HDPE Pipe Handling Policy

Health and Safety FCX-HS12 | Release Date 1/18/2019

POTENTIAL FATAL RISKS

Uncontrolled Release of Energy
Lifting Operations
Vehicle Impact on Person

CRITICAL CONTROLS

- Segregation, Guards, Barriers & Barricades
- Tensioned Lines Management
- HDPE Management
- Energy Isolation
- Mechanical Integrity of Lifting Equipment
- Lifting Execution
- Vehicle Preoperational Inspection
- Positive Communication System
- Fundamentally Stable Parking

TECHNICAL SUPPLEMENTS

Pulling Force
Pipe Handling Permit
Push/Pull/Positioning Illustrations
Rigging Approval Request
Pipe Handling Engineering Review
Receiving/Loading/Unloading Checklist
Approved Rigging Assemblies

TRAINING REQUIREMENTS

All employees and contractors handling HDPE pipe must be trained in this policy and required skills
HDPE Pipe Handling (Initial and Refresher)
HYD_FCX2027C & HYD_FCX2024C)
HDPE Pipe Fusing (HYD_MTI1002C)
HDPE Skills training/assessments
HDPE Datalogging (HYD_MTI1003C)
Technical Rigging (RIG_FCX1001C)
Remedial Training as necessary

POLICY

OVERVIEW

Permit is required for handling all pipe 2in. in diameter or larger and 50ft. in length or greater, including deliveries at any length.
SOPs will be developed for activities around HDPE receiving, offloading, storage, pulling and installation, and coiled pipe.
Reference documents use is mandatory.
Engineering reviews and MOC may be required for new installations or major changes.

ACTIONS TO STAY SAFE

Conduct pre-job safety reviews.
Always complete all required permits and checklists.
Verify that equipment in use has adequate lifting/pulling capacity.
Task train employees for all equipment in use with HDPE.
Follow all SOPs when working with HDPE.
All personnel must remain 50ft. (15.24m) or more away from pipe being moved or handled, or utilize substantial barriers.
Personnel directly involved with handling activities and within 50ft. (15.24m) of HDPE must ensure pipe is controlled and blocked as necessary.
Eliminate interaction with traffic or utilize appropriate blocking during pulls.
Consider increased stored energy when bending pipe and install barriers as needed.

RECEIVING, OFFLOADING AND STORAGE

Complete load receiving/loading/unloading checklist.
Receiving personnel will coordinate with operations on all HDPE deliveries.
Establish 50ft. (15.24m) safe zone fully around truck being unloaded.
Safe zones must be demarcated.
Truck drivers will stay with safety watches when unloading HDPE.
FCX vehicles moving pipe will have engineered controls to secure pipe.
Barriers/blocking will be utilized when unstrapping pipe.
Without engineering controls:
Store pipe 10in. (.25m) in diameter or larger no more than two pipes high.
Store pipe less than 10in. (.25m) in diameter no higher than 2ft. (.61m).

PULLING OR MOVING LENGTHS OF PIPE

Complete permit before moving/pulling pipe.
Reference the approved rigging assemblies.
Never use a sling as a choker on 12in. (.3 m) or larger pipe without variance.
Never cut, slot, or shape the pipe for anchorage points.
Use escorts equipped with blue lights, spotters and blockers when pulling or moving pipe when there is a potential for interaction with traffic.
Rigging used for pulling must be identified and cannot be used for lifting.

FUSING, INSTALLATION AND REPAIR

Complete HDPE permit prior to starting work.
Never use banding clamps to splice pipe ends.
Dataloggers must be used when fusing pipe 12in. (.3m) and larger.

ENGINERING REVIEW REQUIRED WHEN:

Pulling pipe longer than 400ft.
Pulling pipe on grades greater than 25%.
Any activities (other than loading/unloading) pipe 42in. (1.07m) and larger diameter.
Pushing pipe of any diameter or length.
All tasks involving double walled or dual contained pipe.
Cutting pipe with significant bends and/or potential stored energy.

Technical Supplement

HDPE Pipe Handling Engineering Review | HDPE Handling FCX-HS12 | Release Date 1/18/2019

Please fill out the form with the reason and the detailed description for the Engineering Review Request. Approval from the division manager or higher is required prior to proceeding with the task.		
Date:	Site:	Div Mgr:
Purpose of the activity :		
Description of request:		
Engineering Review: (engineering must be listed below or attached)		
Risk Mitigation/Control Measures:		
Approval Names & Signatures		
Requestor:		
Reviewing Engineer:		
Health and Safety:		
Area Superintendent:		
Division Manager:		
When completed, give copy of all related documentation to division record keeper for filing.		

FREEPORT-McMoRan

HDPE Pipe Handling Permit and Pre Job Hazard Analysis Approved 1/18/2019

Before completing this permit, it is necessary to thoroughly review applicable policies and SOP's with all affected employees to ensure concrete understanding. Think carefully about the entire task to identify, evaluate, and control all energy sources to prevent incidents.				**Permit Expiration Date:**
Request Date:	**Qualified Individual:**	**Department/Shop:**	**Location:**	**Equipment used for task:**
Pipe Specifications	**Pipe Pulling Information**	**Task Description/Permit Purpose:**		
Diameter:	Length:			
SDR:	From:			
Contents:	To:			

Pre Job Hazard Analysis

Section 1: General Hazard Analysis	YES	NO	NA
Are all personnel working on this task properly trained to perform the work?			
Have all affected departments/areas been notified? *List:*			
Is the pipeline buried, or is earth work required?			
Is a Utility Location Permit required and completed?			
Is a Hot Work Permit been required and completed?			
Are substantial barrier required to protect personnel and are they adequate for this task?			
Are all energized/ pressurized lines near the work area or travel path identified and controlled? *List pressurized lines and controls:* *List energized lines and controls:*			
Has pipe contents been identified and appropriate Safety and Environmental controls in place?			
Has the pipeline been isolated? *LOTOTO points:*			
Have all cut points been clearly identified by a qualified individual?			
Will cutting release any stored energy? *Controls:*			
Is a Safety Watch required for this task?			
Is lighting sufficient for the task?			

Section 2: Pipe Pulling Analysis	YES	NO	NA
Has appropriate rigging been identified?			
Does travel path create any bends in pipe? *Controls:*			
Has travel path been identified and communicated?			
Does the length or path require spotters or blockers?			

Section 3: Fusing/Installation/Repair Analysis	YES	NO	NA
For multiple crews on the pipeline, is energy controlled between crews?			
Will loading or unloading pipe into the fusing machine release stored energy? *Controls*:			
Has safe access been established to the work area?			
Has appropriate rigging been identified?			
Is Datalogger connected and working properly?			

Section 4: Energy Source Review			
YES	NO	HAZARD	CONTROLS:
		High wall/material angle of repose	
		Line of fire	
		Weather	
		Uncontrolled release of energy	
		Falls/falling objects	
		Others:	

HDPE Pipe Handling Permit and Pre Job Hazard Analysis Approved 1/18/2019

Section 5: Significant Hazard Analysis	YES	NO	NA
1. Is the pipeline 12” in diameter or greater?			
2. Are there any bends in the pipe that are storing significant potential energy?			
3. Is a substantial barrier being used for the task?			
4. Will two-way traffic be allowed during the pipe pull?			
5. Will the pipeline be pushed into place?			
6. Is the pipe dual walled our dual contained?			
7. Will pipe 12” in diameter or great be fused without a Datalogger?			

If any of the above questions have a “YES” response, superintendent signature is required. A “YES” response to question 5 or 6 requires Engineering Review.
A “YES response to question 7 requires a Variance (See DOHS SharePoint, Administrative Requirements Policy for additional information).

Qualified Individual – Prior to Starting Task *(QI initials must be completed daily)*

Pre-job safety review has been completed with all employees associated with the task	
Notification has been provided to all departments/areas	
All personnel not involved with the task have been cleared from the area/travelway	
QI Name:	QI Signature
Supervisor Name (if necessary)	Supervisor Signature (if necessary)
Superintendent Name (if necessary)	Superintendent Signature (if necessary)

Employees associated with the task: *I have reviewed the above permit completely and understand the procedures, hazards and controls to complete this task safely.* (Print and sign below)

Technical Supplement

Receiving/Loading/Unloading Checklist | HDPE Pipe Handling FCX-HS12 | Release Date 1/18/2019

Date:	BOL#:	Inspected By:
Driver:		Load Description:

Part 1 – HDPE Pipe Load Checklist

YES	**NO**	Load has not shifted and is not leaning
YES	**NO**	Trailer is equipped with stints, or pipe is loaded and strapped properly according to the HDPE Pipe Shipping Requirements
YES	**NO**	Proper size dunnage (minimum 4x4) is in place between each layer of pipe with chocks on the end
NOTE: If the HDPE pipe is not loaded properly or any of the above conditions have not been met (checked "No"), the truck will NOT be released for off-loading. The superintendent for the area receiving the pipe must be contacted immediately for further evaluation.		
Load Approved:		

Part 2 – HDPE Pipe Receiving Checklist

YES	**NO**	Load has not shifted and is not leaning
YES	**NO**	Pipe is loaded and strapped properly according to the HDPE Pipe Shipping Requirements
YES	**NO**	Proper size dunnage (minimum 4x4) is in place between each layer of pipe with chocks on the end
YES	**NO**	Pipe is free from visible defects or damages
NOTE: If the HDPE pipe is not loaded properly or any of the above conditions have not been met (checked "No"), the truck will NOT be released for off-loading. The superintendent for the area receiving the pipe must be contacted immediately for further evaluation.		
NOTE: All improper loads must be communicated to the PSST Site Representative and GSC		
Receive and Approved:		

Part 3 – HDPE Pipe Unloading Checklist

YES	**NO**	All operators and safety watches have been task trained
YES	**NO**	Operator has completed a pre-use inspection card for equipment
YES	**NO**	Load area is free of other equipment, debris, rocks, holes, etc.
YES	**NO**	Clear access is established to both sides of the truck
YES	**NO**	Truck is sitting with wheels level and is chocked
YES	**NO**	A 50-ft safe zone has been established (or a substantial barrier is put in place)
YES	**NO**	Safety watch is in place
YES	**NO**	Driver is with the safety watch
YES	**NO**	Area where pipe will be placed is inspected
NOTE: Do NOT proceed with unloading if any question above is answered "No"		

Loading/Unloading Approval Signatures

Driver	Safety Watch	Unloading Crew

Technical Supplement

Pipeline Pulling Force | HDPE Handling FCX-HS12 | Release Date 1/18/2019

Table 1 HDPE Pipeline Pulling Force (17.5% Grade)

Nominal Pipe Diameter (inches)	Pipe SDR Rating									
	32.5	26	21	19	17	15.5	13.5	11	9	7 or 7.3
12	2,600	3,200	4,000	4,400	4,800	5,300	6,000	7,200	8,500	10,500
14	3,200	3,900	4,800	5,200	5,800	6,300	7,200	8,600	10,300	12,700
16	4,100	5,100	6,200	6,800	7,600	8,200	9,400	11,300	13,400	16,600
18	5,200	6,400	7,900	86,300	9,600	10,400	11,800	14,200	17,000	21,000
20	6,400	7,900	9,700	10,600	11,800	12,900	14,600	17,600	20,900	25,900
22	7,700	9,600	11,700	12,900	14,300	15,500	17,700	21,200	25,300	31,300
24	9,200	11,400	13,900	15,300	17,000	18,500	21,000	25,300	30,100	37,300
26	10,800	13,300	16,300	17,900	19,900	21,700	24,600	29,600	35,400	43,600
28	12,500	15,500	18,900	20,800	23,100	25,200	28,600	34,400	41,000	
30	14,300	17,700	21,700	23,900	26,500	28,900	32,800	39,400	47,100	
32	16,300	20,200	24,700	27,200	30,100	32,800	37,300	44,900	53,500	
34	18,400	22,800	27,900	30,700	34,000	37,100	42,100	50,600		
36	20,600	25,500	31,300	34,400	38,100	41,600	47,200	56,700		
42+	Engineering Review Required									

Table 2 HDPE Pipeline Pulling Force (25% Grade)

Nominal Pipe Diameter (inches)	Pipe SDR Rating									
	32.5	26	21	19	17	15.5	13.5	11	9	7 or 7.3
12	2,800	3,400	4,200	4,600	5,100	5,600	6,300	7,600	9,000	11,200
14	3,300	4,100	5,100	5,500	6,200	6,700	7,600	9,100	10,900	13,500
16	4,400	5,400	6,600	7,200	8,000	8,700	9,900	11,900	14,200	17,600
18	5,500	6,800	8,300	9,100	10,100	11,000	12,500	15,100	18,000	22,200
20	6,800	8,400	10,300	11,300	12,500	13,600	15,500	18,600	22,200	27,400
22	8,200	10,100	12,400	12,500	151,010	16,500	18,700	22,500	26,800	33,200
24	9,700	12,000	14,800	16,200	18,000	19,600	22,200	26,800	31,900	39,500
26	11,400	14,100	17,300	19,000	21,100	23,000	26,100	31,400	37,500	46,300
28	13,200	16,400	20,100	22,000	24,500	26,600	30,300	36,400	43,400	
30	15,200	18,800	23,000	25,300	28,100	30,600	34,700	41,800	49,800	
32	17,300	21,400	26,200	28,800	31,900	34,800	39,500	47,500	56,700	
34	19,500	24,100	29,600	32,500	36,000	39,300	44,600	53,700		
36	21,800	27,000	33,100	36,400	40,400	44,000	50,000	60,100		
42+	Engineering Review Required									

NOTES

Use in conjunction with the approved rigging assemblies. Friction factor of 0.80 used in calculations (Sand/HDPE published at 0.66).
An engineering review is required for pulling pipe on a slope greater than 14º (25%).
Pulling forces in orange exceed capacity of original six rigging assemblies.
Calculations based on pulling empty 400 ft pipeline up respective slopes, assuming 0.8 coefficient of friction.
This document must be viewed or printed in color.

Technical Supplement

Rigging Approval Request | HDPE 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:	Site:	Div Mgr:
Rigging description :		WLL:
Engineering Review & Summary		
Pipe size and SDR:	Pipe length (ft):	Pipe yield strength:
When using a shackle to pipe assembly, analysis must include the following:		
Shackle WLL (tons):	# of shackles attached to pipe:	Shackle pin diameter *Dp* (inches):
Busing diameter *Dp* (inches):	Edge of pipe to center of hole, *R* (inches):	
Assembly Description/Diagram:		

Parts List: (include all parts such as pulling head, swivel, sling, shackle, master link, wire ropes, rotational controls, etc.)

Ref #	Qty	Description	Supplier	Part #	WLL

Name and Signatures (required for single use approval)
Engineer conducting review:
PSST Site Rep:
Division Manager:
Health and Safety:
Name and Signature (required for inclusion)
Corporate PSST Lead:
When completed, give copy of all related documentation to division record keeper for filing.

Technical Supplement

Receiving/Loading/Unloading Checklist | HDPE Pipe Handling FCX-HS12 | Release Date 1/18/2019

Date:	BOL#:	Inspected By:
Driver:		Load Description:

Part 1 – HDPE Pipe Load Checklist

YES	**NO**	Has the load shifted or is it leaning?
YES	**NO**	Is the trailer is equipped with stints, or pipe is loaded and strapped properly according to the HDPE Pipe Shipping Requirements?
YES	**NO**	Is proper size dunnage (minimum 4x4) in place between each layer of pipe with chocks on the end?
NOTE: If the HDPE pipe is not loaded properly or any of the above conditions have not been met (checked "No"), the truck will NOT be released for off-loading. The superintendent for the area receiving the pipe must be contacted immediately for further evaluation.		
Load Approved:		

Part 2 – HDPE Pipe Receiving Checklist

YES	**NO**	Has the load shifted or is it leaning?
YES	**NO**	Is pipe loaded and strapped properly according to the HDPE Pipe Shipping Requirements?
YES	**NO**	Is proper size dunnage (minimum 4x4) in place between each layer of pipe with chocks on the end?
YES	**NO**	Is pipe free from visible defects or damages?
NOTE: If the HDPE pipe is not loaded properly or any of the above conditions have not been met (checked "No"), the truck will NOT be released for off-loading. The superintendent for the area receiving the pipe must be contacted immediately for further evaluation.		
NOTE: All improper loads must be communicated to the Pipe Safety Steering Team Site Representative and GSC		
Receive and Approved:		

Part 3 – HDPE Pipe Unloading Checklist

YES	**NO**	Have all operators and safety watches been task trained?
YES	**NO**	Has operator completed a pre-use inspection card for equipment?
YES	**NO**	Is load area free of other equipment, debris, rocks, holes, etc.?
YES	**NO**	Is clear access is established on both sides of the truck?
YES	**NO**	Is truck sitting with wheels level and are chocks in place?
YES	**NO**	Has a 50-ft (15.24m) safe zone has been established (or a substantial barrier is put in place)?
YES	**NO**	Is a safety watch is in place?
YES	**NO**	Is the driver is with the safety watch?
YES	**NO**	Has the area where pipe will be placed inspected and free from hazards?
NOTE: Do NOT proceed with unloading if any question above is answered "No"		

Loading/Unloading Approval Signatures

Driver	Safety Watch	Unloading Crew

Technical Supplement

Rigging Approval Request | HDPE 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:	Site:	Div Mgr:
Rigging description :		WLL:
Engineering Review & Summary		
Pipe size and SDR:	Pipe length (ft):	Pipe yield strength:
When using a shackle to pipe assembly, analysis must include the following:		
Shackle WLL (tons):	# of shackles attached to pipe:	Shackle pin diameter *Dp* (inches):
Busing diameter *Dp* (inches):	Edge of pipe to center of hole, *R* (inches):	
Assembly Description/Diagram:		

Parts List: (include all parts such as pulling head, swivel, sling, shackle, master link, wire ropes, rotational controls, etc.)

Ref #	Qty	Description	Supplier	Part #	WLL

Name and Signatures (required for single use approval)
Engineer conducting review:
PSST Site Rep:
Division Manager:
Health and Safety:
Name and Signature (required for inclusion)
Corporate PSST Lead:
When completed, give copy of all related documentation to division record keeper for filing.

Technical Supplement

Fused Pulling Head, 5t Swivel Assembly A | 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:	HDPE Fused Pulling Head, 5-Ton Swivel			Working Load Limit:	16,667 lbs

Engineering Review:

The rigging described here is one of the six original rigging assemblies (Rigging Assembly "A")

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)

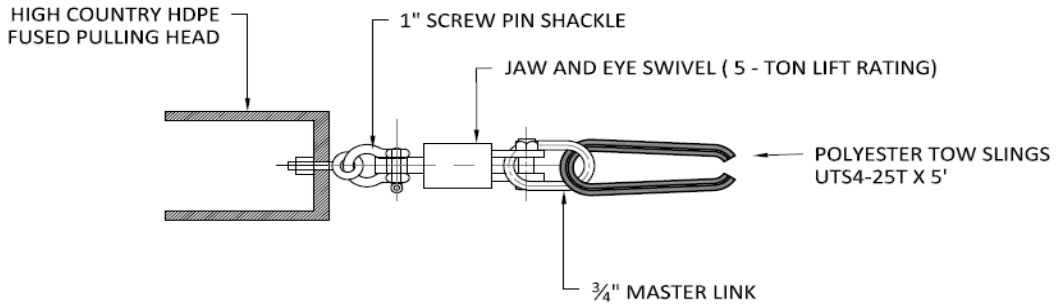
Engineering Review Summary

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:	Shackles Attached to Pipe (number):	Shackle Pin Diameter, *Dp* (inches):
Bushing Diameter, *Dp* (inches):	Hole Diameter in HDPE Pipe, *Dh* (inches):	Shackle Gap Opening Width, *W*:
Opening Length, *L*:	Edge of Pipe to Center of Hole, *R*:	

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



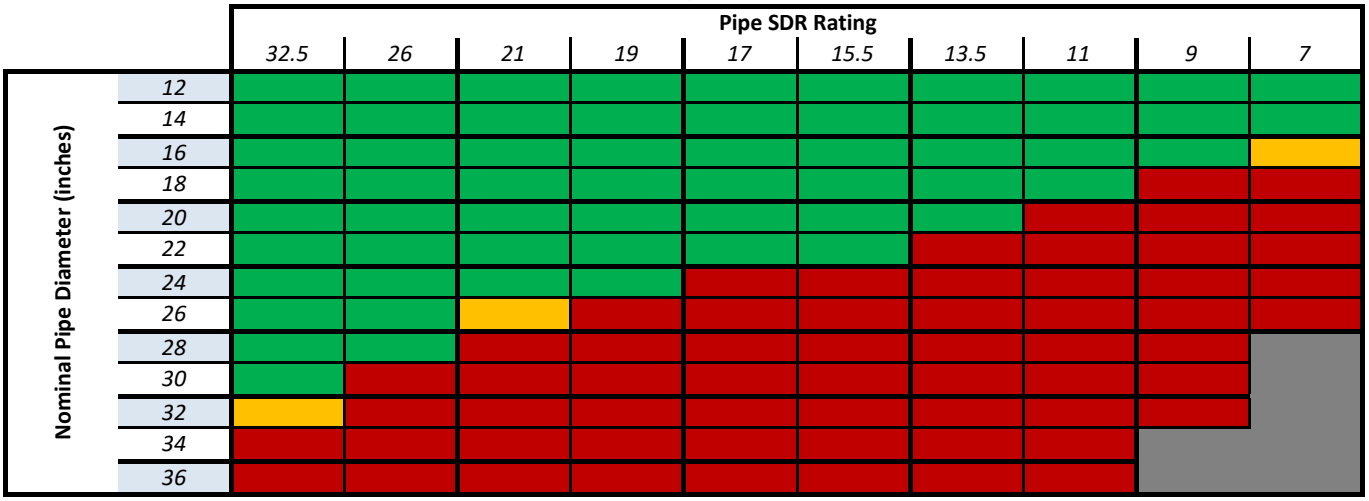
(A) HDPE FUSED PULLING HEAD, 5- TON SWIVEL

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	1	High Country HDPE Fused Pulling Head	Polywarehouse	See Support Docs	16,667 lbs
n/a	1	Jaw and Eye Swivel, 5-ton Lift Rating	Certex	CX05-0259	16,667 lbs
n/a	As Needed	3/4" Master Link	Certex	CX05-0708	16,667 lbs
n/a	As Needed	1" Screw Pin Shackle	Certex	CX10-0026	16,667 lbs
n/a	1	Polyester Tow Sling UTS4-25T x 5-ft	Certex	CX08-0039-5	16,667 lbs

A) HDPE Fused Pulling Head, 5-ton Swivel



Rigging can be used on grades up to 25%

Rigging can be used on grades up to 17.5%

Rigging cannot be used

A) HDPE Fused Pulling Head, 5-ton Swivel

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

X - Rigging can be used on grades up to 25%

O - Rigging can be used on grades up to 17.5%

Rigging cannot be used

Technical Supplement

Single 1 1/2" Skookum Shackel, Bushing, 5t Swivel Assembly B | 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:	Single 1 - 1/2" Skookum Shackle, Bushing, 5-Ton Swivel	Working Load Limit:	16,667 lbs

Engineering Review:

The rigging described here is one of the six original rigging assemblies (Rigging Assembly "B")

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)

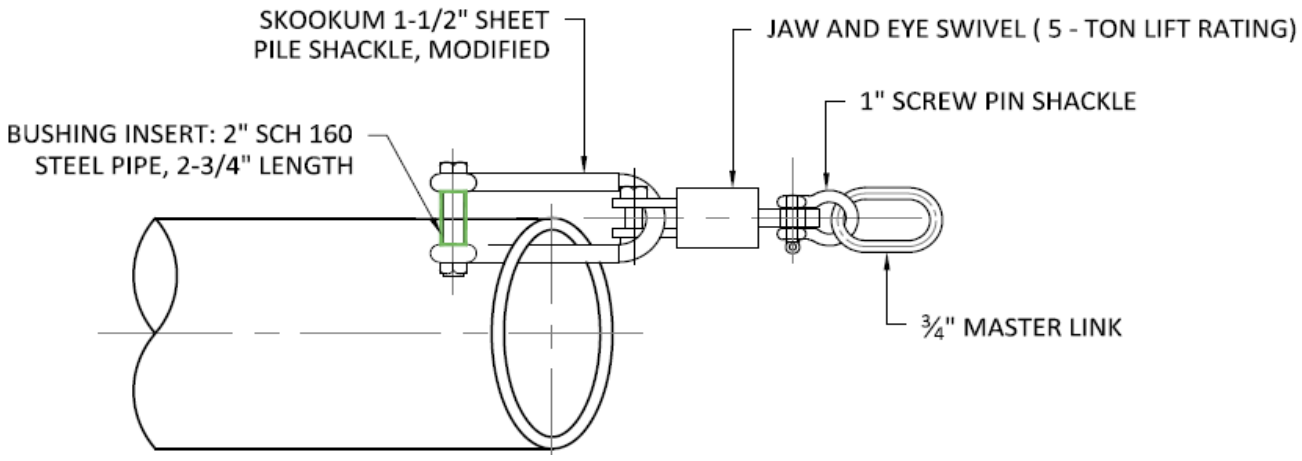
Engineering Review Summary

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):	1	Shackle Pin Diameter, *Dp* (inches):	1.625"
Bushing Diameter, *Dp* (inches):	2.375"	Hole Diameter in HDPE Pipe, *Dh* (inches):	2.5"	Shackle Gap Opening Width, *W*:	2.87"
Opening Length, *L*:	9.5"	Edge of Pipe to Center of Hole, *R*:	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	1	Skookum 1-1/2" Sheet Pile Shackle, modified	Certex	CX10-0778-HAG1	33,333 lbs
n/a	1	Bushing Insert: 2" SCH160 Steel Pipe, 2-3/4" Length			
n/a	1	Jaw and Eye Swivel, 5-Ton Lift Rating	Certex	CX05-0259	16,667 lbs
n/a	As Needed	1" Screw Pin Shackle	Certex	CX10-0026	16,667 lbs
n/a	1	Polyester Tow Sling UTS4-25T x 5-ft	Certex	CX08-0039-5	16,667 lbs
n/a	As Needed	3/4" Master Link	Certex	CX05-0708	16,667 lbs

B) Single 1-1/2 Skookum Shackle with 2" Sch160 Pipe Bushing Insert, 5-ton swivel

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

Rigging can be used on grades up to 25%

Rigging can be used on grades up to 17.5%

Rigging cannot be used

B) Single 1-1/2 Skookum Shackle with 2" Sch160 Pipe Bushing Insert, 5-ton swivel

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

X - Rigging can be used on grades up to 25%

O - Rigging can be used on grades up to 17.5%

Rigging cannot be used

Technical Supplement

Fused Pulling Head, 15t Swivel Assembly C | 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:	HDPE Fused Pulling Head, 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 "C")

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)

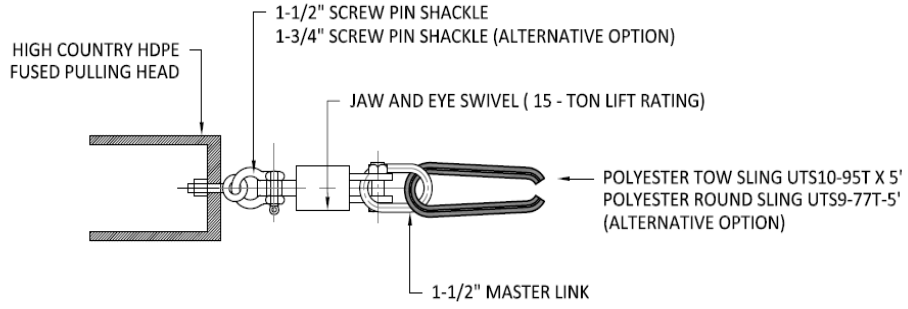
Engineering Review Summary

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:	Shackles Attached to Pipe (number):	Shackle Pin Diameter, *Dp* (inches):
Bushing Diameter, *Dp* (inches):	Hole Diameter in HDPE Pipe, *Dh* (inches):	Shackle Gap Opening Width, *W*:
Opening Length, *L*:	Edge of Pipe to Center of Hole, *R*:	

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



(C) HDPE FUSED PULLING HEAD, 15- TON SWIVEL

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	1	High Country HDPE Fused Pulling Head	Polywarehouse	See Support Docs	50,000 lbs
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 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

C) HDPE Fused Pulling Head, 15-ton Swivel

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

Rigging can be used on grades up to 25%

Rigging can be used on grades up to 17.5%

Rigging cannot be used

C) HDPE Fused Pulling Head, 15-ton Swivel

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

X - Rigging can be used on grades up to 25%

O - Rigging can be used on grades up to 17.5%

Rigging cannot be used

Technical Supplement

Two 1 1/2" Skookum Shackles, 15t Swivel Assembly D |HDPE Pipe Hanlding 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, 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 "D")

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)

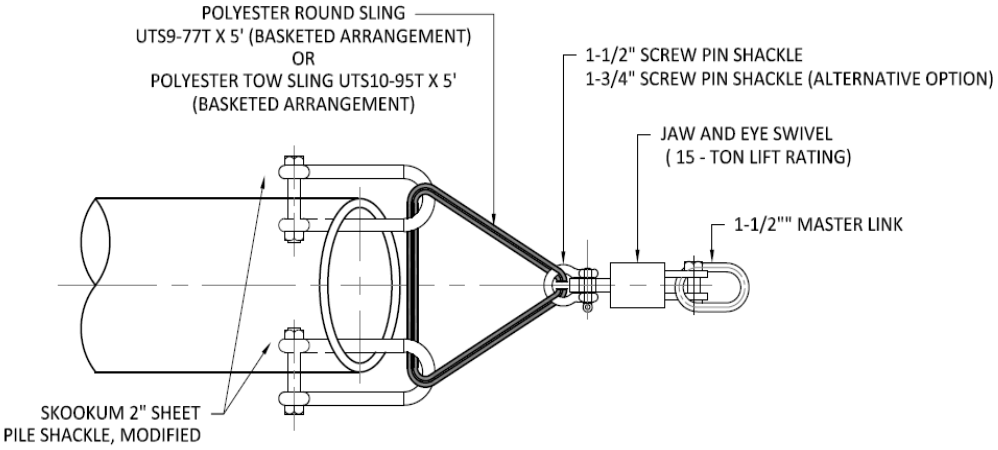
Engineering Review Summary

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, *Dp* (inches):	1.625"
Bushing Diameter, *Dp* (inches):	n/a	Hole Diameter in HDPE Pipe, *Dh* (inches):	2"	Shackle Gap Opening Width, *W*:	2.87"
Opening Length, *L*:	14.125"	Edge of Pipe to Center of Hole, *R*:	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	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

D) Two 1-1/2" Skookum Shackles, 15-ton swivel

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

Rigging can be used on grades up to 25%

Rigging can be used on grades up to 17.5%

Rigging cannot be used

D) Two 1-1/2" Skookum Shackles, 15-ton swivel

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

X - Rigging can be used on grades up to 25%

O - Rigging can be used on grades up to 17.5%

Rigging cannot be used

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)

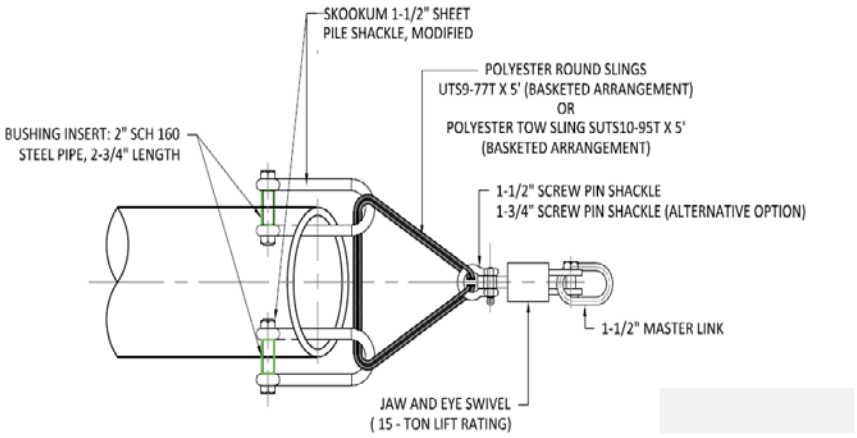
Engineering Review Summary

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, *Dp* (inches):	1.625"
Bushing Diameter, *Dp* (inches):	2.375"	Hole Diameter in HDPE Pipe, *Dh* (inches):	2.5"	Shackle Gap Opening Width, *W*:	2.87"
Opening Length, *L*:	9.5"	Edge of Pipe to Center of Hole, *R*:	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

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

Rigging can be used on grades up to 25%

Rigging can be used on grades up to 17.5%

Rigging cannot be used

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

Nominal Pipe Diameter (inches)	Pipe SDR Rating									
	32.5	26	21	19	17	15.5	13.5	11	9	7
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	
24	O	X	X	X	X	X	X	X	X	
26	O	X	X	X	X	X	X	X		
28	O	X	X	X	X	X	X	X		
30	O	X	X	X	X	X	X	X		
32	O	X	X	X	X	X	X			
34	O	X	X	X	X	X	X			
36	O	X	X	X	X	X	X			

X - Rigging can be used on grades up to 25%

O - Rigging can be used on grades up to 17.5%

Rigging cannot be used

Technical Supplement

Two 2" Skookum Shackles, 15t Swivel - Assembly F| 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 2" Skookum Shackles, 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 "F")

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)

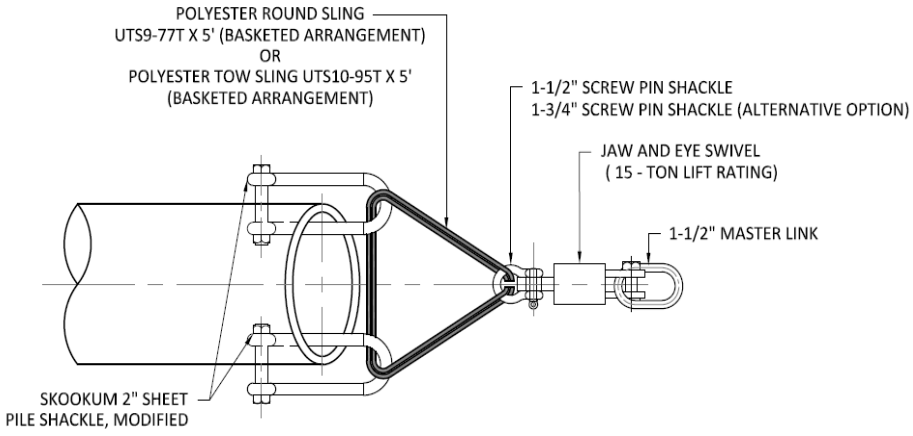
Engineering Review Summary

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:	100,000 lb	Shackles Attached to Pipe (number):	2	Shackle Pin Diameter, *Dp* (inches):	2.25"
Bushing Diameter, *Dp* (inches):		Hole Diameter in HDPE Pipe, *Dh* (inches):	2.5"	Shackle Gap Opening Width, *W*:	4"
Opening Length, *L*:	11.25"	Edge of Pipe to Center of Hole, *R*:	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 2" Sheet Pile Shackle, Modified	Certex	CX10-0778-HAG	100,000 lbs
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

F) Two 2" Skookum Shackles, 15-ton swivel

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

Rigging can be used on grades up to 25%
Rigging can be used on grades up to 17.5%
Rigging cannot be used

F) Two 2" Skookum Shackles, 15-ton swivel

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

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

Technical Supplement

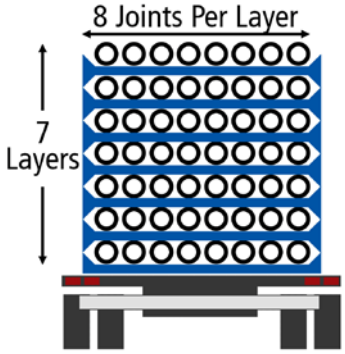
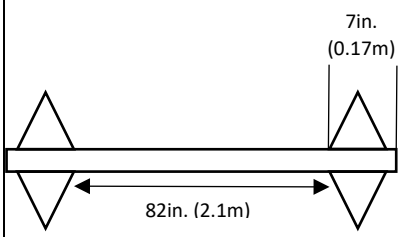
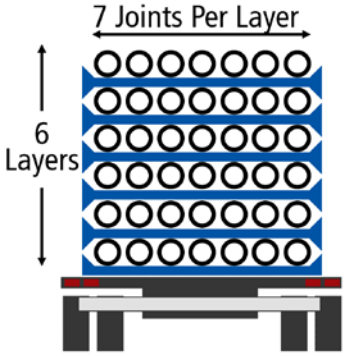
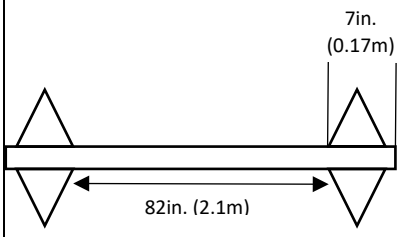
HDPE Pipe Shipping Requirements | HDPE Handling FCX-HS12 | Release Date 5/30/2019

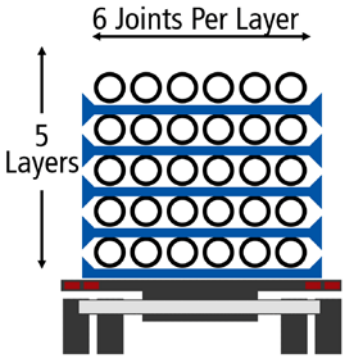
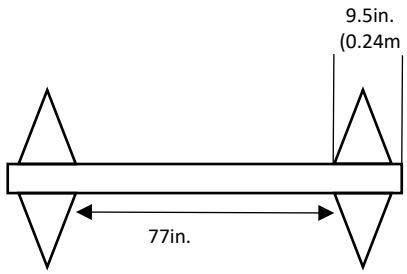
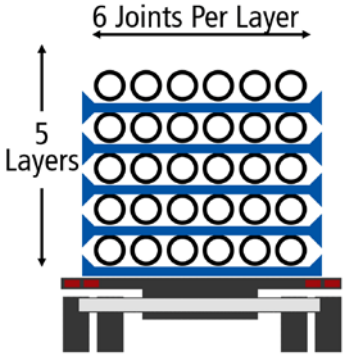
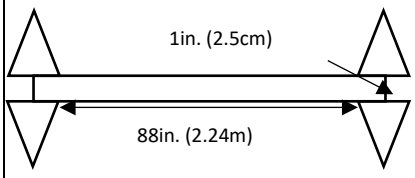
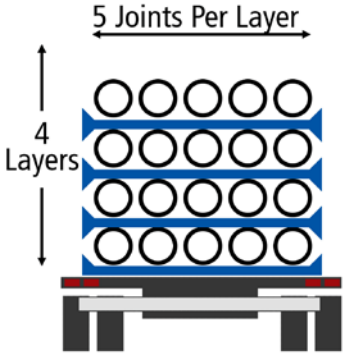
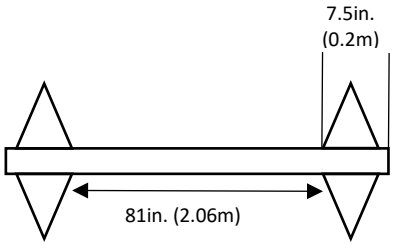
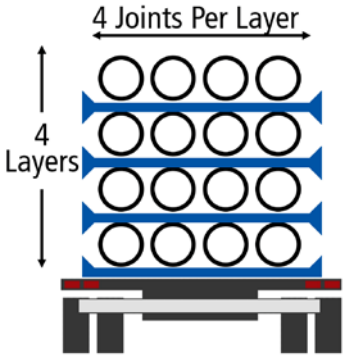
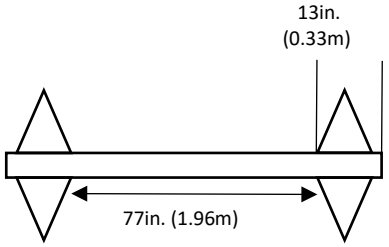
Strapping Requirements

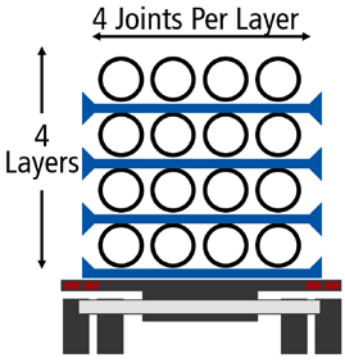
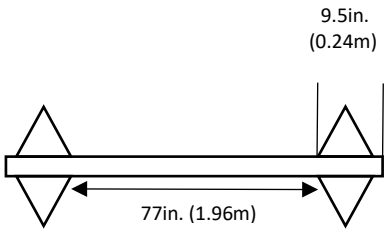
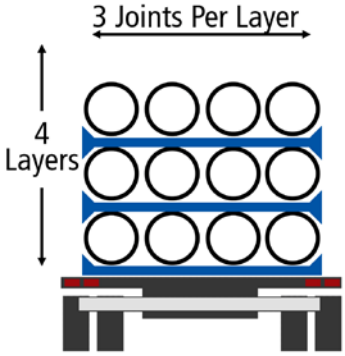
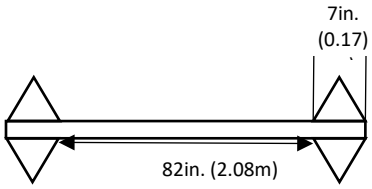
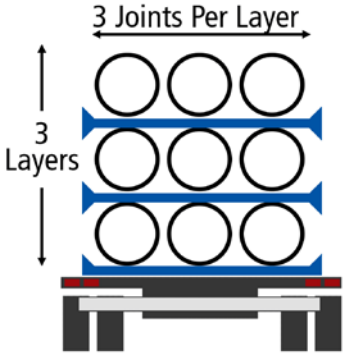
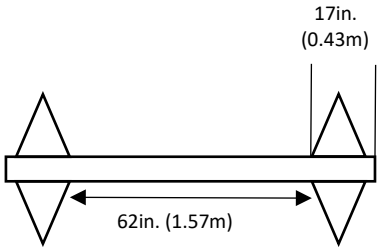
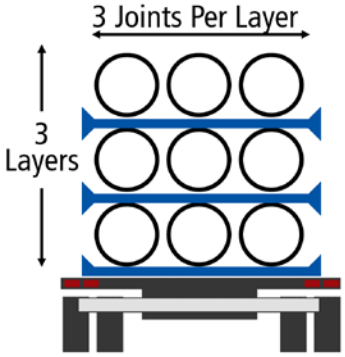
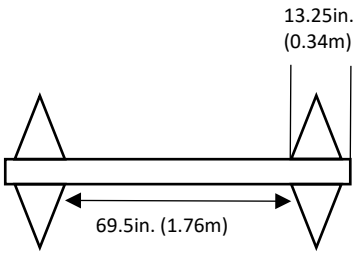
At a minimum, ***two*** straps will be applied to each layer of pipe being shipped to ensure safety while offloading. Four straps will be used to secure the top of the load. If a load is shipped without the minimum 2 straps per layer, then at the receiving site's discretion that load will be subject to rejection or delay.

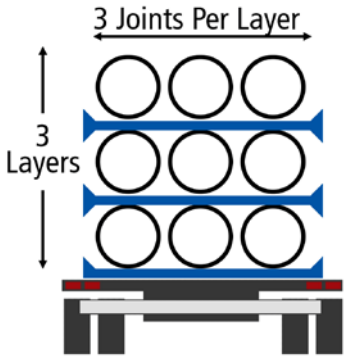
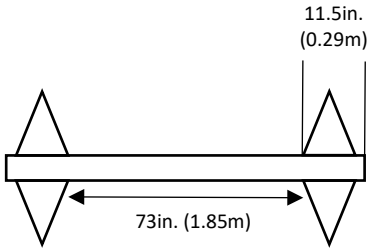
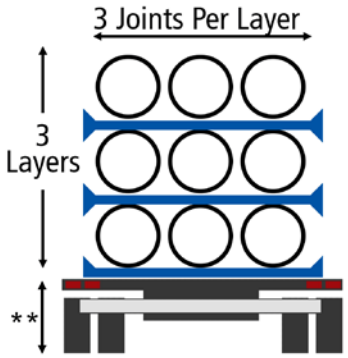
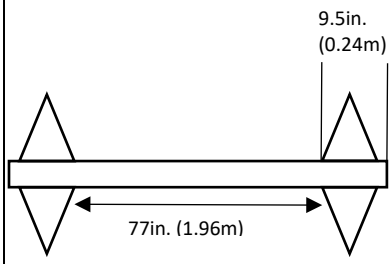
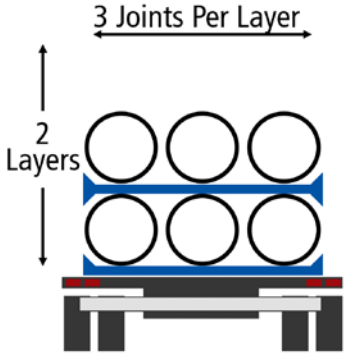
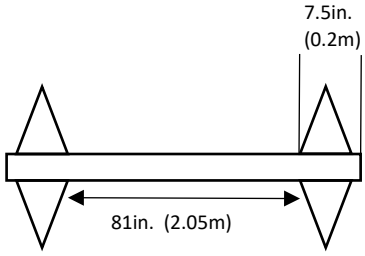
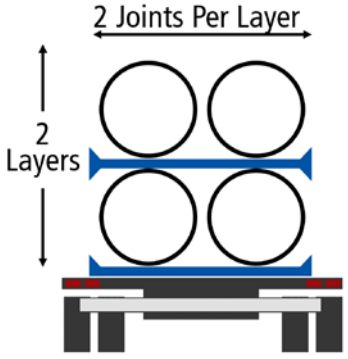
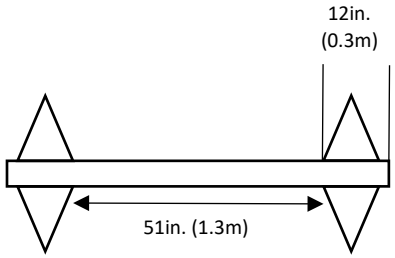
Dunnage Requirements

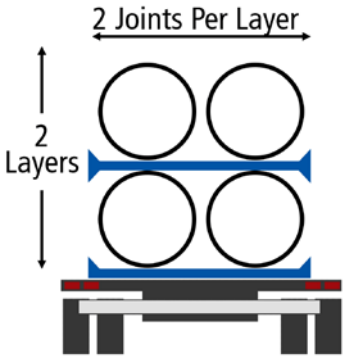
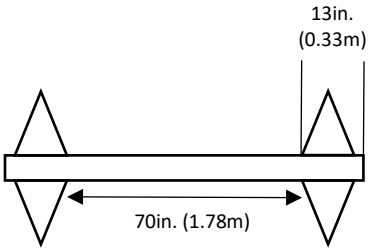
Dunnage should be utilized for all loads as outlined by the remainder of this document to ensure safety while offloading. If a load is shipped without the proper dunnage, then at the receiving site's discretion that load will be subject to rejection or delay.

4"x4" (0.1m x 0.1m) dunnage MUST be positioned between each tier. ALL LOADS MUST BE CHOCKED. Banded material is not to exceed 60 inches and is per single horizontal layer.				**Strip Load Saddle Construction (Length of stringer is measured inside the end guards)**
Pipe Size 10"/ 0.25m	OD 10.75"/ 0.27m	56 JOINTS 96" (2.4m) or 102" (2.6m) Trailer 2240' – 40s 2800' – 50s		
Pipe Size 12"/ 0.30m	OD 12.75"/ 0.32m	42 JOINTS 102" (2.6m) Trailer 1680' – 40s 2100' – 50s		

4”x4” (0.1m x 0.1m) dunnage MUST be positioned between each tier. ALL LOADS MUST BE CHOCKED. Banded material is not to exceed 60 inches and is per single horizontal layer.				**Strip Load Saddle Construction**
Pipe Size 14”/ 0.36m	OD 14” / 0.36m	30 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 1200’ – 40s 1500’ – 50s		
Pipe Size 16”/ 0.40m	OD 16”/ 0.40m	30 JOINTS 102” (2.6m) Trailer 1200’ – 40s 1500’ – 50s		
Pipe Size 18”/ 0.46m	OD 18”/ 0.41m	20 JOINTS 102” (2.6m) Trailer 800’ – 40s 1000’ – 50s		
Pipe Size 20”/ 0.51m	OD 20”/ 0.51m	16 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 640’ – 40s 800’ – 50s		

4”x4” (0.1m x 0.1m) dunnage MUST be positioned between each tier. ALL LOADS MUST BE CHOCKED. Banded material is not to exceed 60 inches and is per single horizontal layer.				Strip Load Saddle Construction
Pipe Size 22”/ 0.56m	OD 22”/ 0.56m	16 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 640’ – 40s 800’ – 50s		
Pipe Size 24”/ 0.61m	OD 24”/ 0.61m	12 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 480’ – 40s 600’ – 50s		
Pipe Size 26”/ 0.66m	OD 26”/ 0.66m	9 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 480’ – 40s 600’ – 50s		
Pipe Size 28”/ 0.71m	OD 28”/ 0.71m	9 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 360’ – 40s 450’ – 50s		

4”x4” (0.1m x 0.1m) dunnage MUST be positioned between each tier. ALL LOADS MUST BE CHOCKED. Banded material is not to exceed 60 inches and is per single horizontal layer.				**Strip Load Saddle Construction**
Pipe Size 30”/ 0.76m	OD 30”/ 0.76m	9 JOINTS 102” (2.6m) Trailer 360’ – 40s 450’ – 50s		
Pipe Size 32”/ 0.81m	OD 32”/ 0.81m	9 JOINTS 102” (2.6m) Trailer 360’ – 40s 450’ – 50s (**Trailer bed no more than 4.5’ (1.37m) from ground.)		
Pipe Size 34”/ 0.86m	OD 34”/ 0.86m	6 JOINTS 102” (2.6m) Trailer 240’ – 40s 300’ – 50s		
Pipe Size 36”/ 0.91m	OD 36”/ 0.91m	4 JOINTS 96” (2.4m) or 102” (2.6m) Trailer 160’ – 40s 200’ – 50s		

<table>
<tr><td colspan="3">4”x4” (0.1m x 0.1m) dunnage MUST be positioned between each tier.
ALL LOADS MUST BE CHOCKED.
Banded material is not to exceed 60 inches and is per single horizontal layer.</td><td>Strip Load Saddle Construction</td></tr>
<tr><td>Pipe Size 40”/ 1.02m
OD 39.37”/ 1.00m</td><td>4 JOINTS
96” (2.4m) or 102” (2.6m) Trailer
160’ – 40s
200’ – 50s</td><td> 
</td><td> 
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