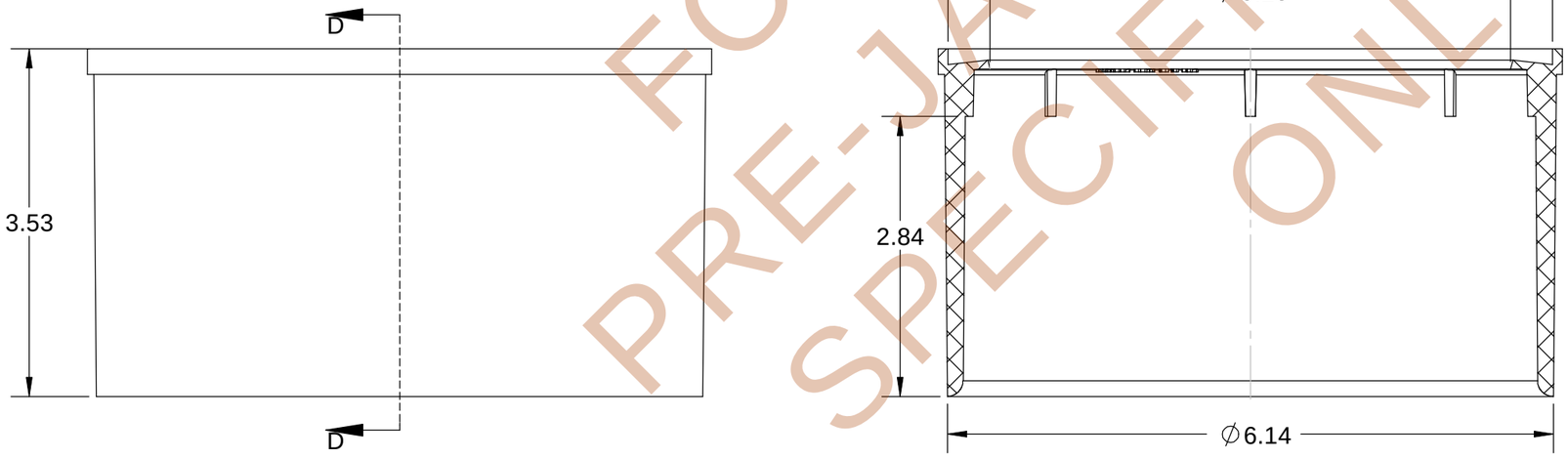
TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES

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

SURFACE QUALITY _____ √

PATENT PENDING



SECTION D-D

VStructural LLC (VSL) SHOP DRAWING

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1	3/26/2010	FOR PRODUCTION		MM	GY
0	1/21/2010	PRELIMINARY		MM	GY

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Dallas, TX office
15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
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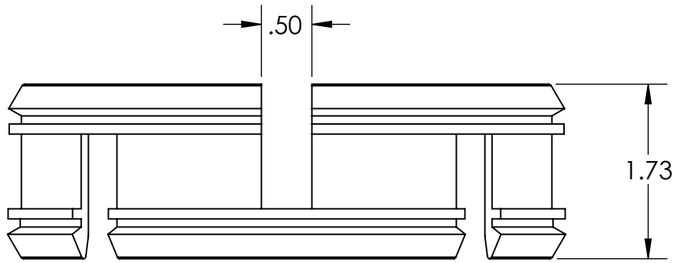
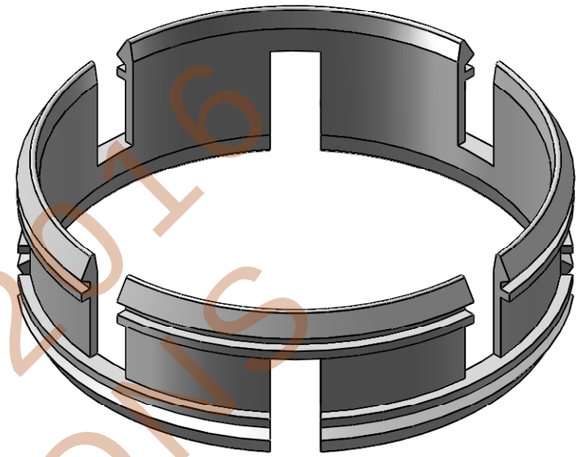
VSL 130mm SEGMENTAL DUCT COUPLER SYSTEM

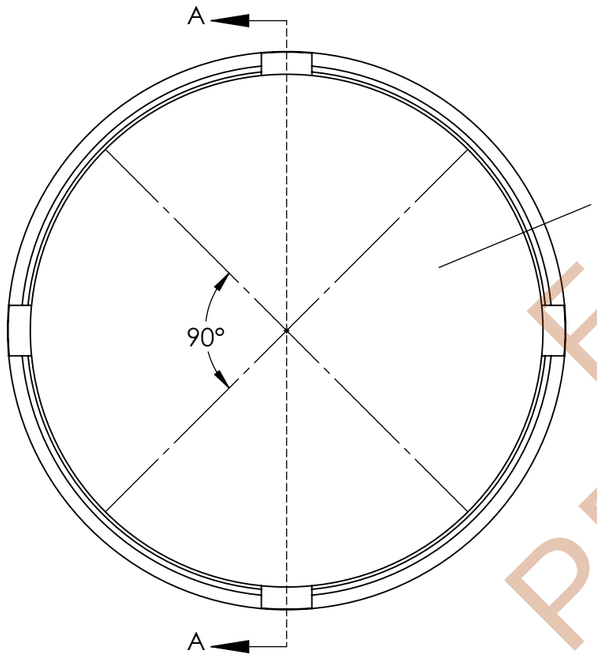
HUB

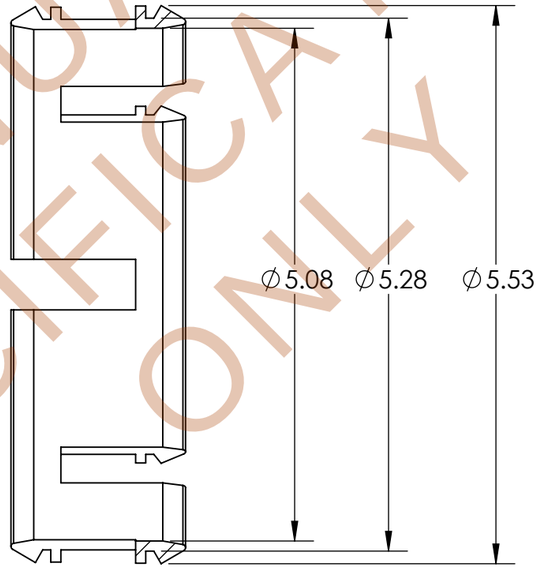
VSL P/N 02SC13001

SCALE: DO NOT SCALE
DRW NO: C656
SHEET: 1 of 1









SECTION A-A

MATERIAL / PROCESS

MATERIAL:
HDPE/UHMWPE/ABS/NYLON6
BLACK OR WHITE IN COLOR

NOTES:
1) 3D MODEL GEOMETRY SUPERCEDES 2D DRAWING DETAILS
2) NOT ALL DIMENSIONS SHOWN
3) DIMENSIONS SHOWN ARE TYPICAL
4) DO NOT SCALE DRAWINGS

VStructural LLC (VSL) SHOP DRAWING

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0	12/14/10	FOR CONSTRUCTION	MFG	MM	

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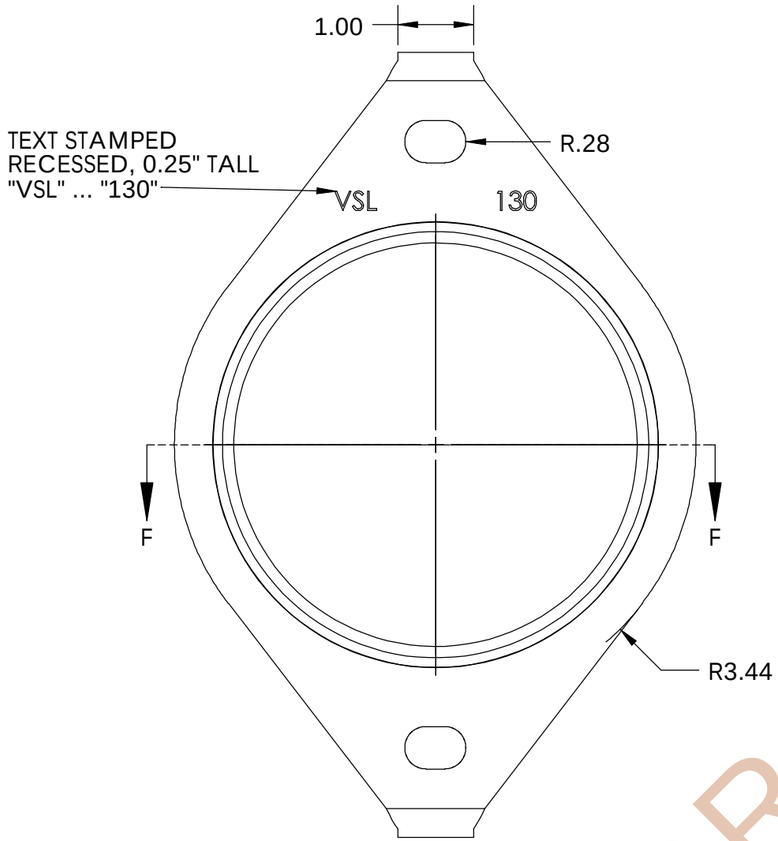
VStructural LLC
Dallas, TX office
15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
Dallas, TX / Washington, DC / Denver, CO / Pompano Beach, FL / Atlanta, GA

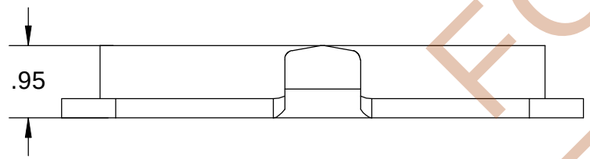
VSL SEGMENTAL COUPLER 130mm

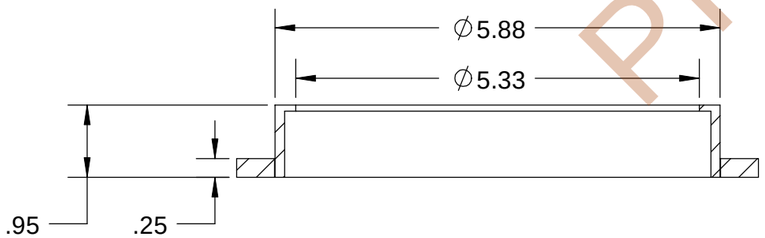
FORMING CLIP

P/N: 02SC13004 (MACHINED)

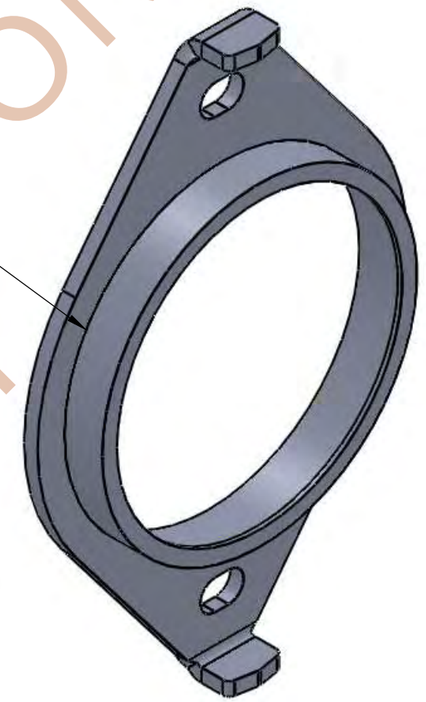
SCALE: DO NOT SCALE
DRW NO: C660
SHEET: 1 OF 1







SECTION F-F



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	1/21/2010	FOR PRODUCTION		MM	GY
0	01/06/2010	PRELIMINARY		MM	GY

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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 130mm SEGMENTAL DUCT COUPLER SYSTEM

130mm FORM TOOL

FOR 3/8" THICK FORMWORK ONLY
VSL P/N 02SC13005

SCALE: DO NOT SCALE
DRW NO: C661
SHEET: 1 of 1

VStructural LLC (VSL) SHOP DRAWING

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PATENT PENDING

MATERIAL

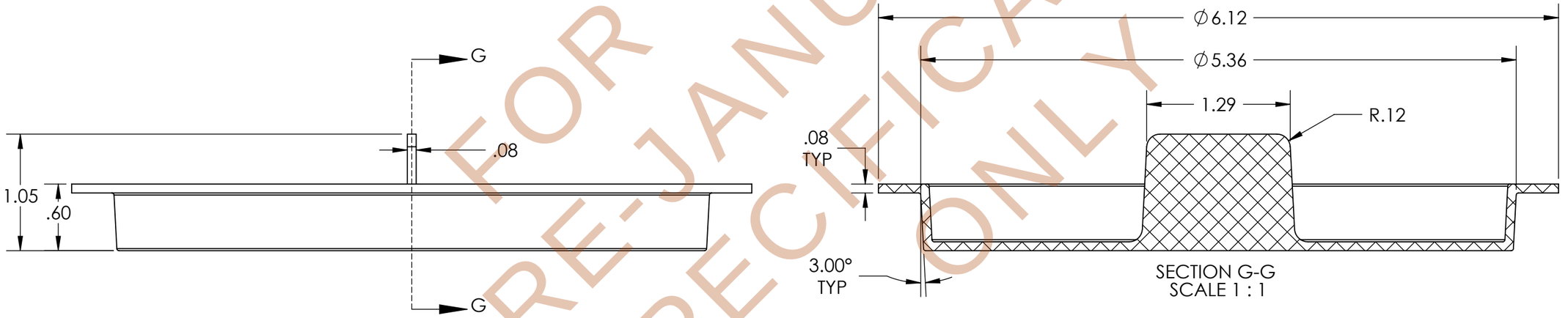
LDPE,
Black, Blue or Red in color

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

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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

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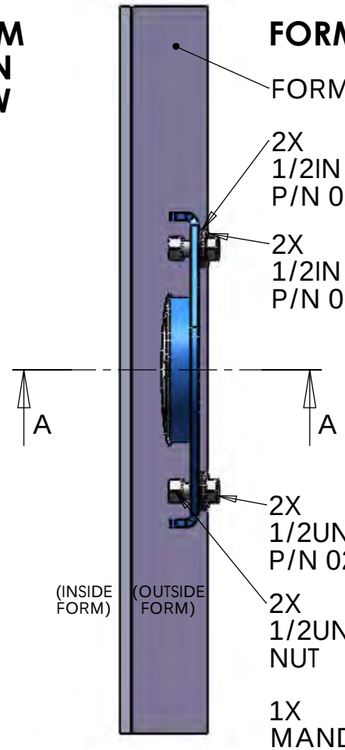
VSL 130mm SEGMENTAL DUCT COUPLER SYSTEM

130mm PROTECTIVE CAP

VSL P/N 02SC13006

SCALE: DO NOT SCALE
DRW NO: C664
SHEET: 1 of 1

FORM PLAN VIEW



FORMING MATERIALS

FORM BULKHEAD

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

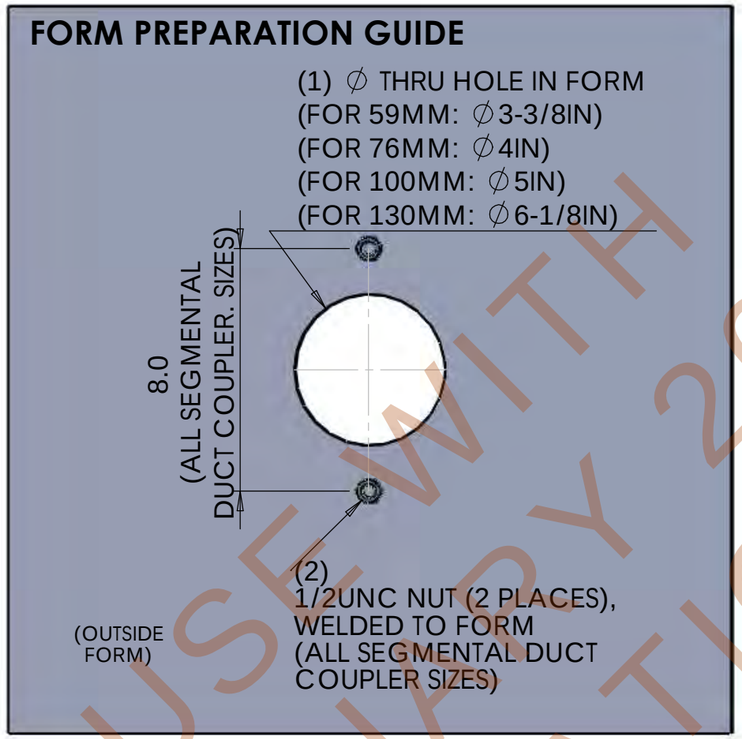
2X
1/2IN FLAT WASHER
P/N 02SC50002

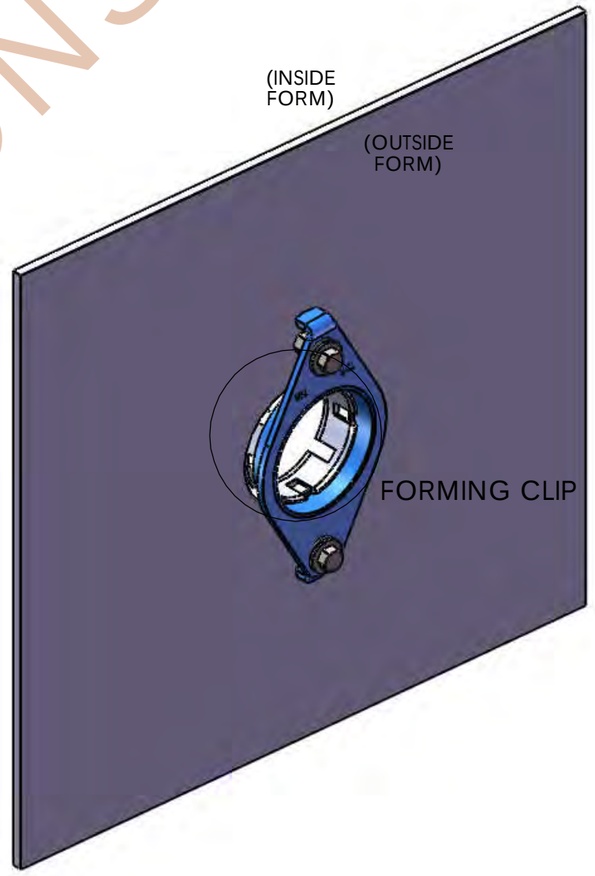
2X
1/2UNC-1.25L HEX BOLT
P/N 02SC50003

2X
1/2UNC
NUT

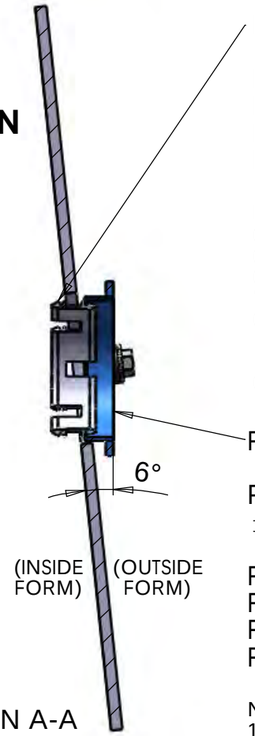
1X
MANDREL (NOT SHOWN)

FORM PREPARATION GUIDE





FORM ELEVATION VIEW



SECTION A-A

FORMING 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

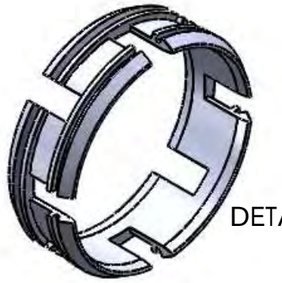
NOTES:
(1) The "open" side of the Spider Clip is manually "snapped" onto either the Hub (shown sheet 4) or the Form Tool (shown here)
(2) The "closed" side of the Spider Clip is "engaged" when the Mandrel is inserted through the Spider Clip from the "open" side (see sheet 2).
(3) The Spider Clip is used 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

Notes:
1) P/Ns SHOWN ARE FOR 3/8" THICK FORMWORK ONLY
2) Alternate Form Tools May be used by Contractor only if they permit ±6° skew angle and if they position the Recess Former half-way inside the form being cast.



DETAIL FORMING CLIP
SCALE 2 : 5

NO.	DATE	DESCRIPTION	ISSUED FOR	BY	CHK
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Dallas, TX office
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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

VStructural LLC (VSL) SHOP DRAWING

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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 Forming Clip installed in each Form Tool.

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

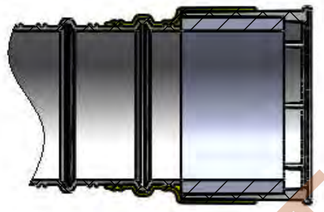
(3) (Optional) Ducts can be pre-assembled with Hub Seals and Hubs to speed the forming time. Any silicon-based or oil-based lubricant or dishwashing detergent solution acceptable to the contractor and the local DOT may be used to assist with the assembly of VSL's Segmental Duct Coupler components.

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, locking the Forming Clip and securing the Form Tool to the Hub, with a Recess Former sandwiched in-between.

(5) The wet cast is ready to pour.

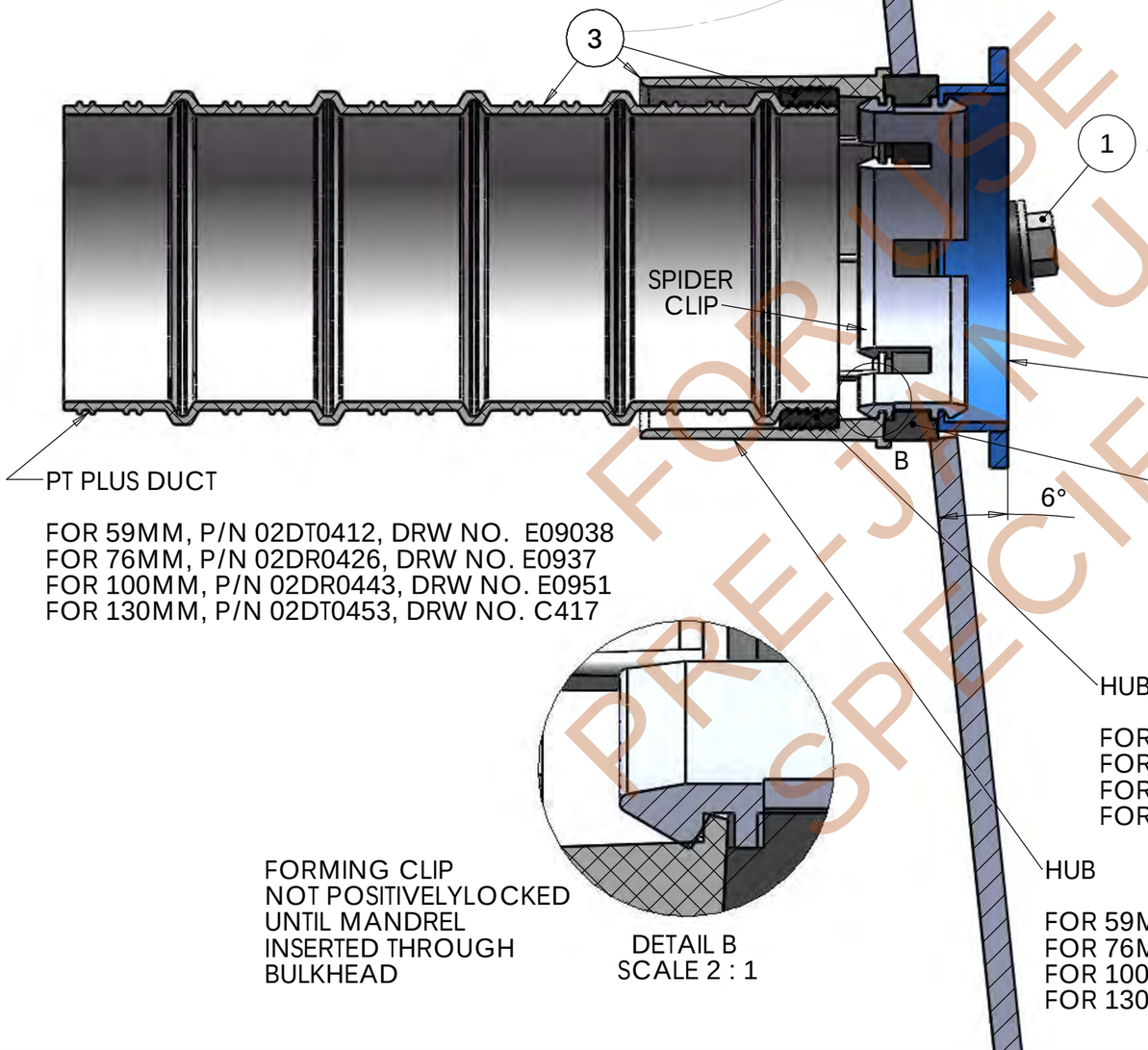
3



NOTE:
APPROVED ALTERNATE ASSEMBLY SHOWN
MAY BE USED ON ONE OR BOTH SIDES OF TENDON INTERCHANGEABLY
APPLIES ALSO TO SUBSEQUENT SHEETS OF THIS DRAWING

USE OF ALTERNATE ASSEMBLY
DOES NOT CHANGE INSTALLATION PROCEDURES

For Additional Details and BOM:
FOR 59MM, SEE DRW NO. A248
FOR 76MM, SEE DRW NO. A240
FOR 100MM, SEE DRW NO. A238
FOR 130MM, SEE DRW NO. A242



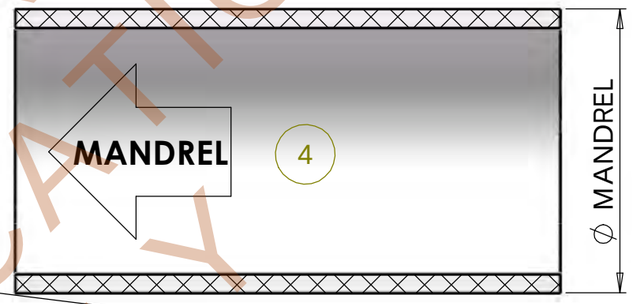
PT PLUS DUCT

FOR 59MM, P/N 02DT0412, DRW NO. E09038
FOR 76MM, P/N 02DR0426, DRW NO. E0937
FOR 100MM, P/N 02DR0443, DRW NO. E0951
FOR 130MM, P/N 02DT0453, DRW NO. C417

FORMING CLIP
NOT POSITIVELYLOCKED
UNTIL MANDREL
INSERTED THROUGH
BULKHEAD

DETAIL B
SCALE 2 : 1

MANDREL (BY OTHERS)
STEEL, PLASTIC OR INFLATABLE MANDREL RECOMMENDED
(FOR 59MM USE 2-2.25" OD MANDREL, OR INFLATABLE)
(FOR 76MM USE 2.75-2.90" OD MANDREL, OR INFLATABLE)
(FOR 100MM USE 3.75-3.90" ODMANDREL, OR INFLATABLE)
(FOR 130MM USE 5" OD MANDREL, OR INFLATABLE)



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

RECESS FORMER

2

FOR 59MM, P/N 02SC05907, DRW NO. C670
FOR 76MM, P/N 02SC07607, DRW NO. C648
FOR 100MM, P/N 02SC10007, DRW NO. C639
FOR 130MM, P/N 02SC13007, DRW NO. C659

HUB SEAL

FOR 59MM, P/N 02SC05902, DRW NO. C668
FOR 76MM, P/N 02SC07602, DRW NO. C647
FOR 100MM, P/N 02SC10002, DRW NO. C642
FOR 130MM, P/N 02SC13002, DRW NO. C657

HUB

FOR 59MM, P/N 02SC05901, DRW NO. C667
FOR 76MM, P/N 02SC07601, DRW NO. C646
FOR 100MM, P/N 02SC10001, DRW NO. C641
FOR 130MM, P/N 02SC13001, DRW NO. C656

VStructural LLC (VSL) SHOP DRAWING

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VStructural LLC
Dallas, TX office
15600 Trinity Blvd., Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
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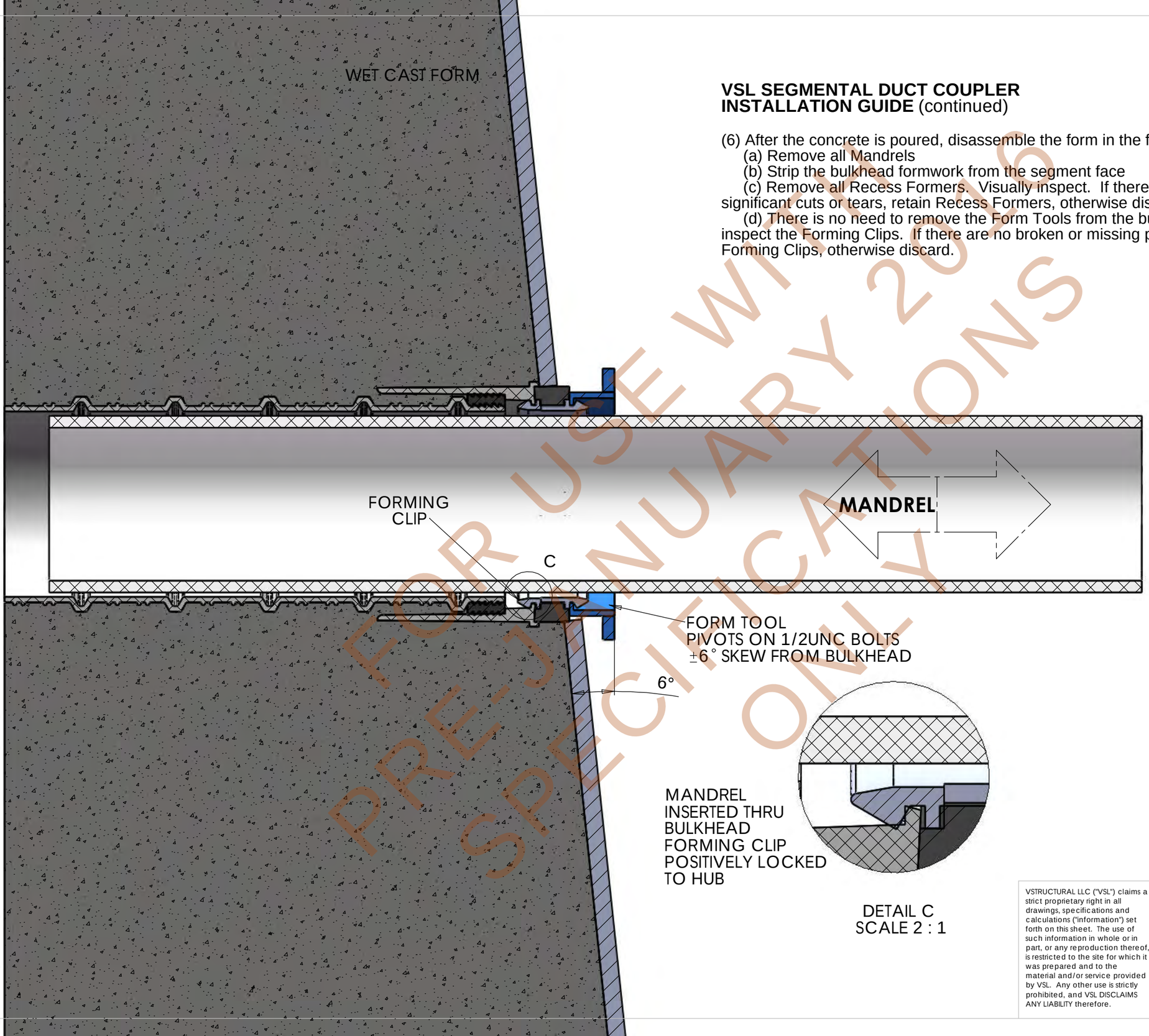
VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

SCALE: DO NOT SCALE
DRW NO: A243
SHEET: 2 of 8

VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(6) 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 Formers, otherwise discard.
(d) There is no need to remove the Form Tools from the bulkhead. Visually inspect the Forming Clips. If there are no broken or missing parts, retain Forming Clips, otherwise discard.



DETAIL C
SCALE 2 : 1

VStructural LLC (VSL) SHOP DRAWING

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0	1/26/2010	FOR CONSTRUCTION		MM	GY

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Dallas, TX office
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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

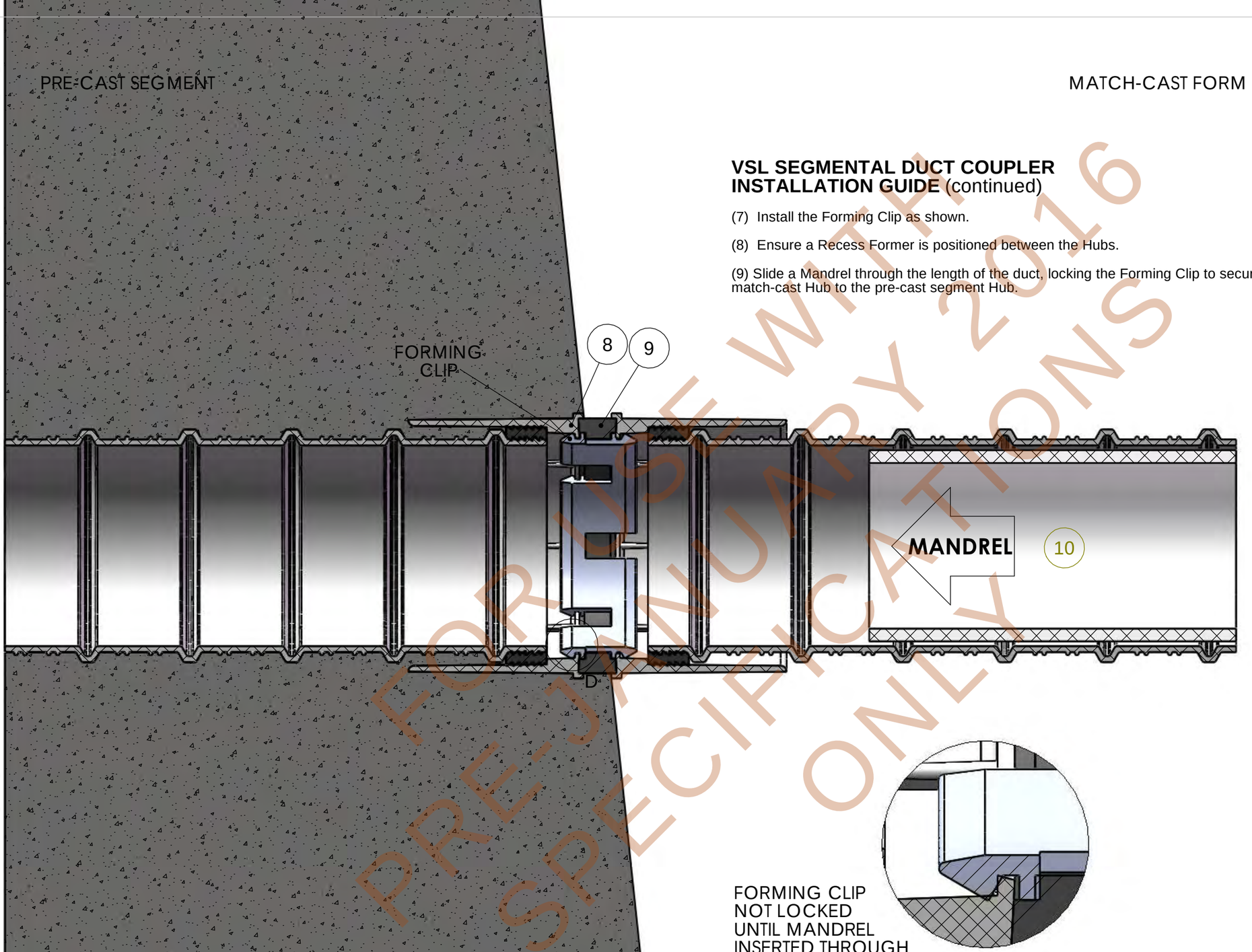
SCALE: DO NOT SCALE
DRW NO: A243
SHEET: 3 of 8

VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(7) Install the Forming Clip as shown.

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

(9) Slide a Mandrel through the length of the duct, locking the Forming Clip to secure the match-cast Hub to the pre-cast segment Hub.



FORMING CLIP NOT LOCKED UNTIL MANDREL INSERTED THROUGH BULKHEAD

DETAIL D
SCALE 2 : 1

VStructural LLC (VSL) SHOP DRAWING

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0	1/26/2010	FOR CONSTRUCTION		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

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VSL SEGMENTAL DUCT COUPLER

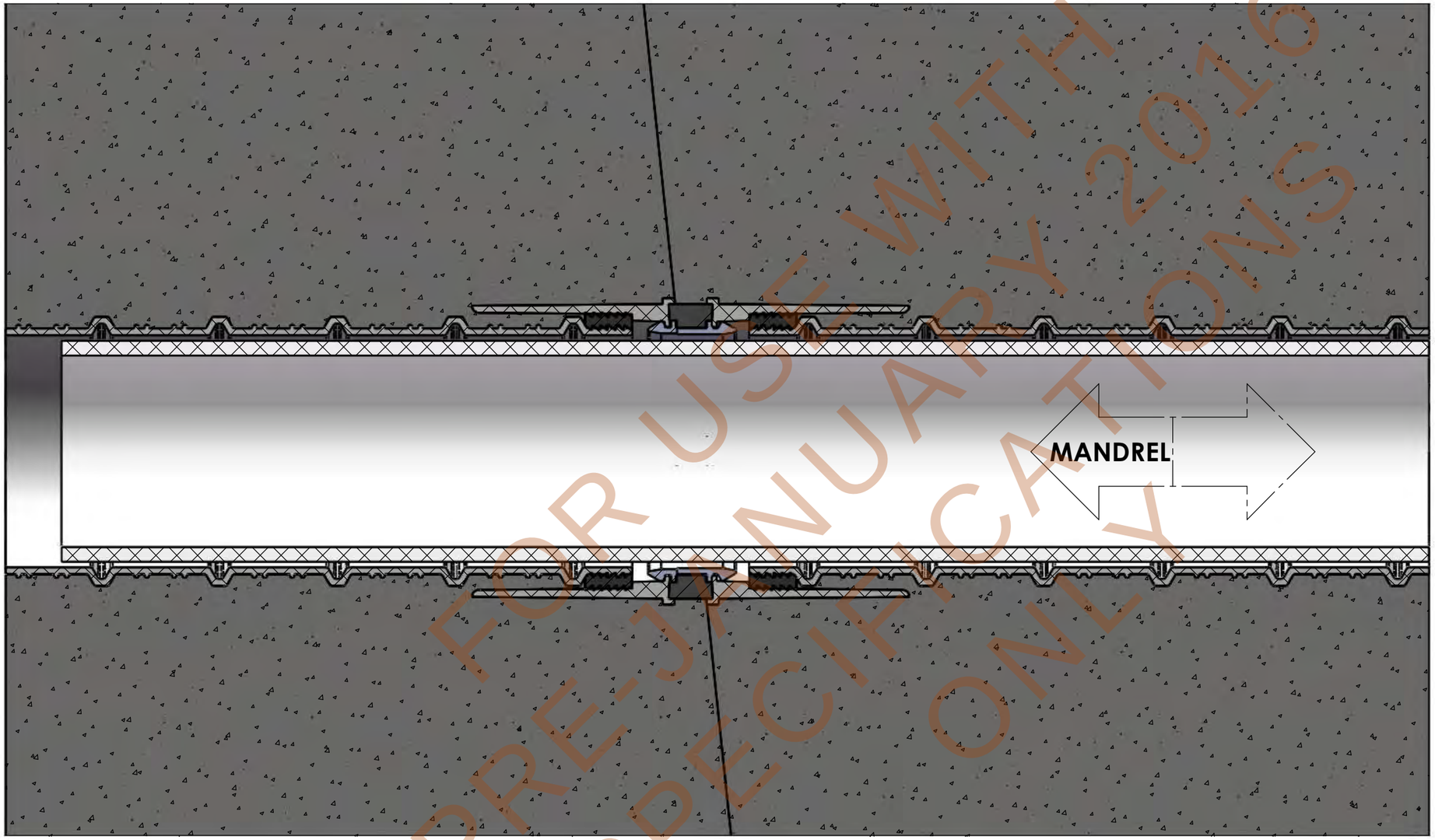
INSTALLATION GUIDE

SCALE: DO NOT SCALE

DRW NO: A243

PRE-CAST SEGMENT

MATCH-CAST SEGMENT



VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(10) Once the Mandrel is inserted, the Forming 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
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VSL

VStructural LLC
Dallas, TX office

15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155

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

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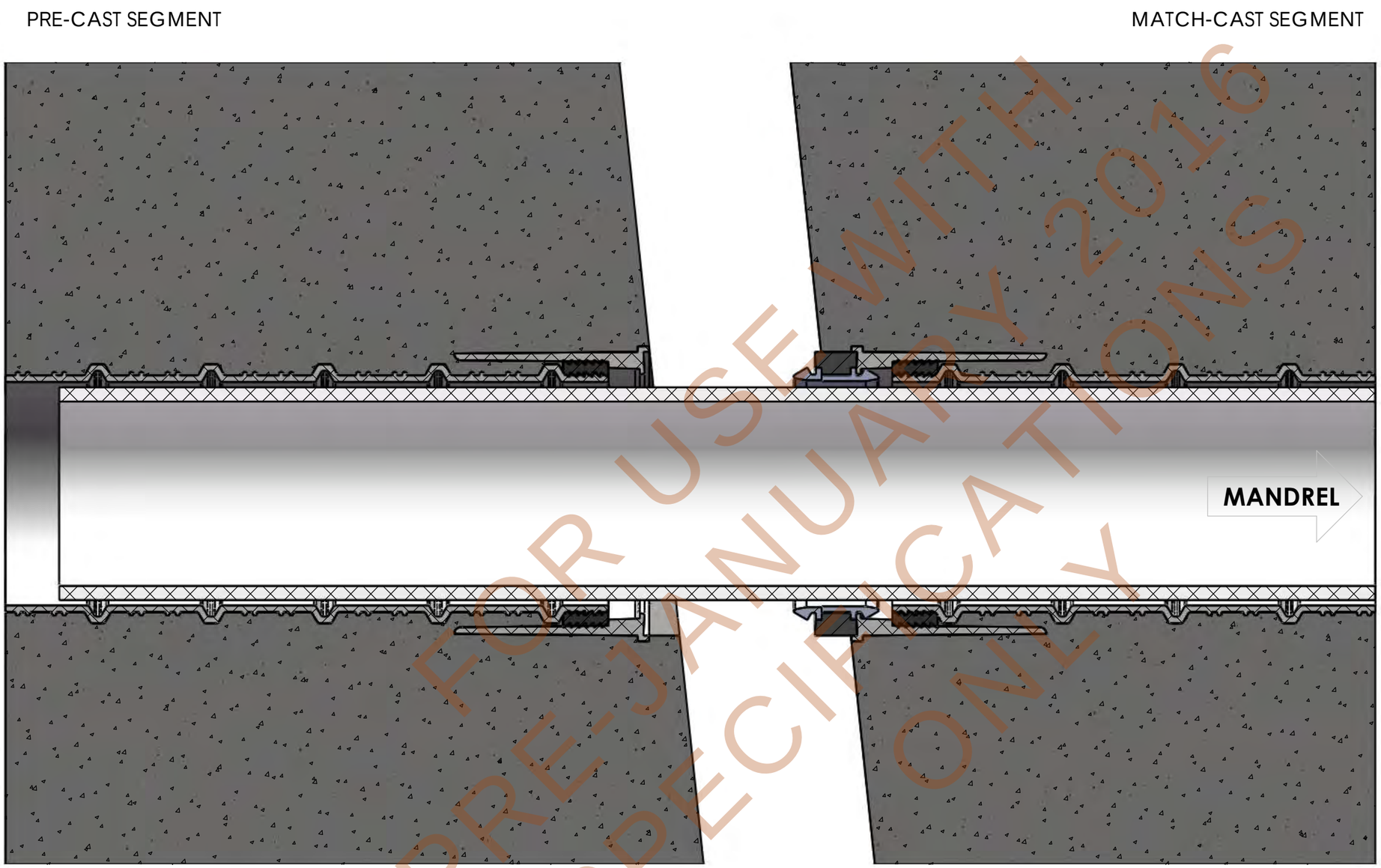
VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

SCALE: DO NOT SCALE

DRW NO: A243

SHEET: 5 of 8



VSL SEGMENTAL DUCT COUPLER INSTALLATION GUIDE (continued)

(11) 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 Forming Clips. Visually inspect. If there are no broken or missing parts, retain Forming Clip, otherwise discard.
- (d) Note: There is no need to remove the Form Tools from the bulkhead. Visually inspect the Forming Clips as noted above.

(12) Install Protective Caps (OPTIONAL) over duct openings to keep dust and debris out of tendons until segments are erected (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).

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VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

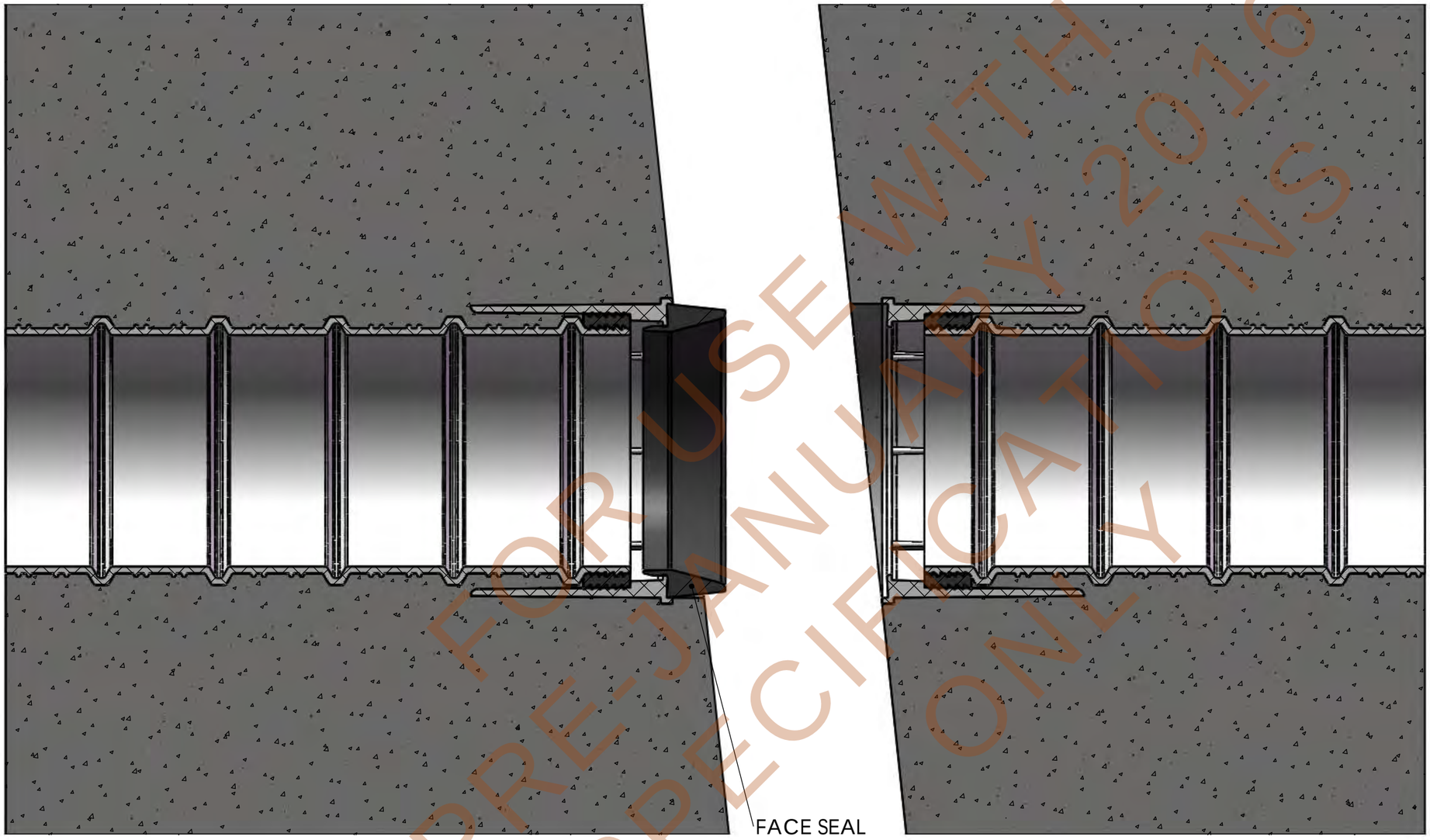
SCALE: DO NOT SCALE

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:

(13) Remove protective caps from duct openings
(14) Install Face Seals into one segment face only.
(15) Apply segmental epoxy to segment faces as required.
(Do not apply epoxy to Face Seal. Steps: 14 and 15 may be reversed at the discretion of the contractor.)
(16) Segments may be closed together.

VStructural LLC (VSL) SHOP DRAWING

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VStructural LLC
Dallas, TX office
15600 Trinity Blvd, Ste 118
Fort Worth, TX 76155
Phone: (817) 545-4807
Fax: (817) 545-4827
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VSL SEGMENTAL DUCT COUPLER

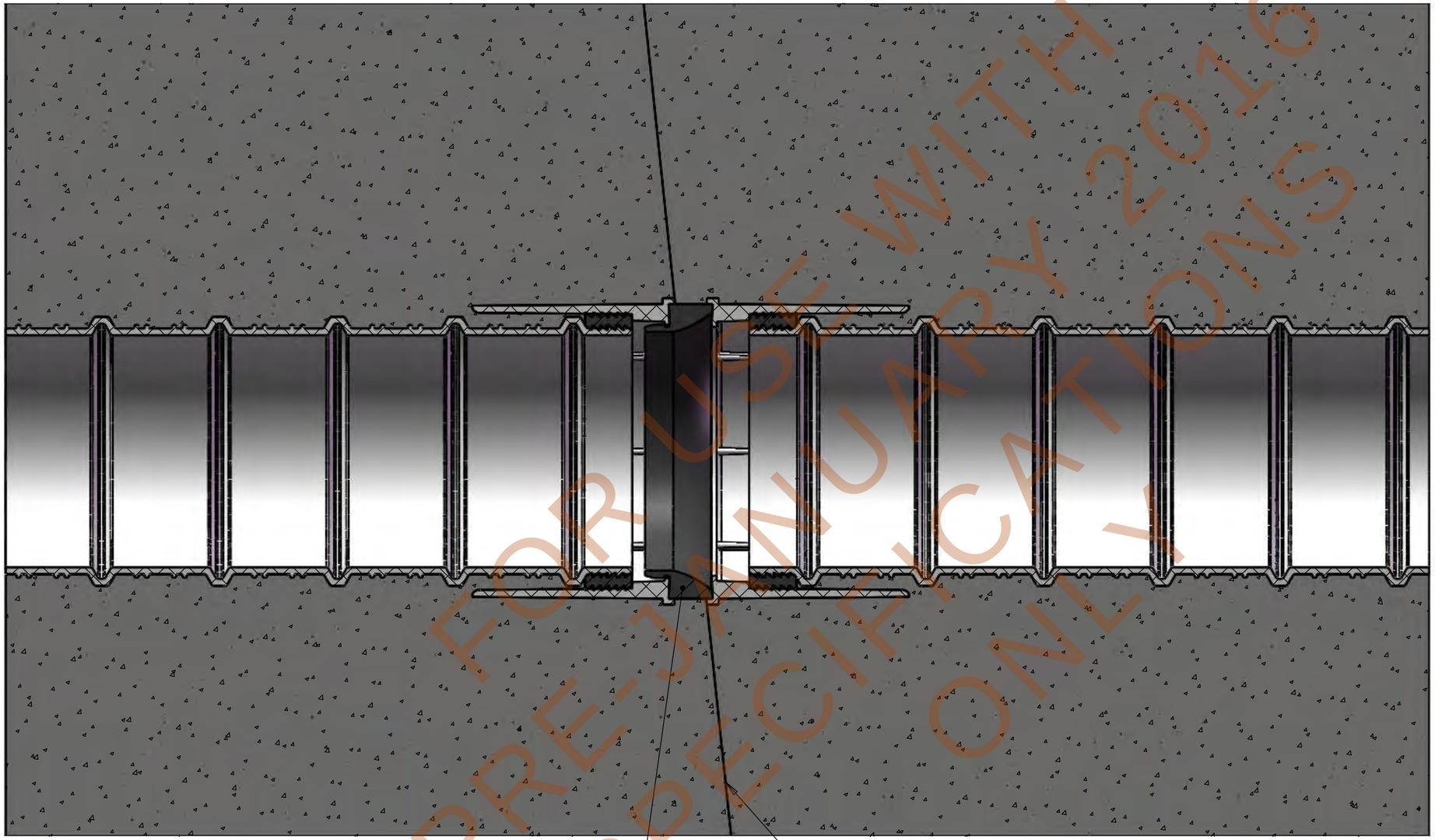
INSTALLATION GUIDE

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

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Fax: (817) 545-4827

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VSL SEGMENTAL DUCT COUPLER

INSTALLATION GUIDE

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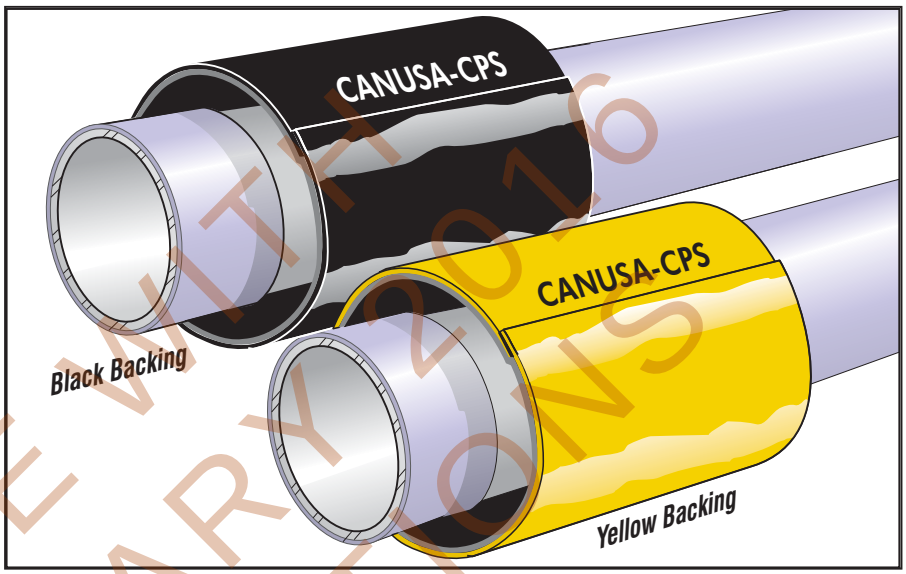
SHEET: 8 of 8

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

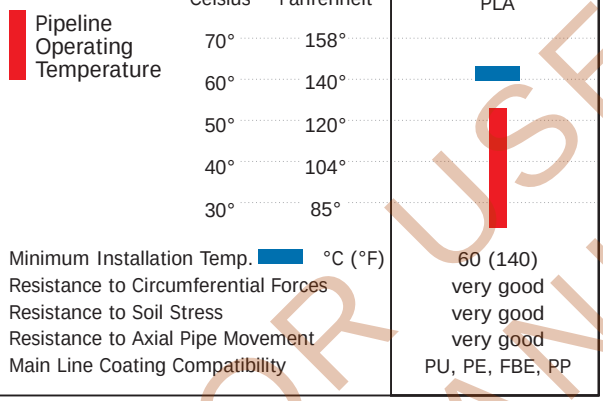
Product Selection Guide **Choose your sleeve based on your Pipe Diameter**

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

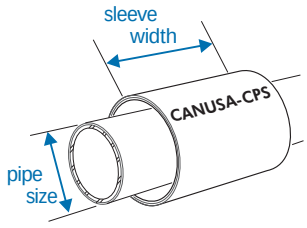
		Test Standard	Unit	PLA
Adhesive	Softening Point	ASTM E28	°C (°F)	72 (162)
	Lap Shear	DIN 30 672	N/cm² (psi)	60 (87)
Backing	Specific Gravity	ASTM D792		0.93
	Tensile Strength	ASTM D638	MPa (psi)	20 (2900)
	Elongation	ASTM D638	%	600
	Hardness	ASTM D2240	Shore D	46
	Abrasion Resistance	ASTM D1044	mg	45
	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

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