### PART NO. DESCRIPTION MATERIAL SPECIFICATION

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>MATERIAL SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 31 248</td>
<td>MULTI-PLANE ANCHOR CASTING GALVANIZED</td>
<td>DUCTILE IRON ASTM A474, GR 65-45-17, EN-GJL-004-17, MIN. COVER 21.25&quot;</td>
</tr>
<tr>
<td>68 31 254</td>
<td>STANDARD SPIRAL</td>
<td>DUCTILE IRON ASTM A474, GR 65-45-17, EN-GJL-004-17, MIN. COVER 21.25&quot;</td>
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<tr>
<td>68 31 172</td>
<td>CAP WEDGE PLATE</td>
<td>HDPE (68 31 233)</td>
</tr>
<tr>
<td>68 31 723</td>
<td>ANYLON CAP WITH O-RING FOR FLEXIBLE FILLER</td>
<td>8&quot; [200mm]</td>
</tr>
<tr>
<td>68 31 608</td>
<td>CONE DRILL TOOL</td>
<td>CONE DRILL TOOL</td>
</tr>
<tr>
<td>68 31 607</td>
<td>BRAZED SPIRAL AND MPA</td>
<td>HDPE SPIRAL, 68 31 608,0.0575&quot; WALL, 0.51&quot; [13mm] DIAMETER</td>
</tr>
<tr>
<td>68 31 606</td>
<td>HEX NUT</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
</tr>
<tr>
<td>68 31 605</td>
<td>METRIC PLUG</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
</tr>
<tr>
<td>68 31 604</td>
<td>M/C WEDGE</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
</tr>
<tr>
<td>68 31 550</td>
<td>CONTINUOUS SPIRAL</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
</tr>
<tr>
<td>68 31 549</td>
<td>MICROCRYSTALLINE WAX</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
</tr>
<tr>
<td>68 31 548</td>
<td>CAST WEDGE PLATE</td>
<td>HDPE (68 31 233)</td>
</tr>
<tr>
<td>68 31 547</td>
<td>M/C WEDGE</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
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<tr>
<td>68 31 546</td>
<td>CONTINUOUS SPIRAL</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
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<tr>
<td>68 31 545</td>
<td>MICROCRYSTALLINE WAX</td>
<td>3/8&quot;-16 UNC 316L S.S. HEX</td>
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</tbody>
</table>

### INSTALLATION PROCEDURE:

1. PREassemble the multi-plane anchor, hose pipe and spiral. Move the spiral over the hose pipe, attach transition pieces, and install anchors in a manner that ensures the spiral is aligned with the hose pipe. Ensure that all parts are properly secured, and that the spiral is not obstructed by other objects.

2. BOLT the multi-plane anchor (MPA) to the hole in the concrete. The MPA shall be oriented such that the flexible filler hole points up.

3. INSTALL the duct system as shown on the drawings. Secure the duct profile every two feet.

4. PRESSURE test the duct system for leaks. See Testing Procedures for additional information.

5. AFTER completion of concrete placement, prove that the ducts and concrete are free of obstructions and damages. Pass a toroidal through the duct to demonstrate.

6. PROVE that all flexible filler vents are free and secure.

7. AFTER the concrete has hardened, the stressing operation may begin.

8. INSTALL strands by pulling or pulling individually or a bundle into ducts. Allow sufficient tail length for stressing.

9. CHECK the wedge plate for rust, dirt, and grime. Clean the wedge plate if necessary. Lightly grease or oil wedge holes.

10. 1/2" NPT pipe nipples, 3/4" NPT pipe nipples, and discard rusty wedges. Use only clean wedges.

11. INSTALL wedge plate with screws and/or use the wedges over the struts and loosely seat in wedge holes.

### CONCRETING CAN PROCEED:

12. AFTER the stressing operation is completed and the elongations fall within 95% and 105% of the allowable elongation, the engineer must cut the strand tails approximately 2 1/2" (65mm) into the concrete.

13. EVALUATE STRESSING OPERATION if elongations fall outside this range. The engineer shall cut the strand tails accordingly.

14. CONNECT the multi-plane anchor pipe into the assembly.

15. THREAD 1/2" NPT pipe nipples into the threaded ports provided in the duct cap. This port can be used as an injection vent only if a plug is securely seated in the duct cap.


### FLEXIBLE FILLER OPERATION CAN PROCEED:

17. AFTER the required number of wedges has been installed, the flexible filler can be used.
DUCTILE IRON
WITH TWO GROUT PORTS
65-45-12

3/8"-16UNC
6x67 PLACES

NOTES FOR GALLANIZED PARTS:
1. GALVANIZE ACCORDING TO ASTM A123 AND TAKE CARE HOW CASTINGS ARE STORED TO PREVENT RUST.
2. DRILL & TAP BOLT HOLES AND GROUT PORTS AND SPRAY THEM WITH ZINC RICH PRIMER ACCORDING TO ASTM A356.
ENSURE THREADABILITY.

31-0.6" MULTI-PLANE ANCHOR
WITH TWO GROUT PORTS-GALV.

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320 MARMON DRIVE - BOLINGBROOK, IL 60440
PHONE: 630-739-1100 FAX: 630-739-1405
NOTES:
1. SPIRAL IS MADE FROM STANDARD 
   #6 REBAR, NO PART NUMBER 
   MARKING IS SHOWN.
2. KEEP SPIRAL AND MPA AXIS 
   ALIGNED, IF USING SIDE PORT, 
   ROTATE SPIRAL TO CLEAR.

NUMBER OF FULL TURNS: 9
DEVELOPED LENGTH: 43'-0-1/2"
WEIGHT: ~64.5 LBS.
MATERIAL:
24 GAUGE GALVANIZED SHEET METAL
PER ASTM A653
WALL THICKNESS = 0.0276"

TRANSITION PIECE FOR 31-0.6"
FLEXIBLE FILLER TENDON USING HDPE PIPE

DIMENSIONS: INCH (mm)

MATERIAL: SEE ABOVE
SCALE: 1:2

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320 MARMON DRIVE - BOLINGBROOK, IL FAX: 830-739-1405

DRAWING NUMBER: 68 31 501
PART NUMBER: 68 31 501

DATE: 10/15/18  DWG#: 1 TRA  CHECK: SI  APPR: SI

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MATERIAL: 5" 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

<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&quot;</td>
<td>1&quot; 1 1/4&quot;, 1 3/8&quot;</td>
<td>KLNN/L 63-450 BK</td>
<td>U00039063</td>
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<tr>
<td>3&quot; SDR 17</td>
<td>12-0.6&quot;</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&quot;</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>

NOTE:
FOLLOW MANUFACTURER’S INSTALLATION INSTRUCTIONS.

DIMENSIONS: INCH (mm)
mm FOR REFERENCE ONLY

QUALITY PLAN NUMBER:

REV. DATE NAME
1 06-29-20 SI

PART NUMBERS:
U00039063
U00039090
U00039115
U00039125

DRAWING NUMBER:
U00039000

KLNN HEAT SHRINK SLEEVE

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 Pitting TO THE UN-AIDED EYE IS NOT ALLOWED.

MATERIAL:
0.6" 270 KSI LOW RELAX STRAND
ASTM A416
NOTES:
1. SHARP EDGES MUST BE BROKEN.
2. VIBRATE TO SURFACE FINISH OF 63 µm, 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
<table>
<thead>
<tr>
<th>POS.</th>
<th>PART NUMBER</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;-16 UNC 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;-16 UNC 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;-16 UNC COUPLER, ZINC COATED</td>
</tr>
<tr>
<td>5</td>
<td>00 00 777</td>
<td>3/8&quot;-16 UNC HEX NUT</td>
</tr>
<tr>
<td>6</td>
<td>00 00 778</td>
<td>5/16&quot;-18 UNC HEX BOLT, 7/8&quot; LONG, ZINC PLATED</td>
</tr>
<tr>
<td>7</td>
<td>00 00 783</td>
<td>3/8&quot;-16 UNC 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;-16 UNC BOLT, 4-1/4&quot; LONG (FULL THREAD)</td>
</tr>
<tr>
<td>9</td>
<td>00 00 789</td>
<td>3/8&quot;-16 UNC CARRIAGE BOLT, 4-1/2&quot; LONG</td>
</tr>
<tr>
<td>10</td>
<td>00 00 790</td>
<td>3/8&quot;-16 UNC 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

Pressure Rated: 150 PSI

Dimensions: Inch [mm]

Material: SCH 40 Black Welded Steel

Scale: 1:1

Rev. Date Name EDN

Part Number: 00 00 878

Drawing Number: 00 00 878

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3/4" NPT, 14 THREADS PER INCH, 0.55" THREAD ENGAGEMENT

PRESSURE RATED: 150 PSI

DIMENSIONS: INCH (mm) FOR REFERENCE ONLY

MATERIAL: BRASS

SCALE: 3/4" = 1"

WEIGHT: 0.77 LBS.

DTWE: I. TIRA
PA: SE

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3/4" NPT NYLON PLUG

PRESSURE RATED: 150 PSI

DIMENSIONS: INCH (mm) FOR REFERENCE ONLY

QUALITY PLAN NUMBER:

WEIGHT: .009 LBS.

REV. DATE NAME

PART NUMBER: 00 00 849

MATERIAL: NYLON 6 COLOR: WHITE

SCALE 1:1

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PARTY OTHER THAN FOR REASONS EXPRESSLY INTENDED BY DSI'S SUBMITAL TO
THE ORIGINAL RECEIVER. THEY HAVE TO BE RETURNED UPON REQUEST.
1/2" NPT PIPE NIPPLES

LENGTH VARIES

1/2" NPT THREAD TYP.

DIAMETER: 0.840 (NOMINAL)

PRESSURE RATED: 150 PSI

DIMENSIONS: INCH [mm]

QUALITY PLAN NUMBER: Q000000020P

REV. DATE NAME

PART NUMBER: 00 00 678

MATERIAL: SCH 40 BLACK WELDED STEEL

SCALE 1:1

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1/2" NPT, 14 THREADS PER INCH, 0.53" THREAD ENGAGEMENT

PRESSURE RATED: 150 PSI

MATERIAL: BRASS

SCALE: 3/4" = 1"

DIMENSIONS: INCH (mm)

0.590 [15.0] Min. ID

0.984 [25.0] Hex

2.313 [58.7] 

2.781 [70.6] 

3.937 [100.0]
1/2" NPT NYLON PLUG

DIMENSIONS: INCH [mm], mm FOR REFERENCE ONLY

QUALITY PLAN NUMBER:

WEIGHT: .006
REV: DATE NAME: EORN: PART NUMBER:

REV: DATE NAME: EORN: PART NUMBER:

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PHONE: 630-739-1100 FAX: 630-739-1405

PRESSURE RATED: 150 PSI
PRESSURE RATED: 150 PSI
### 3/4" NPT Female Coupler

**Pressure Rated:** 150 PSI

**Dimensions:**

- **1.500 [38.1]**
- **Ø1.460 [37.1]**

**Material:** SCH 40 Black

**Scale:** 1:1

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**DYWIDAG-SYSTEMS INTERNATIONAL, USA, INC.**

320 MARMON DRIVE - BOLINGBROOK, IL 60440

PHONE: 630-739-1100 FAX: 630-739-1405
3/4" NPT 90° Elbow, Female-Female

Pressure rated: 150 PSI
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