INSTALLATION PROCEDURE:

1. PREASSEMBLE THE MULTI-PLANE ANCHOR, SPIRAL AND PE VALVE. USE PRETIGHTEN 15% SILICONE BETWEEN MPI AND TRUMPET TO HAVE A STRONG CONNECTION. GENTLY THE BOLTS TO FACILITATE REMOVAL LATER.

2. BOLT THE MULTI-PLANE ANCHOR (MPI) WITH PE TRUMPET. TIGHTEN 15% OF THE VALVE BOLTS IN MPI. THE MPI SHOULD BE OBTAINED SUCH THE FLEXIBLE FILLER HOLES FACET IT. THE SPIRAL, SPIRAL IS ATTACHED TO ADJACENT REAR AND ROTATES SUCH THAT IT MIGHT INTERFERE WITH THE PIPE (USE TEFLON TAPE IF USING SIDE FLEXIBLE FILLER HOLES IN MPI). ALIGN AXIS OF SPIRAL WITH MPI. USE TEFLON TAPE ON MPI AS SHOWN. INSTALL PIPE NIPPLE WITH FOAM INSULATION FOR ANY PIPE NIPPLE CAST IN CONCRETE.

3. INSTALL THE DUCT SYSTEM AS SHOWN ON SHOP DRAWINGS. INSERT 1/2" ON 1/4" PIPE INTO TRUMPET AND HEAT SHRINK. SECURE DUCT PROFILE EVERY TWO FEET.

4. PRESSURE TEST DUCT SYSTEM PER SPECIFICATIONS. EITHER A BLOWOUT TAP OR VACUUM ASSISTED FILLER INJECTION WILL BE USED.

CONCRETING CAN PROCEED.

5. AFTER COMPLETION OF CONCRETE PLACEMENT. PROVE THAT THE DUCTS ARE CLEAN OF ANY OBSTRUCTIONS OR DAMAGE. PASS A THERMOMETER THROUGH THE DUCT TO DEMONSTRATE.

6. PROVE THAT ALL FLEXIBLE FILLER VENTS ARE FREE AND SECURED.

7. PROVE THAT ALL STRANDS AND LOOSELY SEAT IN WEDGE HOLES.

8. INSTALL WEDGE PLATE, SLIP THE WEDGES OVER THE SPIRAL AND MPA AXIS ALIGNED.

9. CHECK THE WEDGE PLATE FOR RUST, DIRT AND GRIT. CLEAN OR AS A BUNDLE INTO DUCTS. ALLOW SUFFICIENT TAIL LENGTH FOR STRESSING.

10. CHECK THE WEDGE PLATE FOR RUST, DIRT AND GRIT. INSPECT THE FILLER VENTS AND BOLT THE COVER TO THE WEDGE HOLE WITH 3/4" PIPE NIPPLE ASSEMBLY INTO THE FRONT PORT OF THE MPA. SECURE DUCTS ADJUST TO THE POCKET FORMER USING THREADED HOLES IN MPA. SECURE DUCT PROFILE EVERY TWO FEET.

11. INSTALL WEDGE PLATE, SLIP THE WEDGES OVER THE SPIRAL AND MPA. SECURE DUCT PROFILE EVERY TWO FEET.

12. AFTER THE STRESSING OPERATION IS COMPLETED AND THE ELONGATIONS FALL WITHIN ±7%, OBTAIN APPROVAL FROM THE ENGINEER TO CLEAR THE STRANDS TYPICALLY 34" AWAY FROM THE WEDGES.

13. EVALUATE STRESSING OPERATIONS IF ELONGATIONS FALL OUTSIDE THE ±7% LIMIT.

14. INSTALL WEDGE PLATE, SLIP THE WEDGES OVER THE SPIRAL AND MPA. SECURE DUCT PROFILE EVERY TWO FEET. INSTALL STRANDS AT THE MPA PULL THE WEDGES INTO DUCTS AND SECURE DUCT PROFILE EVERY TWO FEET TO THE POCKET FORMER USING THREADED HOLES IN MPA. SECURE DUCT PROFILE EVERY TWO FEET. INSTALL STRANDS AT THE MPA.

15. INSTALL WEDGE PLATE, SLIP THE WEDGES OVER THE SPIRAL AND MPA. SECURE DUCT PROFILE EVERY TWO FEET.

16. CHECK THE WEDGE PLATE FOR RUST, DIRT AND GRIT. INSPECT THE FILLER VENTS AND BOLT THE COVER TO THE WEDGE HOLE WITH 3/4" PIPE NIPPLE ASSEMBLY INTO THE FRONT PORT OF THE MPA. SECURE DUCTS ADJUST TO THE POCKET FORMER USING THREADED HOLES PROVISED IN THE MPA. SECURE DUCT PROFILE EVERY TWO FEET.

17. PRESSURE TEST DUCT SYSTEM PER SPECIFICATIONS. EITHER A BLOWOUT TAP OR VACUUM ASSISTED FILLER INJECTION WILL BE USED.

FLEXIBLE FILLER INJECTION CAN PROCEED. 

18. REMOVE FLEXIBLE FILLER PORT NIPPLES AND INSTALL PLUGS.
NOTES FOR GALVANIZED PARTS:
1. AFTER CASTING IS STRIPPED, GRIND AND TOUCH UP TOP AND BOTTOM SURFACES AS NECESSARY TO ELIMINATE ANY PARTING LINES OR UNLEVEL AREAS.
2. GALVANIZE ACCORDING TO ASTM A123 AND TAKE CARE HOW CASTINGS ARE STORED TO PREVENT RUST.
3. DRILL & TAP BOLT HOLES AND GROUT PORTS AND MACHINE GROOVE IN BOTTOM OF ANCHOR USING A WATER BASED CUTTING FLUID AND SPRAY THEM WITH ZINC RICH PAINT ACCORDING TO ASTM A780, ENSURE THREADABILITY.

SECTION A-A

SECTION X-X

VIEW Y-Y
NOTES:
1. SPIRAL IS MADE FROM STANDARD
    #5 REBAR, NO PART NUMBER
    MARKING IS SHOWN.
2. KEEP SPIRAL AND MPA AXIS
    ALIGNED, IF USING SIDE PORT,
    ROTATE SPIRAL TO CLEAR.

DIMENSIONS: INCH [mm] FOR REFERENCE ONLY

QUALITY PLAN NUMBER: QSM002140A

STANDARD SPIRAL FOR
19-0.6"/27-0.5" MPA

TOLERANCES: ±0.020 UNLESS NOTED

WEIGHT 33.5 POUNDS

REV.  DATE  NAME  ECN

MATERIAL:
ASTM A615

SCALE 1:5

PART NUMBER: 68 19 254

DRAWING NUMBER: 68 19 254

DYWIDAG-SYSTEMS INTERNATIONAL, USA, INC.
320 MARMON DRIVE - BOLINGBROOK, IL  60440
PHONE: 630-739-1100  FAX: 630-739-1405

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PARTY OTHER THAN FOR REASONS EXPRESSLY INTENDED BY DSI'S SUBMITTAL TO
THE ORIGINAL RECEIVER. THEY HAVE TO BE RETURNED UPON REQUEST.
MATERIAL SPECIFICATIONS:
1. MEETS REQUIREMENTS OF ASTM D3350 WITH A MINIMUM CELL CLASS OF 445574C.
2. CONTAINS ANTIOXIDANTS WITH A MINIMUM OXIDATIVE-INDUCTION TIME (OIT) ACCORDING TO ASTM D3398 OF 40 MINUTES.
3. REMELTED FINISHED MATERIAL HAS A MINIMUM FAILURE TIME OF 24 HOURS WHEN TESTED FOR STRESS CRACK RESISTANCE USING ASTM F2136 AT AN APPLIED STRESS OF 600 PSI.

END VIEW

SECTION A-A

DETAIL A-A
THREAD FITS INTO 19-0.6" MPA CASTING (SEE DRAWING 68 19 216)
19-0.6" CAST WEDGE PLATE

DIMENSIONS: INCH/mm

QUALITY PLAN NUMBER: QS00014200P

WEIGHT: 32.08 lbs.

MATERIAL: DUCTILE IRON 80-65-08 ASTM A536

SCALE: 2:1

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320 MARMON DRIVE - BOLINGBROOK, IL 60440
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320 MARMON DRIVE - BOLINGBROOK, IL
POST TENSIONING / REINFORCING UNIT
FAX: 630-739-1405
PHONE: 630-739-1100

19-0.6" NYLON CAP WITH O-RING FOR FLEXIBLE FILLER

NOTES:
1. USE 3/8"-16 UNC 3/4" S.S. HEX BOLTS, 3-1/2" LONG W/SMALL DIA. WASHER.
2. INSTALL O-RING IN CRONE USING DROPS OF LIQUID ADHESIVE BEFORE SHARING. DON'T USE EXCESSIVE ADHESIVE. O-RING MUST STAY IN PLACE UNTIL INSTALLATION.
3. THE NYLON CONFORMS TO ASTM D6999, WITH CELL CLASSIFICATION S-40401. (ULTIMATE STRENGTH 10,000 PSI MIN. WITH UV STABILIZER ADDED).
4. DRILL 1/2" [12.7] HOLE IN PORT BEING USED - CAUTION - RECOMMEND USING HOLE SAW BIT OR SPACE OFF (BY COVERS), BE CAREFUL TO PREVENT DAMAGE TO THREADS OR CAP.
5. WHEN PRESSURIZING GROUT CAPS, DO NOT STAND BEHIND CAPS.
MATERIAL: 4" SDR 17 HDPE PIPE.

SPECIFICATIONS:
1. PIPE SHALL BE OF HIGH-DENSITY POLYETHYLENE AND SHALL HAVE A MAXIMUM DIMENSION RATIO (DR) OF 17 AS ESTABLISHED BY EITHER ASTM D3035 OR ASTM F714, AS APPROPRIATE FOR MANUFACTURING PROCESS USED.
2. PIPE SHALL HAVE A MINIMUM PRESSURE RATING OF 125 PSI.
3. MEETS REQUIREMENTS OF ASTM D3350 WITH A MINIMUM CELL CLASS OF 445574C.
4. CONTAINS ANTIOXIDANTS WITH A MINIMUM OXIDATIVE-INDUCTION TIME (OIT) ACCORDING TO ASTM D3895 OF 40 MINUTES.
5. REMOLDED FINISHED MATERIAL HAS A MINIMUM FAILURE TIME OF THREE HOURS WHEN TESTED FOR STRESS CRACK RESISTANCE USING ASTM F2136 AT AN APPLIED STRESS OF 348 PSI.
6. MINIMUM BEND RADIUS = 30 FT.
## KLNN HEAT SHRINK SLEEVE

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**TOP VIEW**

- Cut to width in field as needed (in this direction)
- Closure tab
- Length varies to fit pipe size

**END VIEW**

- Closure tab
- 1.5" [38.1mm]

### NOTE:
Follow manufacturer's installation instructions.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>STRAND SYSTEM</th>
<th>BAR SYSTEM</th>
<th>HEAT SHRINK SLEEVE SIZE</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2&quot; IPS DR 17</td>
<td>7–0.6”</td>
<td>1&quot;, 1 1/4&quot;, 1 3/8&quot;</td>
<td>KLNN/L 63–450 BK</td>
<td>U00039063</td>
</tr>
<tr>
<td>3&quot; SDR 17</td>
<td>12–0.6”</td>
<td>1 3/4&quot;, 1 3/8&quot;</td>
<td>KLNN/L 90–450 BK</td>
<td>U00039090</td>
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<tr>
<td>4&quot; SDR 17</td>
<td>19–0.6”</td>
<td>2 1/2&quot;, 3&quot;</td>
<td>KLNN/L 115–450 BK</td>
<td>U00039115</td>
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<tr>
<td>5&quot; SDR 17</td>
<td>27–0.6&quot; &amp; 31–0.6&quot;</td>
<td></td>
<td>KLNN/L 125–450 BK</td>
<td>U00039125</td>
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</tbody>
</table>

**DIAGRAM**

- Dimension: Inch [mm]
- Quality Plan Number: 00039000
- Drawing Number: U00039000
- Rev. Date: 06-29-20
- Name: SI
- Part Numbers: U00039063, U00039090, U00039115, U00039125

**MATERIAL:**
Polyolefin meets DOT specs 980-2.2.1B for flexible filler

**SCALE:**
XX

DYWIDAG-SYSTEMS INTERNATIONAL, USA, INC.
320 MARMON DRIVE - BOLINGBROOK, IL 60440
PHONE: 630-739-1100 FAX: 630-739-1405
0.6" BARE 270 KSI STRAND

NOTES:
1. NO PART NUMBER OR IDENTIFICATION MARKS ON STRAND.
2. RUST PRODUCING VISIBLE FITTING TO THE UN-AIDED EYE IS NOT ALLOWED.

MATERIAL:
0.6" 270 KSI LOW RELAX STRAND
ASTM A16

 PHONE: 630-739-1100
 FAX: 630-739-1405
NOTES:
1. SHARP EDGES MUST BE BROKEN.
2. VIBRATE TO SURFACE FINISH OF 63 µIN. MAX.
3. DIP IN SQ70 OIL OR EQUIV. FOR CORROSION PROTECTION.
4. MAKE SURE THAT THE BUTTRESS THREAD IS ORIENTED IN THE DIRECTION SHOWN ON THIS DRAWING.
5. NO STAMPED PART NUMBER

MATERIAL: 12L14 ALL HARDENED

DIMENSIONS: INCH/mm
mm FOR REFERENCE ONLY

QUALITY PLAN NUMBER: Q8000005000

TOLERANCES: ±0.010 in.
UNLESS NOTED

WEIGHT 0.19 lbs.

REV. DATE NAME

MATERIAL: SEE ABOVE

SCALE 2:1

3-PART WEDGE FOR 0.6" STRAND

DRAWING NUMBER: 68 00 0536
### WASHER FOR NYLON CAPS

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Part No.</th>
<th>Description (All Parts 316L Stainless Steel Unless Noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>00 00 771</td>
<td>3/8&quot;-16UNC HEX BOLT, 2-3/4&quot; LONG (1&quot; LONG THREAD)</td>
</tr>
<tr>
<td>2</td>
<td>00 00 772</td>
<td>3/8&quot;-16UNC HEX BOLT, 3-1/2&quot; LONG (1&quot; LONG THREAD)</td>
</tr>
<tr>
<td>3</td>
<td>00 00 774</td>
<td>TYPE A NARROW WASHER FOR 3/8&quot;-UNC BOLT</td>
</tr>
<tr>
<td>4</td>
<td>00 00 776</td>
<td>3/8&quot;-16UNC COUPLER, ZINC COATED</td>
</tr>
<tr>
<td>5</td>
<td>00 00 777</td>
<td>3/8&quot;-16UNC HEX NUT</td>
</tr>
<tr>
<td>6</td>
<td>00 00 778</td>
<td>5/16&quot;-18UNC HEX BOLT, 7/8&quot; LONG, ZINC PLATED</td>
</tr>
<tr>
<td>7</td>
<td>00 00 783</td>
<td>3/8&quot;-16UNC HEX BOLT, 3-1/4&quot; LONG (1&quot; LONG THREAD)</td>
</tr>
<tr>
<td>8</td>
<td>00 00 784</td>
<td>3/8&quot;-16UNC HEX BOLT, 4-1/4&quot; LONG (FULL THREAD)</td>
</tr>
<tr>
<td>9</td>
<td>00 00 789</td>
<td>3/8&quot;-16UNC CARRIAGE BOLT, 4-1/2&quot; LONG</td>
</tr>
<tr>
<td>10</td>
<td>00 00 790</td>
<td>3/8&quot;-16UNC CARRIAGE BOLT, 5-1/2&quot; LONG</td>
</tr>
</tbody>
</table>

**Note:**

- The 316L S.S. bolts are special order.
- All washers, hex nuts & couplers have no markings.
3/4" NPT PIPE NIPPLES

LENGTH VARIES

3/4" NPT THREAD
TYP.

PRESSURE RATED: 150 PSI

DIMENSIONS: INCH [mm]
mm FOR REFERENCE ONLY

QUALITY PLAN NUMBER:
Q000000020P

MATERIAL:
SCH 40
BLACK WELDED STEEL

SCALE
1:1

DYWIDAG-SYSTEMS INTERNATIONAL, USA, INC.
320 MARMON DRIVE - BOLINGBROOK, IL 60440
PHONE: 630-739-1100 FAX: 630-739-1405
3/4" NPT, 14 THREADS PER INCH, 0.55" THREAD ENGAGEMENT

PRESSURE RATED: 150 PSI

MATERIAL: BRASS
SCALE: 3/4" = 1"
WEIGHT: 0.77 LBS.

2.500 [63.5]
3.474 [88.2]
4.723 [120.0]
PRESSURE RATED: 150 PSI

3/4" NPT NYLON PLUG

MATERIAL:
NYLON 6
COLOR: WHITE

DIMENSIONS: INCH (mm)
1.125 [28.6] HEX
.875 [22.2]
.625 [5.1]

DYWIDAG-SYSTEMS INTERNATIONAL, USA, INC.
320 MARMON DRIVE - BOLINGBROOK, IL 60440
PHONE: 630-739-1100 FAX: 630-739-1405
1/2" NPT PIPE NIPPLES

LENGTH VARIES

1/2" NPT THREAD TYP.

0.840 (21.3) (NOMINAL)

PRESSURE RATED: 150 PSI
1/2" NPT, 14 THREADS PER INCH,
0.53" THREAD ENGAGEMENT

PRESSURE RATED: 150 PSI
1/2" NPT NYLON PLUG

PRESSURE RATED: 150 PSI
3/4" NPT PIPE NIPPLES

LENGTH VARIES

3/4" NPT THREAD TYP.

Pressure rated: 150 PSI
3/4" NPT THREAD TYP.

PRESSURE RATED: 150 PSI
3/4" NPT 90° ELBOW, FEMALE-FEMALE

PRESSURE RATED: 150 PSI

DIMENSIONS: INCH [mm]

MATERIAL: SCH 40 BLACK STEEL

SCALE: 1:1

3/4" NPT THREAD TYP.
INSTALLATION PROCEDURE:
(SEE MANUFACTURER INSTRUCTION MANUAL FOR DETAILED INSTRUCTIONS)

1. CUT PIPE ENDS PRECISELY AT RIGHT ANGLES TO THE PIPE AXIS.
2. CLEAN BOTH PIPE ENDS CAREFULLY.
3. SCRAP BOTH PIPES ENDS AS REQUIRED TO REMOVE THE OXIDE LAYER COMPLETELY.
4. CLEAN BOTH PIPE ENDS WITH CONCENTRATED ISOPROPYL ALCOHOL.
5. USE REROUNDING TOOLS TO CORRECT OVAL PIPE IF NEEDED.
6. USE ALIGNMENT CLAMPS TO SECURE THE ALIGNMENT OF CONNECTED PIPES.
7. PROVIDE SUPPORT TO THE PIPE AND COUPLER TO PREVENT ANY MOVEMENT.
8. ENSURE THERE IS NO EXISTING GAPS BETWEEN COUPLE AND PIPE FACE.
9. ATTACH LEADS OF THE FUSION PROCESSOR TO THE COUPLER.
10. SCAN THE BARCODE ON THE COUPLER AND CONFIRM THE COUPLER'S SIZE ON THE PROCESSOR SCREEN.
11. INITIATE FUSION PROCESS.
12. UNPLUG THE LEADS AS SOON AS THE FUSION PROCESS ENDS.
13. CHECK COOLING TIME OF THE PROVIDED COUPLER BASED ON COUPLER'S SIZE.
14. DO NOT ALLOW MOVEMENT OR APPLIED PRESSURE ON THE JOINTS BEFORE COOLING TIME ENDS.
WELDING OPERATIONS:
DRILL A HOLE USING SPECIFIED CONE DRILL TOOL WHEREVER NEEDED IN HDPE PIPE. HEAT UP HDPE GROUT PORT AND THE HOLE IN DUCT FOR ABOUT 10 SECONDS USING PES-TEC WELDING EQUIPMENT. RELEASE THE GROUT PORT AND PRESS INTO THE HOLE IN DUCT BY HAND FOR 15 SECONDS.

MATERIAL: POLYETHYLENE
COLOR: BLACK (UV PROTECTED)
USAGE: FOR SMOOTH HDPE PIPE
PRESSURE RATED: 150 PSI