



Technical Supplement

Two 1 1/2" Skookum, 2" Sch160 Bushing, 15t Swivel Assembly E | HDPE Pipe Handling FCX-HS12 | Release Date 1/18/2019

Attach all supporting documentation including but not limited to drawings, PE stamps, calculations, etc. For fabricated rigging a detailed drawing and PE stamp must be provided.

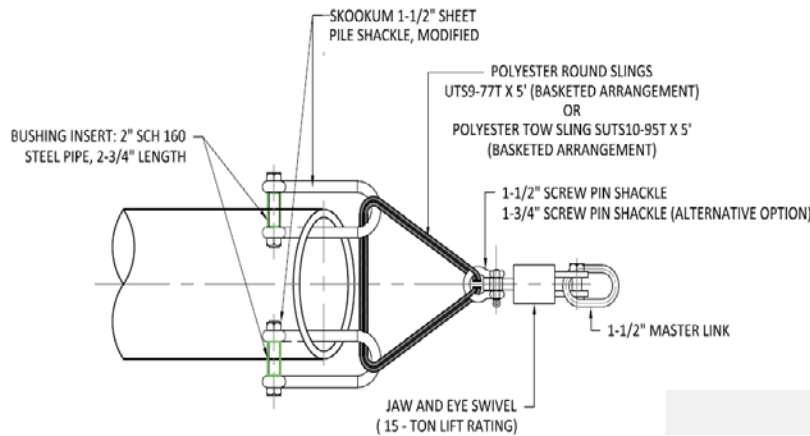
| | | | | | |
|-------------------------|---|-------|--------------|---------------------|--------------|
| Date: | 4/25/2016 | Site: | Company PSST | Division Manager: | Company PSST |
| Description of Rigging: | Two 1-1/2" Skookum Shackles w/ 2" Sch160 Pipe Bushing Insert, 15-Ton Swivel | | | Working Load Limit: | 50,000 lbs |

Engineering Review:
 The rigging described here is one of the six original rigging assemblies (Rigging Assembly "E")
 Alternative rigging equipment and supplier may be substituted as long as they have:
 - Equivalent function
 - Equivalent rating or higher (Working Load Limit must be based on a design factor of at least 1:3)

Engineering Review Summary

| | | | | | |
|---|--------------------|--|--------|--|--------|
| Pipe Diameter and SDR: | See Attached Table | Pipe Length: | 400-ft | Pipe Yield Strength: | n/a |
| When using a shackle to pipe assembly analysis must include the following: | | | | | |
| Shackle's Working Load Limit: | 33,333 lbs | Shackles Attached to Pipe (number): | 2 | Shackle Pin Diameter, <i>D_p</i> (inches): | 1.625" |
| Bushing Diameter, <i>D_p</i> (inches): | 2.375" | Hole Diameter in HDPE Pipe, <i>D_h</i> (inches): | 2.5" | Shackle Gap Opening Width, <i>W</i> : | 2.87" |
| Opening Length, <i>L</i> : | 9.5" | Edge of Pipe to Center of Hole, <i>R</i> : | 8" | | |

Assembly Description/Diagram: *(this must be listed below or attached on a separate sheet)*



Parts List:
 Include all parts such as: pulling head, swivel, nylon sling, shackle to equipment, master link, wire rope slings, flange break strength, rotational energy controls, etc.

| Ref. # | Quantity | Item Description | Supplier | Part Number | Working Load Limit |
|--------|-----------|---|----------|----------------|-----------------------|
| n/a | 2 | Skookum 1-1/2" Sheet Pile Shackle, Modified | Certex | CX10-0778-HAG1 | 50,000 lbs (per pair) |
| n/a | 1 | Bushing Insert: 2" SCH160 Steel Pipe, 2-3/4" Length | | | |
| n/a | 1 | Jaw and Eye Swivel, 15-Ton Lift Rating | Certex | CX05-0277 | 50,000 lbs |
| n/a | As Needed | 1-1/2" Master Link | Certex | CX05-0712 | 50,000 lbs |
| A | As Needed | 1-1/2" Screw Pin Shackle | Certex | CX10-0030 | 50,000 lbs |
| B | As Needed | 1-3/4" Screw Pin Shackle (Alternative to Ref. A) | Certex | CX10-0031 | 50,000 lbs |
| C | 1 | Polyester Tow Sling (Basketed Arrangement) - UTS10-95T x 5-ft | Certex | CX08-0045-5 | 50,000 lbs |
| D | 1 | Polyester Tow Sling (Alternative to Ref. C) - UTS9-77T x 5-ft | Certex | CX08-0044-5 | 50,000 lbs |

E) Two 1-1/2" Skookum Shackles with 2" Sch160 Pipe Bushing Insert, 15-ton swivel

| | | Pipe SDR Rating | | | | | | | | | |
|--------------------------------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 32.5 | 26 | 21 | 19 | 17 | 15.5 | 13.5 | 11 | 9 | 7 |
| Nominal Pipe Diameter (inches) | 12 | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| | 14 | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| | 16 | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| | 18 | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| | 20 | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| | 22 | Green | Green | Green | Green | Green | Green | Green | Green | Green | Red |
| | 24 | Green | Green | Green | Green | Green | Green | Green | Green | Red | Red |
| | 26 | Green | Green | Green | Green | Green | Green | Green | Red | Red | Red |
| | 28 | Green | Green | Green | Green | Green | Green | Green | Red | Red | Grey |
| | 30 | Green | Green | Green | Green | Green | Green | Green | Red | Red | Grey |
| | 32 | Green | Green | Green | Green | Green | Green | Green | Red | Red | Grey |
| | 34 | Green | Green | Green | Green | Green | Green | Green | Red | Red | Grey |
| 36 | Green | Green | Green | Green | Green | Green | Green | Red | Red | Grey | |

Green: Rigging can be used on grades up to 25%
 Yellow: Rigging can be used on grades up to 17.5%
 Red: Rigging cannot be used

E) Two 1-1/2" Skookum Shackles with 2" Sch160 Pipe Bushing Insert, 15-ton swivel

| | | Pipe SDR Rating | | | | | | | | | |
|--------------------------------|----|-----------------|----|----|----|----|------|------|----|-------|-------|
| | | 32.5 | 26 | 21 | 19 | 17 | 15.5 | 13.5 | 11 | 9 | 7 |
| Nominal Pipe Diameter (inches) | 12 | O | X | X | X | X | X | X | X | X | X |
| | 14 | O | X | X | X | X | X | X | X | X | X |
| | 16 | O | X | X | X | X | X | X | X | X | X |
| | 18 | O | X | X | X | X | X | X | X | X | X |
| | 20 | O | X | X | X | X | X | X | X | X | X |
| | 22 | O | X | X | X | X | X | X | X | X | Black |
| | 24 | O | X | X | X | X | X | X | X | X | Black |
| | 26 | O | X | X | X | X | X | X | X | X | Black |
| | 28 | O | X | X | X | X | X | X | X | X | Black |
| | 30 | O | X | X | X | X | X | X | X | X | Black |
| | 32 | O | X | X | X | X | X | X | X | X | Black |
| | 34 | O | X | X | X | X | X | X | X | X | Black |
| 36 | O | X | X | X | X | X | X | X | X | Black | |

X - Rigging can be used on grades up to 25%
 O - Rigging can be used on grades up to 17.5%
 Black: Rigging cannot be used