



STS **PRESSURE**
CONTROL
RENTAL & SUPPORT EQUIPMENT



Pressure Control

Product List.....	PC-1
Equipment and Testing Facilities.....	PC-2
Wireline Personnel.....	PC-3
Grease Injection Packages.....	PC-4
Grease Injection Units.....	PC-5
MAC-26 Grease Injection Pump.....	PC-5
Dual 20k Grease Injector.....	PC-6
“Lightweight” Wireline Valve.....	PC-7
Compact Wireline Valve.....	PC-8
Quad Wireline Valve.....	PC-9
Shear and Seal Wireline Ram Assembly.....	PC-10
Wireline Grease Injection Control Head.....	PC-11
Enviro™ Single “Compact” Pack-Off.....	PC-12
Tool Catcher and Ball Check Valve.....	PC-13
Hydraulic Tool Trap.....	PC-14
Quick Test Sub.....	PC-15
Chemical Injection Sub.....	PC-16
Bleed-Off Sub.....	PC-17
Adapter Flanges.....	PC-18
Lightweight Lubricator.....	PC-19
Large Bore Riser.....	PC-20
Wireline Lubricator with Threaded Unions.....	PC-21
Dual Hydraulic Wireline Annular	PC-22a-b
Top Entry Systems.....	PC-23a-e
Articulated Top Entry System.....	PC-24a-b
Kaerer Air Compressor Model 26 92.....	PC-25
900 Series Pressure Test Unit.....	PC-26
TEEF Triplex Well Service Pump.....	PC-27
HP-550 Triplex Power Test Pump.....	PC-28
Crane Trucks.....	PC-29
Working Ranges.....	PC-30
Auxiliary Equipment: Lights Plants.....	PC-31
STS Job Order Form.....	PC-32
Bowen Unions.....	PC-33
Otis Quick Union Chart.....	PC-34
H2S Service Equipment.....	PC-35
Corrosive Index for Carbon Dioxide.....	PC-36
Glycol Mixing Chart.....	PC-37
WireLine Grease Chart.....	PC-38

Product List

Grease Injection Package

Pressure Rating 5k, 10k, 15k, 20k

- Air Powered 5k 10k
- Diesel Powered 10k 15k 20k

Wireline Valves

Pressure Rating 5k, 10k, 15k, 20k

- Dual
- Triple
- Quad.

Wireline Grease Injection

Control Head

Pressure rating 5k, 10k, 15k, 20k

- Grease Injection Control Head
- 5k Single Packoff
- Tool Catcher
- Ball Check Valve

Wireline Lubrication

Accessories

- Quick Test Sub Pressure Rating 5k-20k
- Chemical Injection Sub Pressure Rating 5k-20k
- Bleed Off Sub Pressure Rating 5k-20k
- Adaptors Sub Pressure Rating 5k-20k
- Flange to Lubricator Pressure Rating 5k-20k

Lubricator Joints

- STD + H₂S Lightweight - 10k - 3", 4 1/16", + 5 1/8" ID
- STD + H₂S Large Bore 3k-5k - 5 1/2, 7", 7 5/8, 9 5/8, 10 3/4, 13 3/8 ID
- STD + H₂S Lubricator 5k-15k - 3", 4 1/2, + 5 1/2 ID

Dual Hydraulic Wireline Annular Valve

- Dual Packoff 3k 7 5/8 + 9 5/8

Pipe Recovery Equipment

- T.E.A.S Top Entry Access System
- T.E.S. Top Entry System
- Articulated Top Entry System

Wireline Accessory Equipment

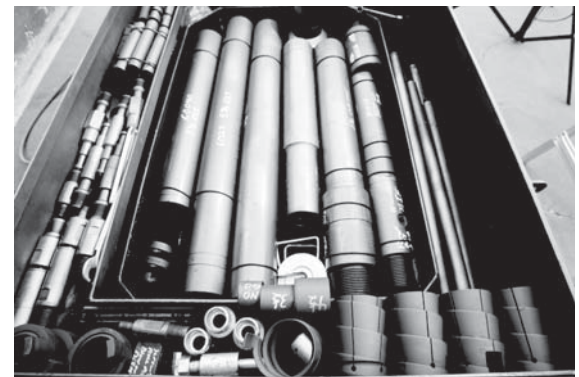
- Air Compressors
- Air Test Pumps
- Diesel Well Service Pumps
- Diesel Test Pumps
- Crane Trucks
- Offshore Lights

Equipment and Testing Facilities

STS has a broad range of wellsite equipment all across the US

STS offers a complete line of equipment to meet all of your pressure control and pipe recovery needs.

- H2S/Standard Service - 5K-15K psi rated packages
- H2S/Standard Service - 5K-20K psi rated packages
- Equipment to meet specific Zone 1 requirements
- Packoffs, Wireline Valves, Lubricator, Flanges
- Swedges, Spools, Adapters and Subs
- Packages with single or dual packoff options up to 8.25" ID
- Open Hole Fishing Kits
- Top Entry Access System
- Top Entry Safety System



Reasons Why Our Equipment Performs as Expected:

The quality and reliability of our equipment is the reason your jobs will have minimal problems and high success rates. Every piece of our equipment is subjected to a thorough inspection prior to dispatch and upon return from all jobs. Any equipment not meeting our rigid specification is either rejected from our rental fleet or repaired by our skilled technicians.

State of the Art Testing Booth

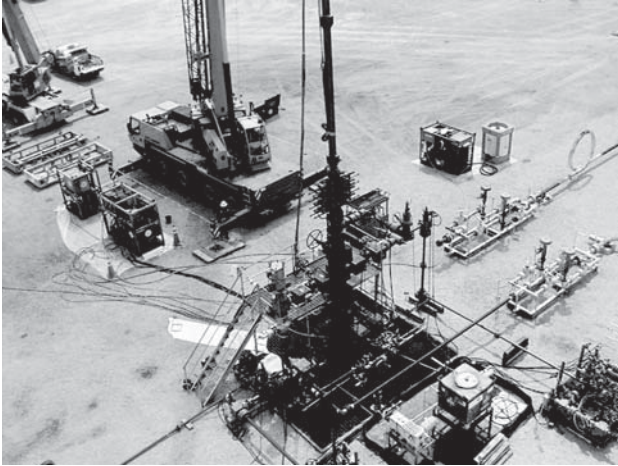
We realize the importance of maintaining quality standards with our equipment. Our standards have led to the installation of Pressure Test Bays throughout our district locations to ensure our equipment meets Quality Assurance Guidelines before it leaves for your location. STS also has a Service Center dedicated to maintaining our high pressure, large bore fleet of equipment. This location can also perform pressure tests up to 30,000 psi which can be witnessed via a web cam from the comfort of your office.



YOU CAN RELY ON EQUIPMENT RENTED FROM STS

Wireline Personnel

STS Wireline Service personnel have the experience and know-how to assist you in a successful wellsite operation.



**Wireline Schools Level I, II & III
Openhole Personnel to Make Up & Break Down**

STS has assembled a team of wireline specialists that are recognized as second to none in their field! Let our team of skilled personnel help design your next job. By involving our specialists in the planning of your job we can help reduce downtime and enhance a safe and successful operation.

All STS wellsite specialists receive both classroom and on the job Wireline Training as well as industry regulated classes to meet all your needs. During our training process we stress the importance of performing any high pressure wellsite operation safely and efficiently. Our personnel are trained in various wellsite procedures which translates into safe field operation and their ability to work under pressure.

Grease Injection Packages - 5k, 10k, 15k, 20k

Product Description	Application	Working Pressure	Test Pressure	ID (Ranges)	Features
Grease Injection Package	WL/SL	5000	10000	3"	Grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	5000	10000	4 1/16"-4 3/4"	Grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	10000	15000	3"	Dual operated grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	10000	15000	4 1/16"	Dual operated grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	10000	15000	5 1/8"	Dual operated grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	15000	22500	3 1/16"	Dual hydraulic grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	15000	22500	4 1/16"	Dual hydraulic grease injection pumps, hoses, lubricator, wireline valves, and grease head
Grease Injection Package	WL/SL	15000	22500	5 1/8"	Dual hydraulic grease injection pumps, hoses, lubricator, wireline valves (Quad), and grease head
Grease Injection Package	WL/SL	20000	30000	3 1/16"	Dual hydraulic grease injection pumps, hoses, lubricator, wireline valves (Quad), and grease head
Grease Injection Package	WL/SL	20000	30000	4 1/16"	Dual hydraulic grease injection pumps, hoses, lubricator, wireline valves (Quad), and grease head

- Other ID Ranges Available Upon Request



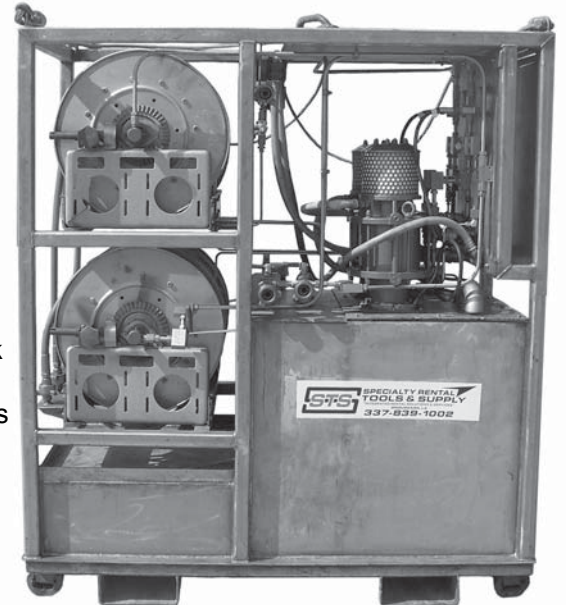
Grease Injection Units (SEPCO)

Features:

- Redundant pumps for grease injection and hydraulic actuation
- Stainless steel control panel, gauges, tubing, fittings and valves
- Four point lift sling
- One 3.3 cubic foot storage compartment
- Wet center stainless steel hose reels
- Fork lift slots
- Compact, rugged design

Specifications:

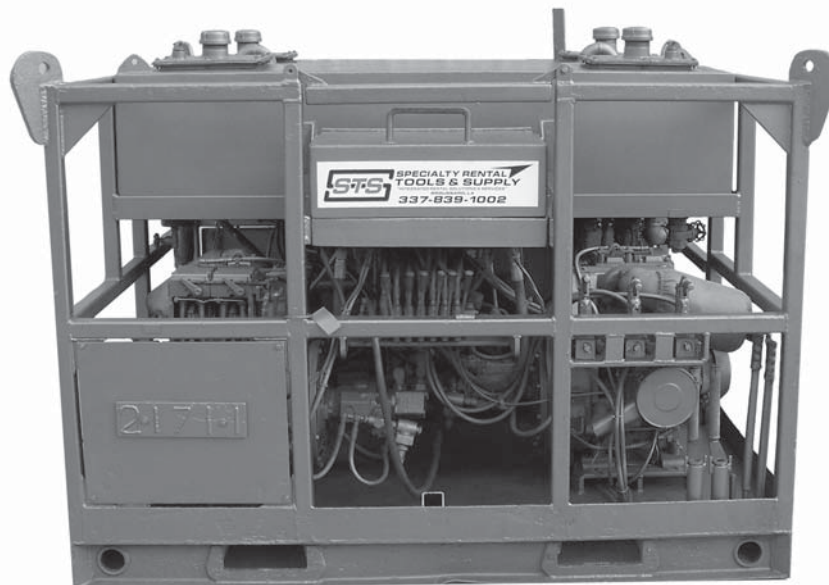
- Grease Pumps - Two air-driven .169 to 1 ratio Lincoln grease pumps, 14, 000 psi maximum output
 - Tanks - One 100 gallon grease tank and One 3.5 gallon hydraulic tank
 - Dimensions - 39 3/16" W x 63" L x 66" H
 - Control Panel - Color coded, engraved stainless steel and components
 - Weight of Complete Assembly - 2,900# (dry)
 - Hoses
 - Grease Injection - 120', 1/2" ID, 10,000psi
 - Grease Return - 120', 1/2" ID, 10,000psi
 - Wireline Valves- 75', 1/2" ID, 10,000psi
- All hoses are rated for -40° F to 200° F (-40° C to 93° C)*



MAC-26 Grease Injection Pump

Features

The MAC-26 is a single stage, hydraulic driven reciprocating pump. It has a 6" power cylinder with a 2" stroke. The MAC 26GP is offered in applications in grease-seal wireline type lubricators. It features ductile iron cylinders and 4140 steel fluid ends. The operating pressure of the MAC-26GP is 22,500 psi. The pump is made up of three major parts: the main cylinder, fluid ends, and the hydraulic control valve. The Mac-26GP pump will provide virtually trouble-free operation for extended running time, provided that the pump is properly maintained and lubricated.



Dual 20k Grease Injector (SEPCO)

Operating Ranges

Working pressure of 20,000 psi (137.9 MPa)
 Pressure tested up to 30,000 psi (206.8 MPa)
 -40°F to +104°F (-40°C to +40°C)

Engines

Two 4-cylinder, 50hp, water-cooled, diesel engines with block heater and air shutoff valve

Pumps

Two Lee Specialties 20ksi intensifier style grease pumps
 45 cm³, variable displacement hydraulic pump coupled with tandem, positive displacement pump
 Grease pre-charge pump with variable pressure and flow controls
 22ksi backup pneumatic grease pump
 Lee Specialties stainless steel, dual hand pumps for packoff, linewiper, tool catcher, tool trap,
 plus one auxiliary operation

Accumulator System

Two 11 gal (41.6 L) 1,500 psi accumulator bottles
 Hydraulic accumulator controls and connections for quad BOP operation
 Automatically controlled pressure
 Hydraulic oil temperature cooled with thermostatic controls

Fluid Tanks

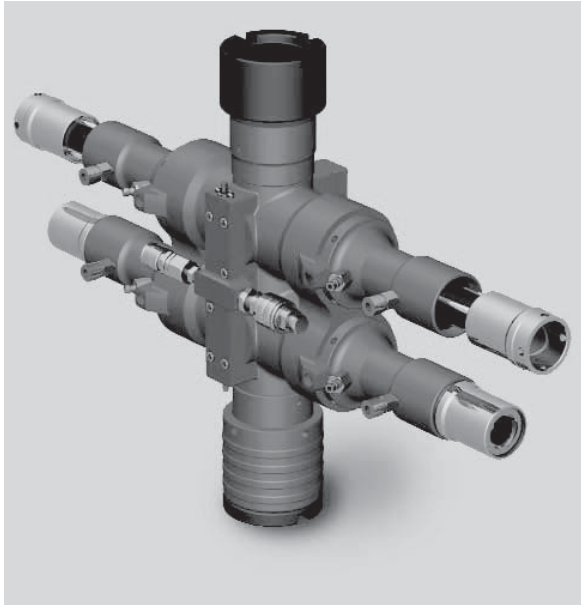
Split grease tank 115 U.S. gal (435 L) + 82 U.S. gal (310 L)
 Two 49 U.S. gal (186 L) hydraulic fluid tanks
 Two 19 U.S. gal (75 L) fuel tanks

Skid Construction

All stainless steel frame and cage (standard painted steel available)
 Stainless steel, engraved control panel
 Four-point lifting brackets and forklift pockets
 Dash and working lights
 Spill containment floor pans



“Lightweight” Wireline Valve



The Elmar “Lightweight” Wireline Valve is available in 3” and 4 1/16” I.D., 10,000 psi working pressure, H2S service, in either single, dual or triple configurations.

The Elmar “Lightweight” Wireline Valve gives positive protection during well service operations, when operating with slickline, braided wireline and electric line.

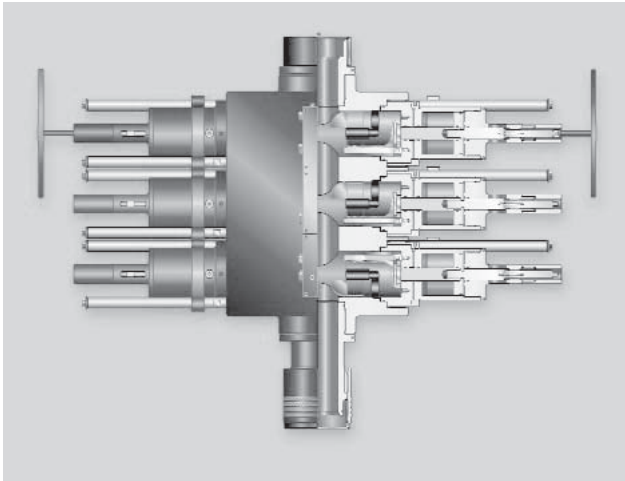
All Elmar “Lightweight” Wireline Valves are up to 60% lighter than previous generation wireline valves.

Features:

- Lightweight, allowing easier handling 3” Single 66kg, (146lb), Dual 114kg, (251lb) and Triple 162kg, (357lb) with Elmar lightweight quick unions
- Compact size, allowing shorter rig-up heights
- Back-up manual closure
- Threaded quick unions, allowing the use of any Bowen, Elmar or Otis type union without changing the body
- Ram position indicator rods
- Manifold blocks with integral equalisation, glycol and grease injection
- Maximum working pressure 10,000 psi H2S service
- Maximum hydraulic working pressure 3,000 psi
- API 6A and NACE compliant, with Third Party Design Approval
- Keyless Q-GUIDE™ ram design providing flexible ram configuration and positive wireline guiding
- “Multiline” inner seal accommodating a range of wireline sizes from slickline to 5/16”

Manifolds	
<p>Grease/Glycol Injection and Equalisation</p>	<p>Bleed Off and Gauge</p>
Lightweight BOP, Lubricator and Stuffing Box	

Compact Wireline Valve

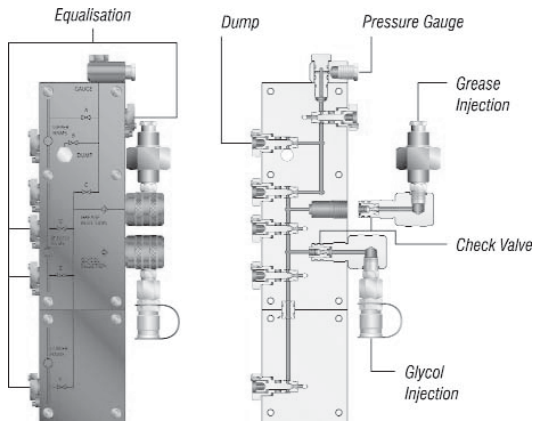


The Elmar Compact Wireline Valve is of mono-block construction and is designed for use in either single, dual, triple or quad configurations.

The valve gives positive protection during well service operations, when operating with slickline, braided wireline and electric line. It is available in a full range of sizes and working pressures, from 2 1/2" to 6.70" bore sizes, and 5,000 psi to 15,000 psi working pressures. Additional sizes are available on request.

For greater corrosion resistance all sizes of Elmar Compact Wireline Valves can be supplied with Inconel inlays in the ram bores and the through bore.

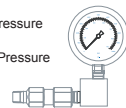
Typical Triple Manifold Block Type "C"



Manifold type "A" : Equalisation and Pressure Gauge Connection Facility
 Manifold type "B" : Equalisation, Pressure Gauge Connection and Grease Injection Facility
 Manifold type "C" : Equalisation, Pressure Gauge Connection and Grease and Glycol Injection Facility

Manifold Gauge Kits

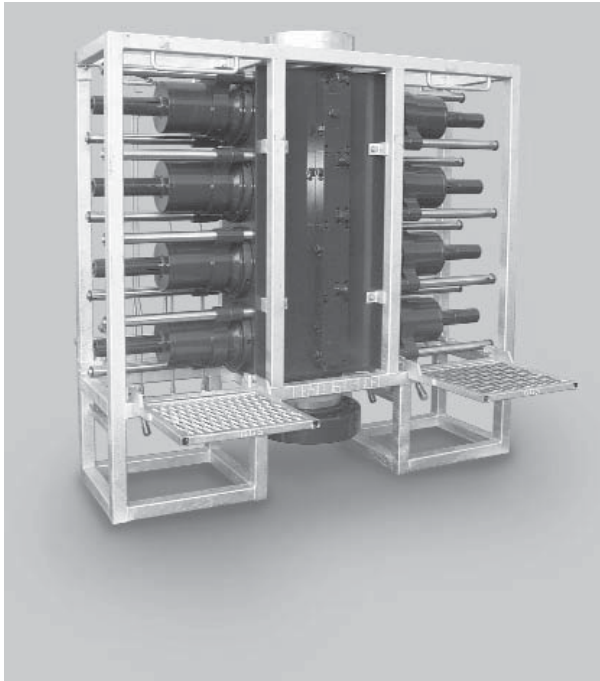
Part Number	Description
L-660492	Manifold Gauge Kit, 5,000 psi Working Pressure
L-660493	Manifold Gauge Kit, 10,000 psi Working Pressure



Features:

- Compact size, allowing shorter rig-up heights
- Keyless ram bores, allowing ram inversion as and when required
- Quick coupled hydraulic cylinders, allowing fast removal of cylinder for ram or seal replacement
- Threaded quick unions, allowing the use of any Elmar, Bowen or Otis quick union without changing the body (integral unions/flanges are available as an optional extra)
- Ram position indicator rods
- Hydraulic cylinder support arms for 4" - 6.70" Pressure Control valves
- Manifold block with integral equalisation, glycol and grease injection
- Q-Guide Ram Assembly for Multi Line slickline to 0.312"

Quad Wireline Valve



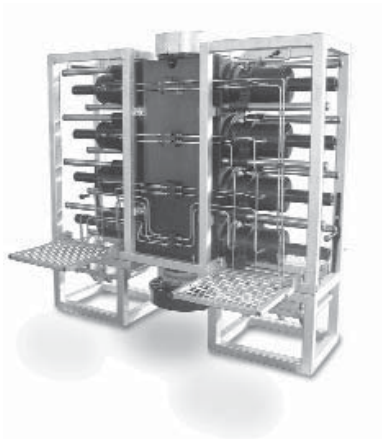
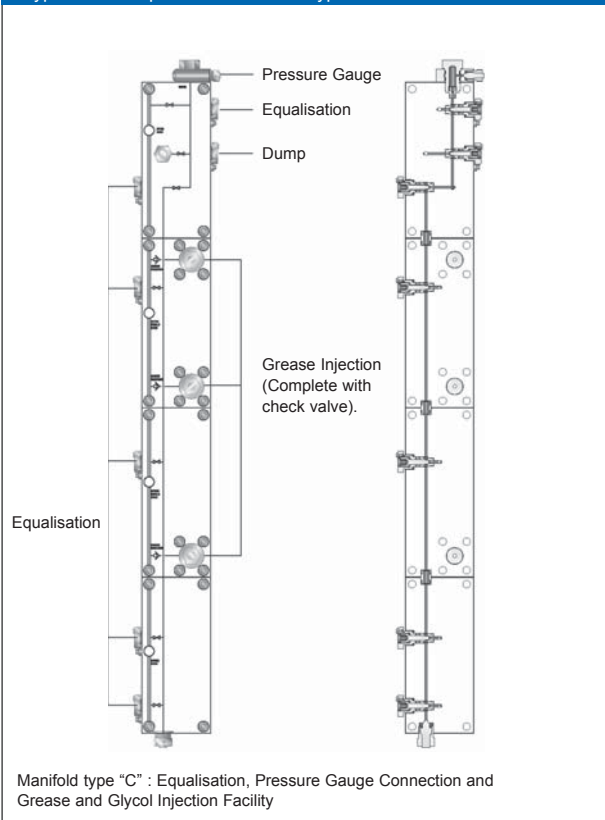
The Elmar 6 3/8" Quad Wireline Valve is certified to 15,000 psi WP at 350F.

Each 6 3/8" Wireline valve is configured for braided line, slickline and shear seal and incorporates Elmar Q-Guide wireline rams.

Features:

- An integral API 6A flange
- Independent grease injection ports
- An integral quick test port in the upper union
- Compact size, allowing shorter rig-up heights
- Keyless ram bores, allowing ram inversion as and when required
- Ram position indicator rods
- Manifold block with integral equalisation, glycol and grease injection facilities
- Hard piped for fire resistance

Typical Quadruple Manifold Block Type "C"



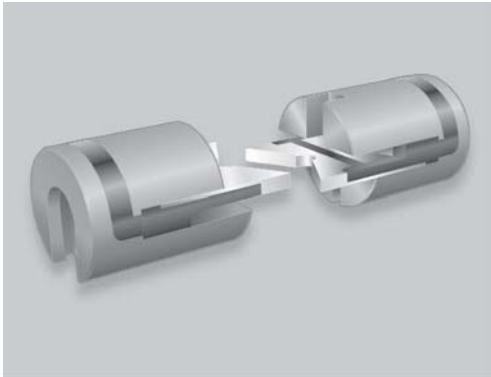
Hard piped for fire resistance



Q-GUIDE™ Ram Body

The Elmar Q-GUIDE™ ram, is a new proprietary design (Patents Pending) that provides a positive alignment for the wireline. V-shaped flat guides on either side of the inner seal restrict the wireline so that the section of line contacting the inner seal is always centred and parallel to the wireline valve axis.

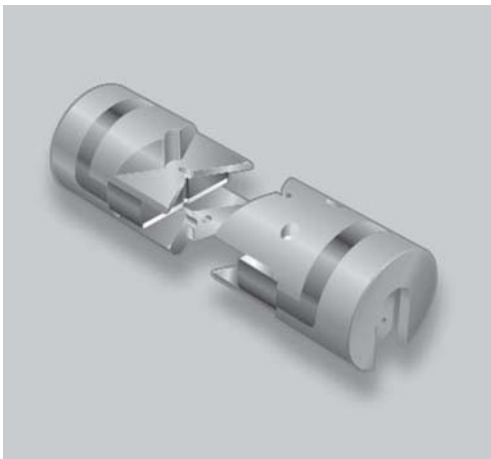
Shear and Seal Wireline Ram Assembly



The Elmar Shear and Seal Wireline Ram Assembly has been developed to satisfy the requirement for wireline operators to be able to shear their wire and seal the well independently of the well control equipment used by the drilling or oil company.

The Elmar Shear and Seal Ram Assembly can be installed in Elmar Surelok and Compact design wireline valves of up to 10,000 psi working pressure and has a full bore (except 2 1/2" - 3" version) guiding and shearing capacity. For use with up to 15/32" wire, dependant on BOP ram assembly size.

The ram bodies are manufactured from H2S resistant alloy steel, the elastomers from tear resistant Nitrile and the shear blades from through hardened alloy steel.



Q-Guide™

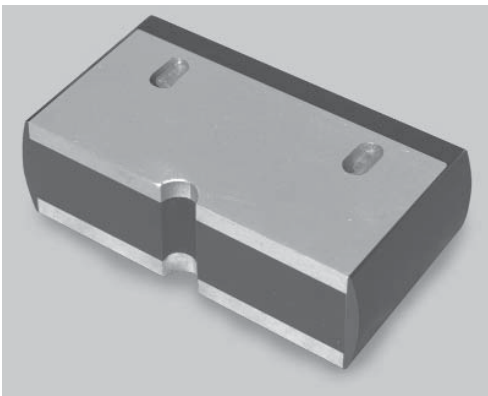
The Elmar Q-GUIDE™ ram, is a new proprietary design (Patents Pending) that provides a positive alignment for the Wireline. V-shaped flat guides on either side of the inner seal restrict the Wireline so that the section of line contacting the inner seal is always centred and parallel to the wireline valve axis.

The Q-GUIDE™ has been designed to accommodate eccentric set-ups where the wireline goes through the wireline valve body at an angle and can be trapped by the rams before falling in the cable groove.

The Q-GUIDE™ style of ram has been developed to replace integral guide style rams. Inner and outer seals used in the Q-GUIDE™ are the same as used in the current styles of ram bodies.

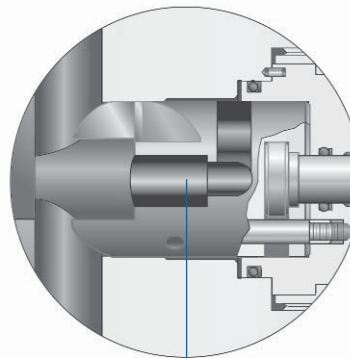
The Elmar multi-line inner seal can be used with the Q-GUIDE™ ram for maximum effect.

The Q-GUIDE™ is available for all sizes of Pressure Control valves.



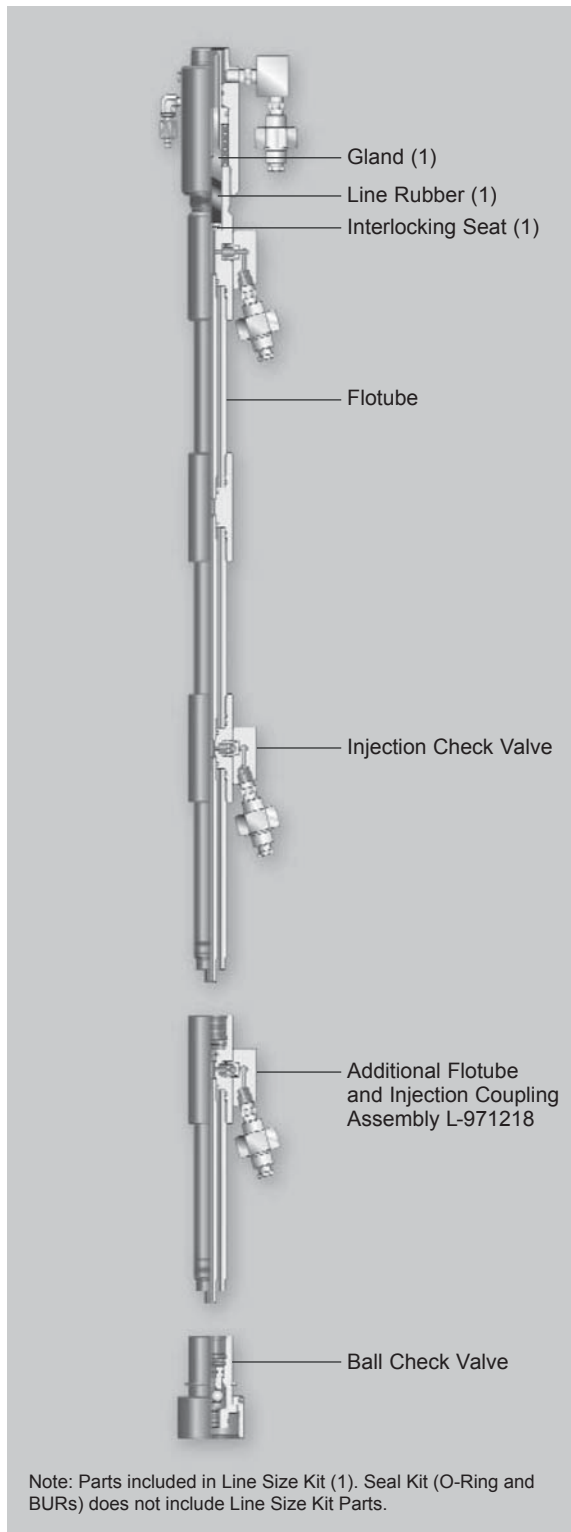
Multi Line Ram Seal

Where conventional seals are sized for one line size only, the Elmar Multi Line Ram Seal has been designed to seal a range of line sizes from blind and cover 0.092" slickline through to 0.312" braided line using a specially developed elastomer. The ram seal is directly interchangeable with conventional seals in Elmar's wireline valves. For use up to 10,000 psi working pressure and -30°C to 121°C, H2S service.



Multi Line Ram Seal

Wireline Grease Injection Control Head



The Elmar Grease Injection Control Head is designed to create a seal around a moving wireline, allowing intervention access to wells under pressure.

Positioned at the uppermost point of the wireline equipment string, the Elmar Grease Injection Control Head comprises two major sub-assemblies, the stuffing box or pack-off and the flotube assembly.

The stuffing box is designed to pack-off on a stationary wireline by means of a pack-off rubber energised by hydraulic pressure.

Two types of flotube assemblies are available, the "solid" type and the "concentric" type, as described in this data sheet. The concentric flotube assembly is made up of an inner flotube sized to fit tightly around the wireline and an outer sleeve to support the assembly.

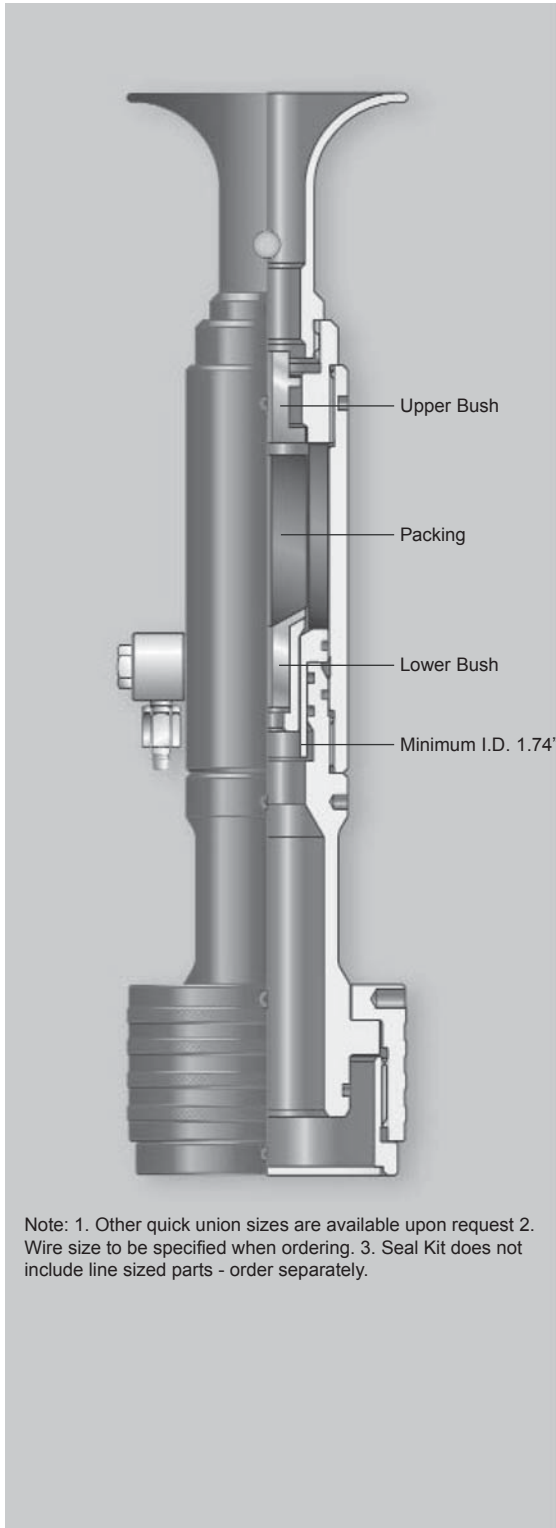
To prepare for operations, the wireline is threaded through the components of the Elmar Grease Injection Control Head before the rope socket and wireline head are made-up. When entering a well under pressure, viscous grease is injected into the flotubes at a pressure minimum 20% greater than the existing well pressure. The grease fills the annular space between the inner wall of the flotube and the outside surface of the wireline, forming a liquid seal that contains the well fluids while allowing wireline movement.

The Elmar Grease Injection Control Head is supplied with pin threaded connections top and bottom. The upper pin is 2" line pipe for connection of a line wiper. The bottom connection can be mated to a quick-union, or a ball check valve/tool catcher combination. An optional Line Wiper is normally connected on top of Stuffing Box.

When changing line size, a different line size kit is needed for the stuffing box, identified by the Line Size Code letter. See overleaf for details.

Recommended flotube clearance + 0.003" to 0.008".

Enviro™ Single “Compact” Pack-Off



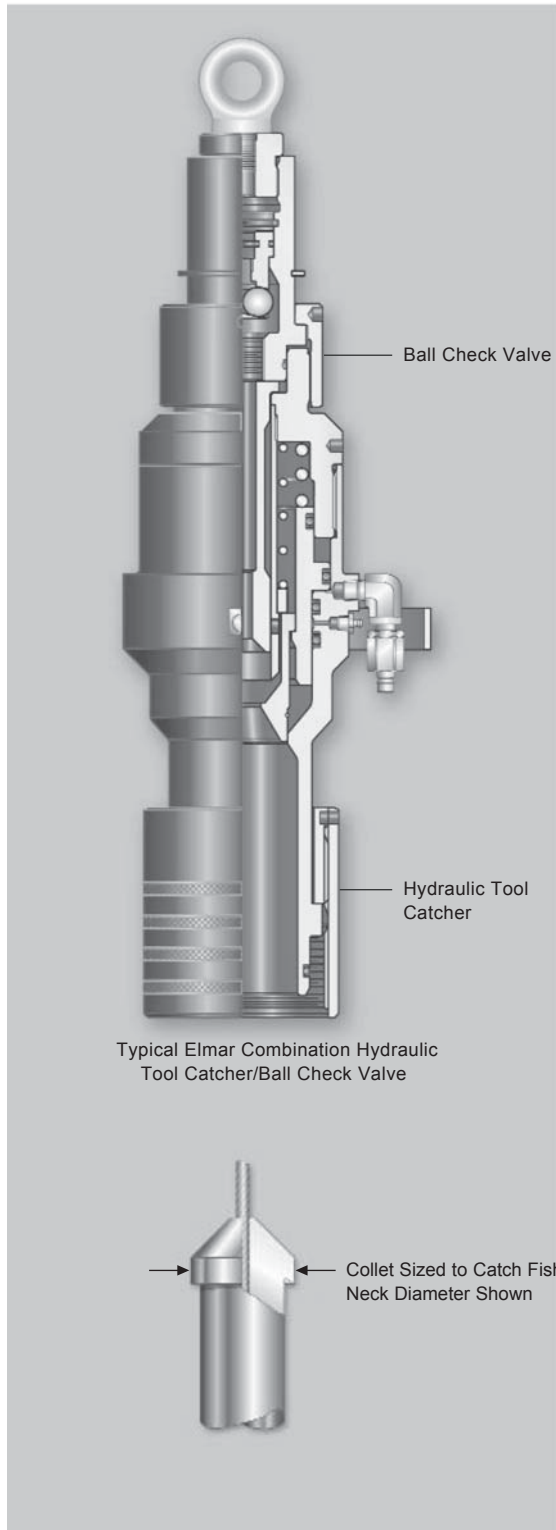
The Elmar Enviro™ Single Hydraulic “Compact” Pack-Off is designed to wipe clean moving cable under pressure. Positioned above the tubing/casing, the Enviro™ Single “Compact” Pack-Off is built around the wire before the wireline tool is lowered into the well.

The Enviro™ Single “Compact” Pack-Off works by squeezing the independent rubber element which is wrapped around the wire. The element seals on the cable outer armour against well pressure, as well as wiping the wire free of fluid. The sealing element will seal on static cable, although the ideal cable to seal on is a seasoned cable.

The Enviro™ Single “Compact” Pack-Off is designed so that the rubber element in direct contact with the wire is easily replaced. The Enviro™ Single “Compact” Pack-Off is rated to 5,000 psi working pressure (static wireline) and H2S service and is available with full material traceability and Third Party Certification. A 0-3000 psi hand pump and hose is required to operate the Enviro™ Single “Compact” Pack-Off.

Note: 1. Other quick union sizes are available upon request 2. Wire size to be specified when ordering. 3. Seal Kit does not include line sized parts - order separately.

Tool Catcher and Ball Check Valve

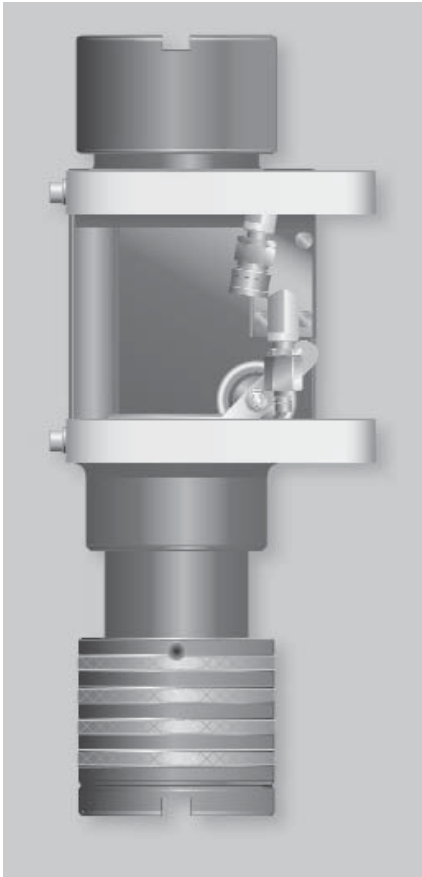


The Elmar Hydraulic Tool Catcher is a safety device for installation below the grease injection head or slickline stuffing box. If the tool is pulled into the top of the lubricator and the wire stripped from the rope socket, the tool catcher will engage the tool's fishing neck and prevent the loss of the tool string into the well bore. The tool catcher is designed to be fail-safe: it is permanently in the catch position and requires hydraulic pressure to release.

Elmar hydraulic tool catchers for electric line are normally supplied with an integral ball check valve assembly, and a top connection into which a grease head can be directly screwed. As an option the tool catcher is available with a glycol injection port. For slick line operations Elmar hydraulic tool catchers are available with quick unions top and bottom.

Elmar hydraulic tool catchers are available with ratings from 5,000 psi to 15,000 psi WP, STD and H2S service. Collet sizes vary from 1" to 1 3/4" fishing necks. Multi-catch options are available in two ranges: 1" to 1 3/4" and 1 3/16" to 2 5/16".

Hydraulic Tool Trap

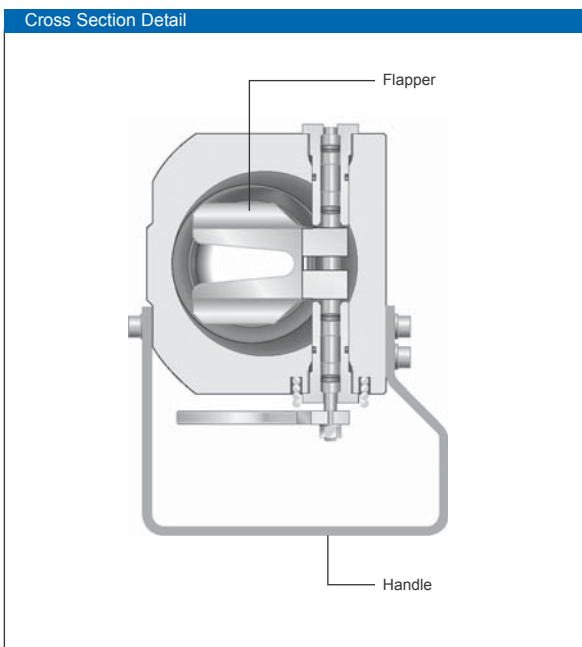


The Elmar Hydraulic Tool Trap with external indicator is installed between the Wireline Valve and the lubricator string. It prevents the loss of wireline tools downhole in the event of the wire being pulled-off the rope socket, by retaining the dropping tool on a flapper. The flapper has an opening larger than the wireline, but smaller than the tool string.

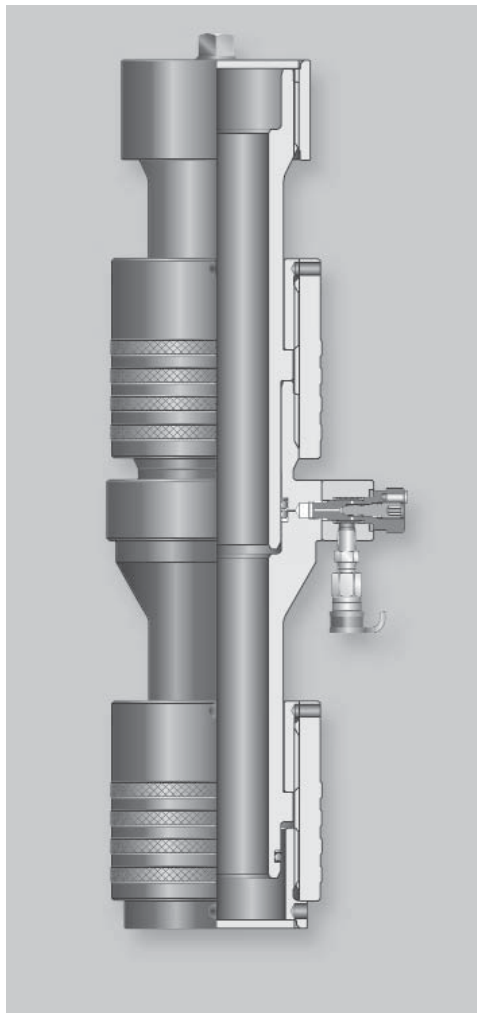
The flapper is operated by a hydraulic actuator, through an external handle, connected to the flapper with a low-torque pressure-balanced shaft. The external handle doubles as a tool passage indicator. The tool string may be pulled freely upwards through the tool trap. The flapper will move upwards, together with the external handle, indicating tool passage. As soon as the string bottom has cleared the flapper, the flapper will drop back into the trap position, pushed by a torsion spring. The flapper can be lifted remotely when running a tool in the well by activating the piston in the hydraulic actuator. Pumping back the piston to its original position allows the flapper to return to its trap position.

The hydraulic actuator can be operated by a dual output manual pump or with an Elmar Hydraulic Control Module.

Pressure Ranges - 5k, 10k, 15k, 20k
Size Ranges - 2 1/2", 3", 4 1/16", 5 1/8"



Quick Test Sub



The Elmar Quick Test Sub (QTS) is designed to save rig time while pressure testing the wireline pressure control equipment string when multiple wireline runs are required.

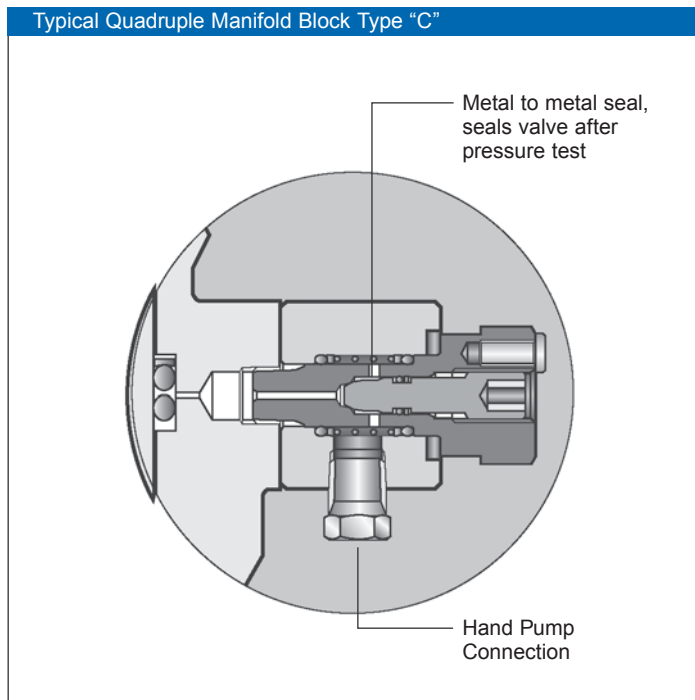
The Elmar Quick Test Sub is inserted either above or below the wireline valve at the position of the joint normally opened to insert and retrieve tools from the well. After performing the first pressure test to check the integrity of the whole String, subsequent pressure tests can be made using the Quick Test Sub to verify the integrity of the joint disconnected, rather than having to test the whole assembly. This is achieved by connecting a small hydraulic hand-pump to the Quick Test Sub and testing the joint 'O' ring seal from the outside. It is estimated that the use of the Elmar Quick Test Sub can reduce the time needed to pressure test the String at each subsequent test by more than 1/2 hour.

Features:

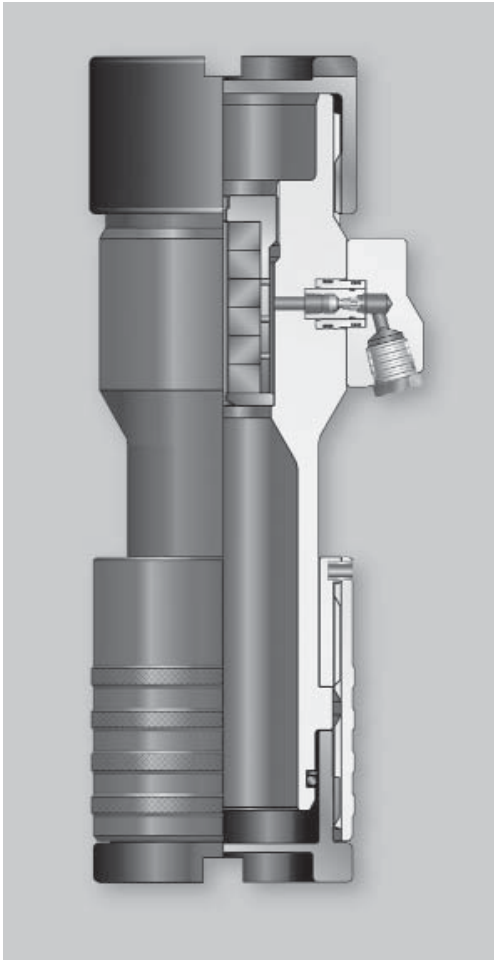
- Saves rig time on pressure test due to design features
- Eliminates prospect of contaminating well with test fluids
- Saves on glycol
- Eliminates risks of pressure testing with perforating guns

Pressure Ranges - 5k, 10k, 15k, 20k

Size Ranges - 2 1/2", 3", 4 1/16", 5 1/8"



Chemical Injection Sub



The Elmar Chemical Injection Sub is designed to apply a de-icing agent or corrosion inhibitor to the wireline during well service operations.

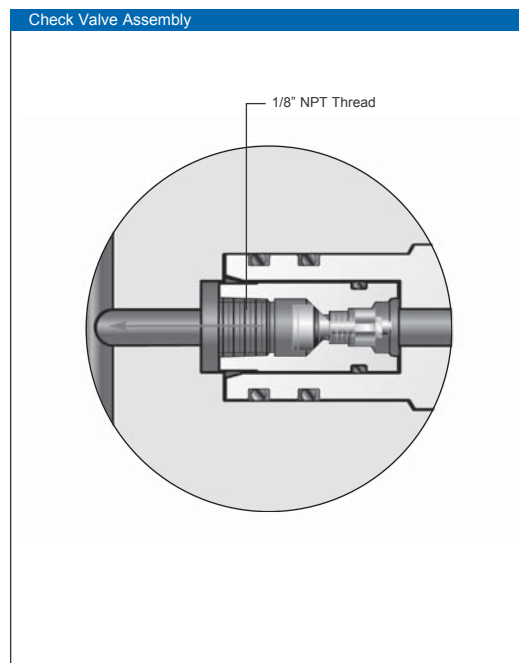
Installed below the grease injection control head or slickline stuffing box, the Elmar chemical injection sub utilises replaceable felt packings to coat the wireline and prevent the chemical from passing downhole.

The Elmar chemical injection sub consists of a one piece body with integral quick unions on both ends, a quick union collar assembly, a manifold injection block assembly with integral check valve and a felt packing retainer assembly. The check valve assembly is designed for easy and quick replacement.

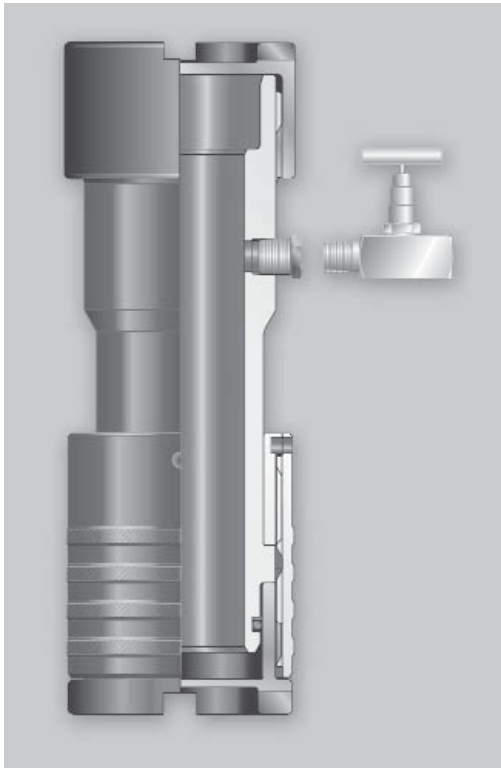
Elmar chemical injection subs are available in a full range of wire sizes, and 5,000 psi to 20,000 psi working pressures.

Features:

- Lightweight
- One piece body with integral quick unions
- Integral check valve
- Available to suit all wire sizes
- Other sizes available upon request

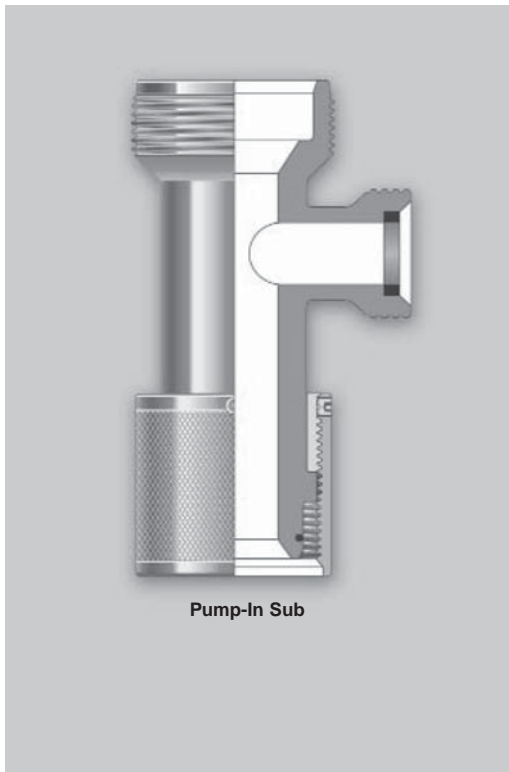


Bleed-Off Sub



For applications when a bleed-off port is required on the lubricator string, subs are available with a 1/2" NPT Port for connection of a suitable valve. The Bleed-Off Sub is particularly effective when used in conjunction with Lightweight Lubricator.

Pressure Ranges - 5k, 10k, 15k, 20k
Size Ranges - 2 1/2", 3", 4 1/16", 5 1/8"

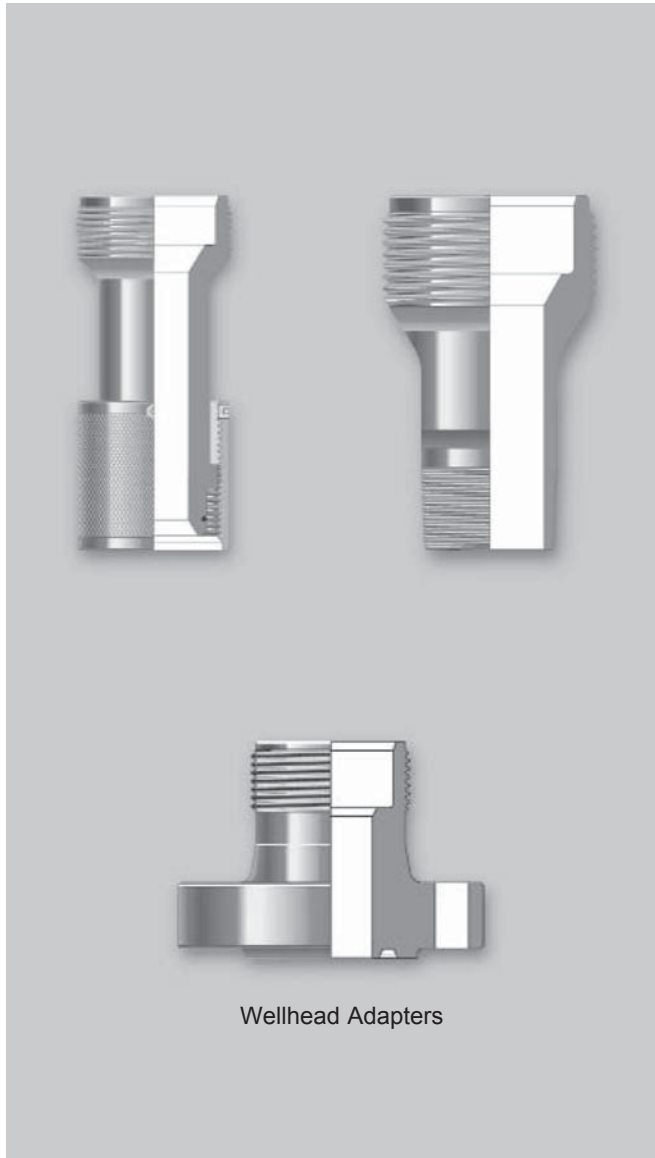


Pump-In Sub

National Oilwell Varco Pump-In Subs are designed to provide convenient access for pumping fluids into the well or bleeding of lubricator pressure. They are available with several variations of side outlet ports. Pump-In Subs are available in I.D. sizes ranging from 2 1/2" to 7 1/6" with a wide range of side outlet configurations. They are available in H2S or standard service.

Pressure Ranges - 5k, 10k, 15k, 20k
Size Ranges - 2 1/2", 3", 4 1/16", 5 1/8"

Adapter Flanges



Wellhead Adapters

Bowen Crossover Adapters are designed to safely connect lubricator sections with different end connections. An adapter can be a combination of a Bowen box section by Bowen pin section and retainer nut, or a combination of a Bowen box section by a tool joint connection (as specified). Bowen Crossover Adapters are manufactured from alloy steel and are available for H2S or standard service.

Features:

- 3,000 psi to 20,000 psi working pressure
- H2S or standard service
- 2" to 6 1/2" I.D. available

Bowen Wellhead Adapters

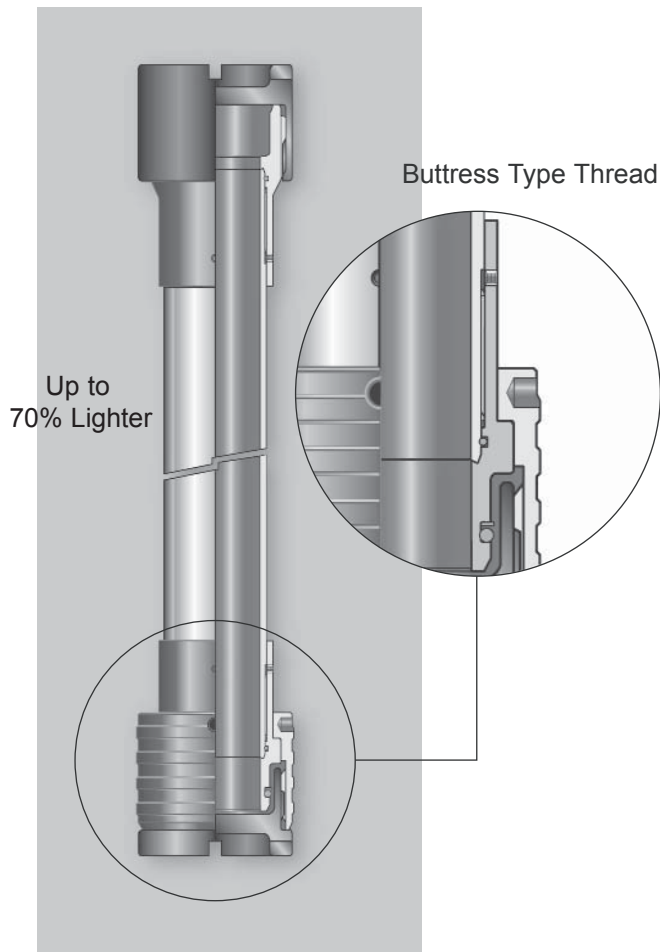
Bowen Wellhead Adapter flanges are manufactured from alloy steel and are designed to provide a means of connecting the wireline lubricator assembly to the wellhead. Bowen Wellhead Adapter flanges are manufactured with an API flange connection on bottom and a union box connection on top.

Features:

- One-piece construction
- Models available for 3,000 psi to 20,000 psi working pressure
- H2S or standard service
- 2 1/16" to 7 1/16" I.D. available

See Charts on Following Page

Lightweight Lubricator



The Elmar “Lite” lubricators enable the wireline tool string to be introduced or retrieved from a well bore under pressure. They are normally positioned above the wireline valve, tool trap or quick test sub. By using high strength stainless steel alloys, the weight of a lubricator section is reduced by up to 70% with respect to conventional integral lubricators.

The Elmar “Lite” lubricator consists of four basic parts: a quick union collar, a male quick union, a lubricator tube, and a female quick union. The quick unions are manufactured in H2S resistant alloy steel to prevent galling.

Elmar “Lite” lubricators are rated 10,000 psi H2S service. The Elmar lightweight quick unions have been selected for optimum weight reduction and to prevent unsafe cross-string assembly. Upper and lower adapters are available to connect existing equipment. These are rated 5,000 psi or 10,000 psi depending on the type of connection.

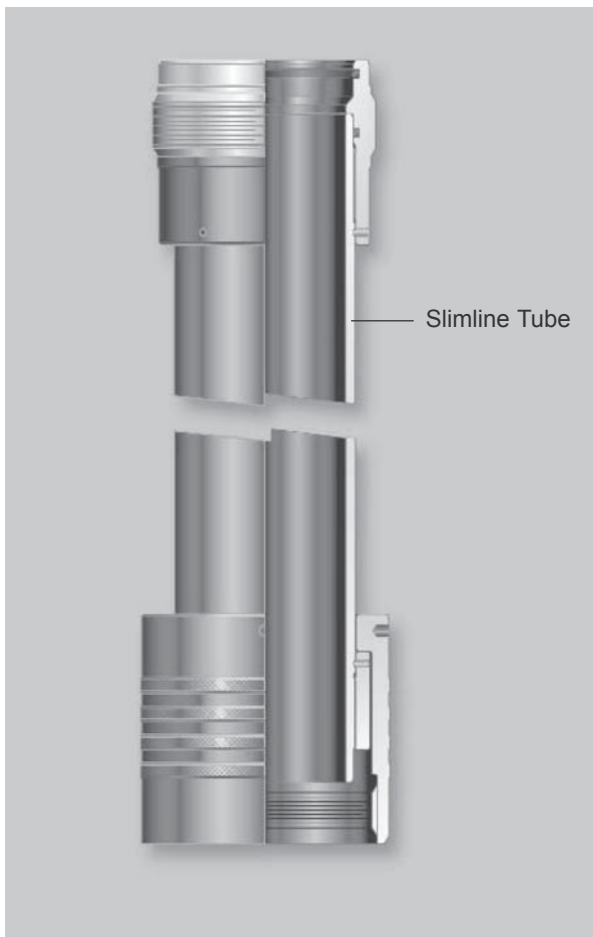
Pressure Ranges - 10k

Size Ranges - 3”, 4 1/16”, 5 1/8”

Features:

- Corrosion Resistant Tube made from high strength NACE Certified Stainless Steel
- Quick unions are coupled through Premium Elmar Lite Coupling:
 - Tube-to-union seal is metal-to-metal backed-up by O-Ring
 - Special handling tools supplied. Calibrated torque is not required
- Bending stresses at the thread undercut are minimised
- Elmar Lightweight Quick Unions:
 - 3" ID: 4 3/4"- 4x2thd (3.750" seal dia)
 - 4 1/16" ID: 6 1/8"- 4x2thd (4.750" seal dia)
- “Otis Type” Union:
 - 5 1/8" ID: 9"- 4thd (6.750" seal dia)
- Other unions available upon request

Large Bore Riser

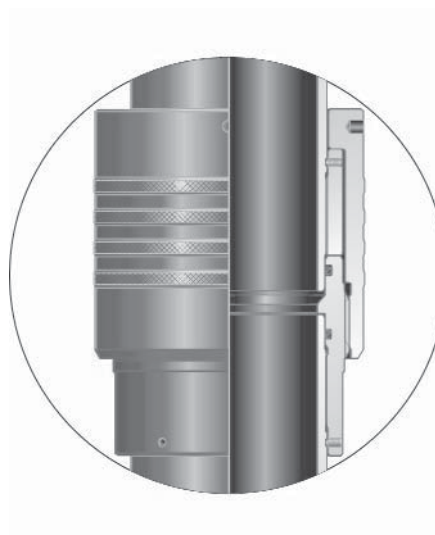


The Elmar Slimline equipment complements Elmar's range of large bore pressure control equipment. Available in H2S and STD service, the equipment is typically used during "Open Hole" wireline intervention work, or for perforating operations with large casing guns.

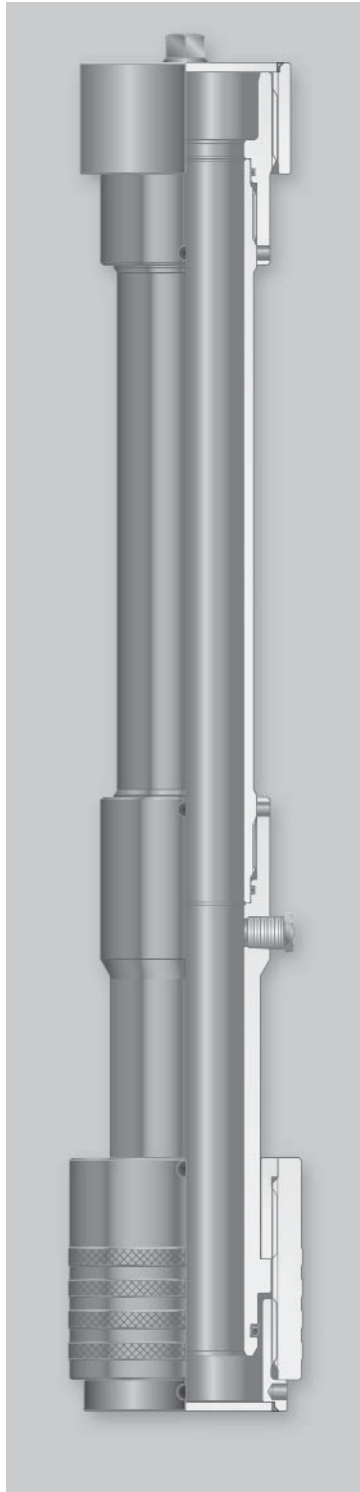
The Slimline range of pressure control equipment uses lubricators made out of L-80 or P-110 Casing tubes. The Slimline equipment has a 1.5 safety factor with Test Pressure = 1.5 X Working Pressure in the 3,000 psi and 5,000 psi WP range.

**Size Ranges - 5 1/2", 7", 7 5/8", 9 5/8", 10 3/4",
13 3/8"**

Slimline Unions



Wireline Lubricator with Threaded Unions



Threaded Lubricator

This Lubricator Section is used when performing wireline or electric line operations with 1/2" NPT bleed port fitted. Quick unions are of the screwed type with a Elmar ACME thread, which incorporates primary 'O' ring seal with metal back-up. Det Norske Veritas and Lloyds Design type approval is available if required.

Features:

- Maximum working pressure 15,000 psi
- Standard and H2S service

3" Diameter Through Bore

Ports	Working Pressure	Service	Quick Union Connection	I.D.	Length
No Port	10,000 psi	H2S	5 3/4"-4thd (4.000") Otis	3"	4ft
No Port	5,000 psi	H2S	5 1/2"-4x2thd (4.375") Bowen	3"	8ft
No Port	10,000 psi	H2S	6 5/16"-4thd (4.375") Bowen	3"	8ft
1 x Port	10,000 psi	H2S	5 3/4"-4thd (4.000") Otis	3"	8ft
No Port	15,000 psi	H2S	7"-5thd (4.375") Bowen	3"	8ft
1 x Port	5,000 psi	STD	5"-4thd (3.500") Otis	3"	10ft
No Port	10,000 psi	H2S	6 5/16"-4thd (4.375") Bowen	3"	10ft

4" - 4 1/2" Diameter Through Bore

Ports	Working Pressure	Service	Quick Union Connection	I.D.	Length
1 x Port	5,000 psi	H2S	7"-5thd (5.250") Bowen	4"	5ft
No Port	10,000 psi	H2S	8 1/4"-4x2thd (6.000") Bowen	4"	6ft
1 x Port	5,000 psi	H2S	6 1/2"-4thd (4.750") Otis	4"	8ft
2 x Port	10,000 psi	STD	6 1/2"-4thd (4.750") Otis	4"	8ft
No Port	10,000 psi	H2S	8 1/4"-4x2thd (6.000") Bowen	4"	10ft
1 x Port	10,000 psi	H2S	8 3/8"-4thd (5.250") Otis	4"	10ft
2 x Port	10,000 psi	H2S	8 1/4"-4x2thd (6.000") Bowen	4"	10ft

5" - 5 1/2" Diameter Through Bore

Ports	Working Pressure	Service	Quick Union Connection	I.D.	Length
No Port	10,000 psi	H2S	9"-4thd (6.750") Otis	5 1/8"	3ft
No Port	10,000 psi	H2S	9"-4thd (6.750") Otis	5 1/8"	5ft
1 x Port	10,000 psi	H2S	9"-4thd (6.750") Otis	5 1/8"	8ft

Dual Hydraulic Wireline Annular Valve

For Open Hole Operations

7 5/8" & 9 5/8"

Elmar Dual Hydraulic Annular Pressure Control Valve 3,000 psi Working Pressure (STD Service)

The M3000 is designed so that the rubber element which is in direct contact with the wire can be easily replaced.

An Air Cleaner is integral to the upper and lower assembly.

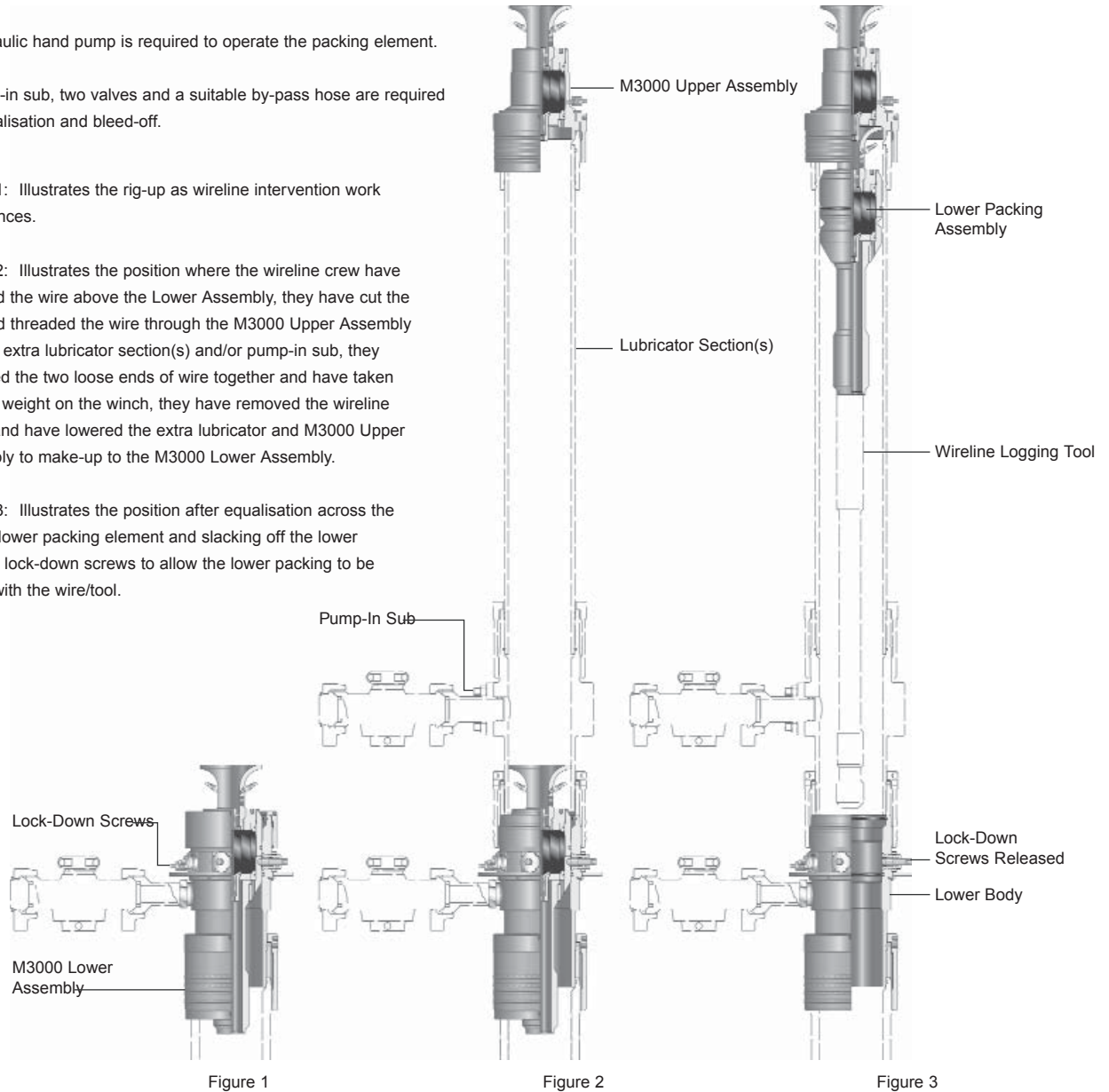
A Hydraulic hand pump is required to operate the packing element.

A pump-in sub, two valves and a suitable by-pass hose are required for equalisation and bleed-off.

Figure 1: Illustrates the rig-up as wireline intervention work commences.

Figure 2: Illustrates the position where the wireline crew have clamped the wire above the Lower Assembly, they have cut the wire and threaded the wire through the M3000 Upper Assembly and the extra lubricator section(s) and/or pump-in sub, they have tied the two loose ends of wire together and have taken the tool weight on the winch, they have removed the wireline clamp and have lowered the extra lubricator and M3000 Upper Assembly to make-up to the M3000 Lower Assembly.

Figure 3: Illustrates the position after equalisation across the M3000 lower packing element and slacking off the lower packing lock-down screws to allow the lower packing to be raised with the wire/tool.



Open Hole Lubricator Sizes:

5 1/2", 7", 7 5/8", 9 5/8", 10 3/4", 13 3/8"

Dual Hydraulic Wireline Annular Valve

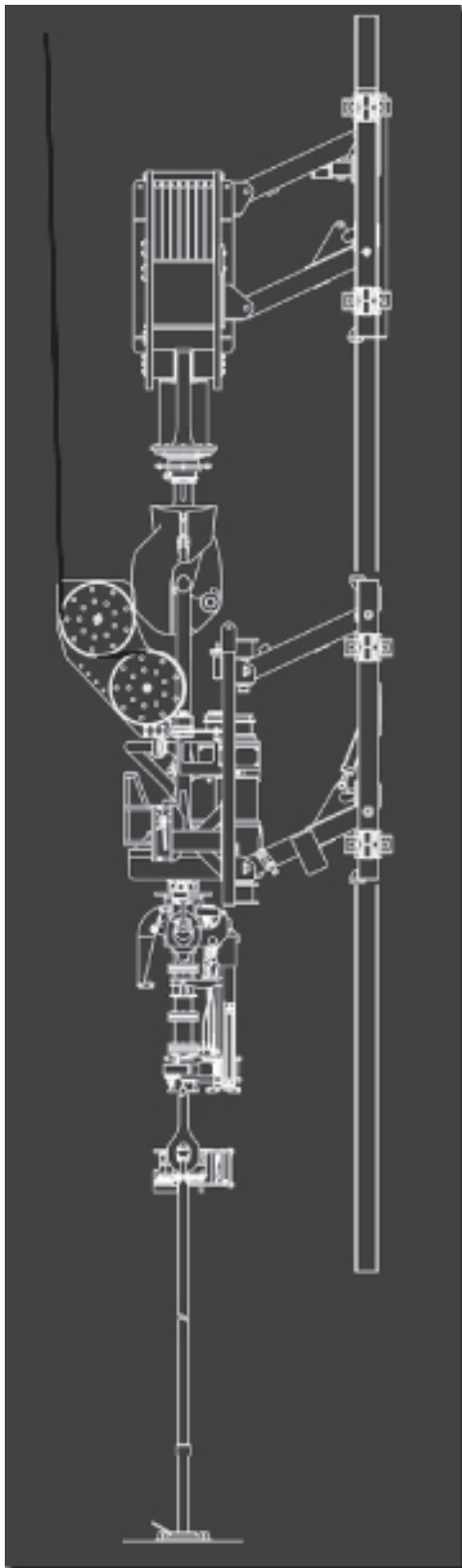


The Elmar Dual Hydraulic Annular Wireline Valve (M3000) is a two piece tool which is designed to seal on a static cable under pressure and which if necessary allows the introduction of extra lubricator sections to the wireline rig-up if the operating conditions necessitate this step. It is to be used for "Safety While Logging" applications, perforating with large guns and other similar wireline intervention work.

Positioned above the drilling BOP, or a "shooting nipple", the M3000 Lower Assembly comprises a lower body and a lower packing assembly which can be easily disassembled for ease of rig-up. The M3000 Lower Assembly offers a through bore of 6 1/2" ID maximum (depending on connection type). Several elements of the lower packing assembly are either slotted or split in order that the cable head with rope socket can remain intact.

In the course of the wireline intervention it may be necessary to add lubricator sections with the Upper Assembly installed to overcome a wireline problem e.g. bird cage or a well "kick". A two step procedure will allow the bird cage to be removed from the well and the wireline tool to be raised above the drilling BOP in order that it may be closed.

Top Entry Access System



Our exclusive STS Top Entry Access System (TEAS) allows wireline access to drill pipe or tubing through the gooseneck connection in the top of the top drive while preserving the ability to use the top drive to pull and torque the pipe.

Top entry eliminates pressure control contact with the top drive housing and traveling block while running the block near the floor. This reduces the potential for cable damage and increases safety.

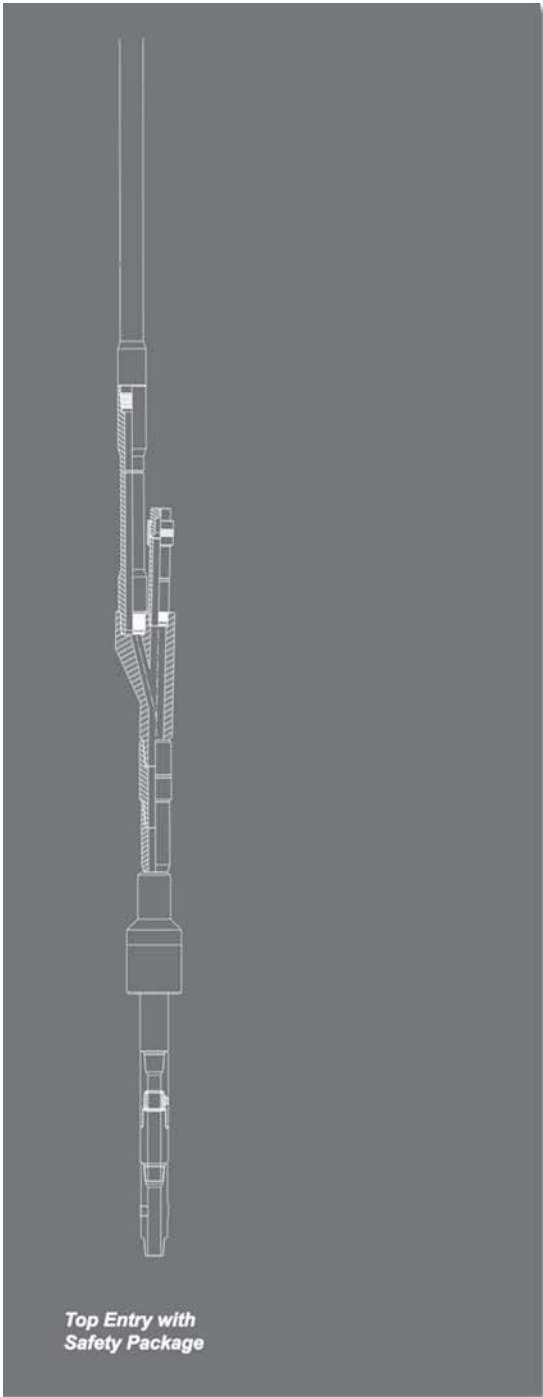
During open hole cut and strip over operations the TEAS eliminates the need for a man in the derrick to stab the wireline overshoot with each connection. The overshoot is simply pulled into the top drive while each 90' stand is picked up. The overshoot is then cycled back through the stand without intervention.

Wireline pipe recovery operations, which traditionally involve inputting torque with the rotary table and working it down while trapping it with a backup tong, can be accomplished with the top drive instead. The elimination of a backup tong and tong line under tension while working torque greatly increases safety on the rig floor.

Efficiency is also enhanced during directional drilling operations with pressure control steering tools.



Top Entry System



STS Top Entry System

The Top Entry System allows wireline tools direct entry into the pipe string. The wireline entry bore is collinear with the pipe bore allowing longer tools unrestricted entry into the well through a wireline quick union.

There is no need to break the drill pipe or tubing connection to enter or exit the well. Wireline pressure control systems ranging from 5,000 psi packoffs to 15,000 psi grease injection heads may be run with this system.

Applications

Directional Drilling

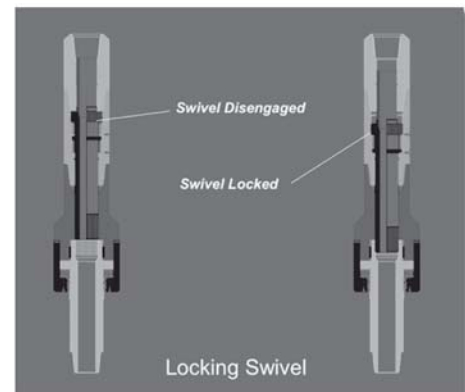
When used with top drive systems, wireline steering tools may be easily admitted and retrieved from the string.

Pipe Recovery

Once assembled, wireline tools have direct entry into the pipe string which eliminates the need to separate and re-connect the pipe string for each run. When run in conjunction with the Locking Swivel, both make-up and reverse torque can be applied and held with the top drive. This eliminates the need to use a back up tong for holding torque and increases safety on the rig floor.

Locking Swivel

The STS Locking Swivel utilizes a hydraulically actuated spline shaft which provides eighty three separate orientations per revolution. This innovation allows the pipe to be worked or oriented as with a conventional swivel but then locked in place. By trapping torque or holding orientation with the top drive's brake, back up tongs and the hazards associated with their use can be eliminated.

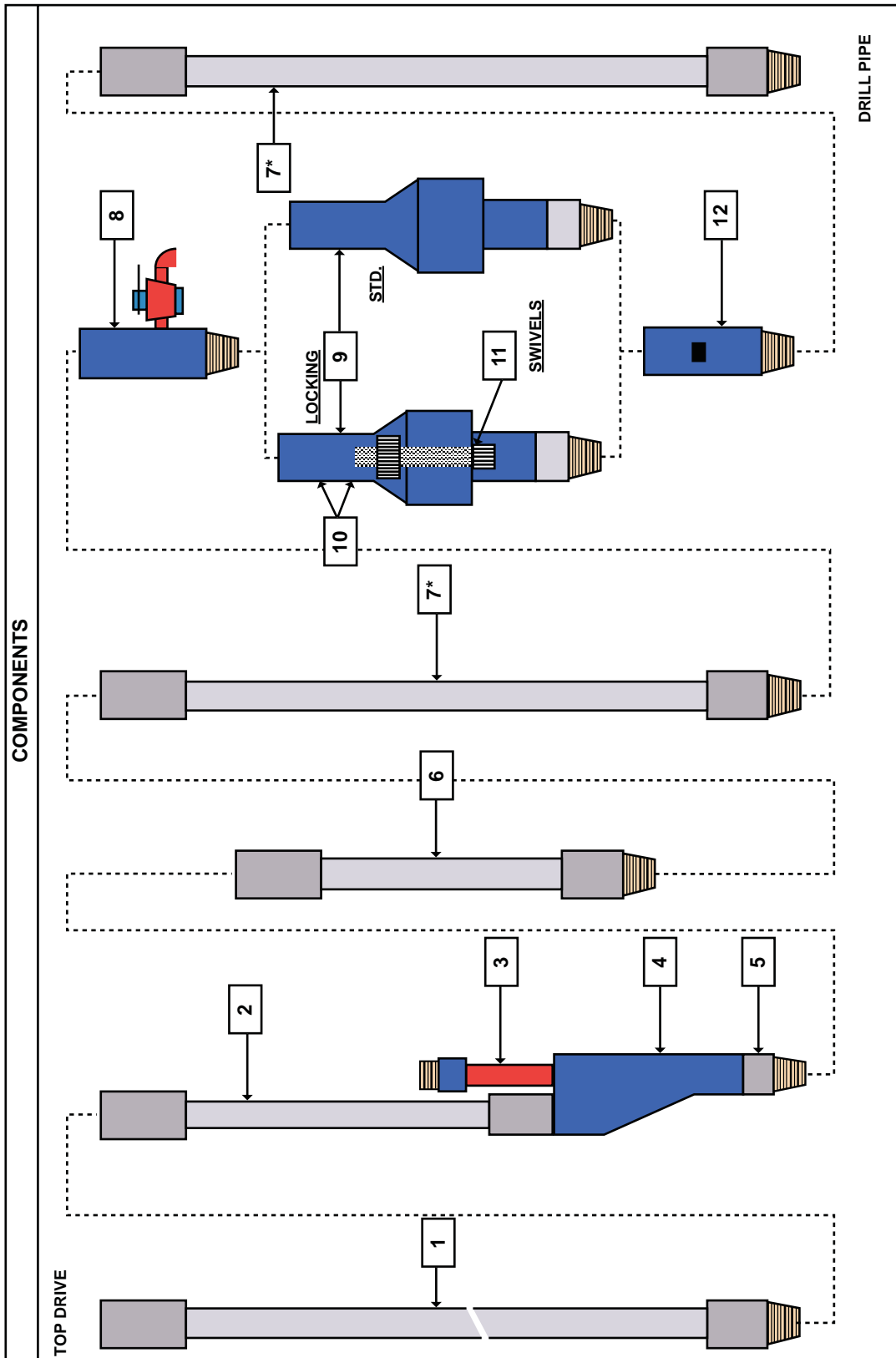


Available Top Entry Sizes

6 5/8", 5 1/2", 4 1/2" and 3 1/2" (tubing jobs)

Top Drive Safety Package

3 1/2" I.F. - 4 1/2" I.F. - 5 1/2" F.H. - XT57 - HT55 - XT57 - HT65 SYSTEMS



Conventional Top Drive Safety Package Specifications

Revision Date 6/19/03								
SPECIFICATIONS								
COMPONENTS	Tool Joint O.D.	Tube O.D.	I.D.	F.P. TQ.	Proof Load	SWL	W.P.S.I.*	T.P.S.I.
3 1/2" I.F. TOP DRIVE SAFETY PACKAGE *								
1. Drill Pipe to Top Drive Unit	5.000"	3.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	5.000"	3.500"	1.750"	11,000	600,000	500,000	5,000	10,000
3. Wireline Adaptor Sub	3.880"	NA	2.500"	100	NA	NA	5,000	10,000
4. Top Entry Sub	5.000"	NA	NA	NA	600,000	500,000	5,000	10,000
5. Lower Protector Sub (Optional)	NA	NA	2.500"	11,000	600,000	500,000	5,000	10,000
6. Extended Lateral Sub	5.000"	3.930"	2.500"	11,000	600,000	500,000	5,000	10,000
7. Pup Joint (Optional)	5.000"	3.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
8. Pump-in Sub	5.000"	NA	2.602"	11,000	600,000	500,000	5,000	10,000
9. Locking Swivel or Std. Swivel	NA	NA	NA	NA	600,000	NA	NA	NA
10. 7 5/8" Full Hole Connection	NA	NA	NA	NA	NA	NA	NA	NA
11. Swivel Locking Mechanism	NA							
12. T.I.W. Valve	5.000"	NA	2.602"	11,000	600,000	500,000	5,000	10,000
4 1/2" I.F. TOP DRIVE SAFETY PACKAGE								
1. Drill Pipe to Top Drive Unit	6.625"	5.000"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	6.625"	5.000"	2.000"	20,000	900,000	720,000	5,000	10,000
3. Wireline Adaptor Sub	3.540"	NA	2.812"	100	NA	NA	5,000	10,000
4. Top Entry Sub	7.500"	NA	3.250"	20,000	900,000	720,000	5,000	10,000
5. Lower Protector Sub (Optional)	6.625"	NA	3.000"	20,000	900,000	720,000	5,000	10,000
6. Extended Lateral Sub	6.250"	4.500"	3.250"	20,000	900,000	720,000	5,000	10,000
7. Pup Joint (Optional)	6.625"	5.000"	3.250"	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
8. Pump-in Sub	6.625"	NA	3.250"	20,000	900,000	720,000	5,000	10,000
9. Locking Swivel or Std. Swivel	6.625"	NA	2.250"	20,000	900,000	720,000	5,000	10,000
10. 7 5/8" Full Hole Connection	9.250"	NA	NA	34,200	900,000	720,000	5,000	10,000
11. Swivel Locking Mechanism	RATING=42,500 F/Ps TORQUE (TESTED TO 60,000F/Ps)							
12. T.I.W. Valve	7.000"	NA	3.250"	20,000	900,000	720,000	5,000	10,000
5 1/2" F.H. TOP DRIVE SAFETY PACKAGE								
1. Drill Pipe to Top Drive Unit	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	7.250"	5.500"	3.500"	31,100	1,000,000	800,000	5,000	10,000
3. Wireline Adaptor Sub	4.125"	NA	3.250"	100	NA	NA	5,000	10,000
4. Top Entry Sub	8.375"	NA	3.250"	31,100	1,000,000	800,000	5,000	10,000
5. Lower Protector Sub (Optional)	8.375"	NA	3.000"	31,100	1,000,000	800,000	5,000	10,000
6. Extended Lateral Sub	7.250"	5.500"	3.500"	31,100	1,000,000	800,000	5,000	10,000
7. Pup Joint (Optional)	7.250"	5.500"	WT.	PER MFG.	PER MFG.	1,000,000	PER MFG.	PER MFG.
8. Pump-in Sub	7.250"	NA	3.750"	31,100	1,000,000	800,000	5,000	10,000
9. Locking Swivel or Std. Swivel	7.857"	NA	3.250"	31,100	1,000,000	800,000	5,000	10,000
10. 7 5/8" Full Hole Connection	9.250"	NA	NA	34,200	1,000,000	800,000	5,000	10,000
11. Swivel Locking Mechanism	RATING=70,000 F/Ps TORQUE (TESTED TO 90,000F/Ps)							
12. T.I.W. Valve	8.250"	NA	3.750"	31,100	1,000,000	800,000	5,000	10,000
5 1/2" HT55 TOP DRIVE SAFETY PACKAGE								
1. Drill Pipe to Top Drive Unit	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	7.250"	5.500"	3.500"	52,000	1,000,000	800,000	5,000	10,000
3. Wireline Adaptor Sub	4.125"	NA	3.250"	100	NA	NA	5,000	10,000
4. Top Entry Sub	8.375"	NA	3.250"	52,000	1,000,000	800,000	5,000	10,000
5. Lower Protector Sub (Optional)	8.375"	NA	3.000"	52,000	1,000,000	800,000	5,000	10,000
6. Extended Lateral Sub	7.250"	5.500"	3.500"	52,000	1,000,000	800,000	5,000	10,000
7. Pup Joint (Optional)	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
8. Pump-in Sub	7.250"	NA	3.750"	52,000	1,000,000	800,000	5,000	10,000
9. Locking Swivel or Std. Swivel	7.857"	NA	3.500"	52,000	1,000,000	800,000	5,000	10,000
10. 7 5/8" Full Hole Connection	9.250"	NA	NA	34,200	1,000,000	800,000	5,000	10,000
11. Swivel Locking Mechanism	RATING=70,000 F/Ps TORQUE (TESTED TO 90,000F/Ps)							
12. T.I.W. Valve	8.250"	NA	3.750"	52,000	1,000,000	800,000	5,000	10,000

Conventional Top Drive Safety Package Specifications

SPECIFICATIONS								
COMPONENTS	Tool Joint O.D.	Tube O.D.	I.D.	F.P. TQ.	Proof Load	SWL	W.P.S.I.*	T.P.S.I.
5 1/2" XT 57 TOP DRIVE SAFETY PACKAGE								
1. Drill Pipe to Top Drive Unit	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	7.250"	5.500"	3.500"	56,000	1,000,000	800,000	5,000	10,000
3. Wireline Adaptor Sub	4.125"	NA	3.250"	100	NA	NA	5,000	10,000
4. Top Entry Sub	8.375"	NA	3.250"	56,000	1,000,000	800,000	5,000	10,000
5. Lower Protector Sub (Optional)	8.375"	NA	3.000"	56,000	1,000,000	800,000	5,000	10,000
6. Extended Lateral Sub	7.250"	5.500"	3.500"	56,000	1,000,000	800,000	5,000	10,000
7. Pup Joint (Optional)	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
8. Pump-in Sub	7.125"	NA	3.750"	56,000	1,000,000	800,000	5,000	10,000
9. Locking Swivel or Std. Swivel	7.857	5.500"	3.250"	56,000	1,000,000	800,000	5,000	10,000
10. 7 5/8" Full Hole Connection	9.250"	NA	NA	34,200	1,000,000	800,000	5,000	10,000
11. Swivel Locking Mechanism	RATING=70,000 F/Ps TORQUE (TESTED TO 90,000F/Ps)							
12. T.I.W. Valve	8.250"	NA	3.750"	56,000	1,000,000	800,000	5,000	10,000
5 1/2" XTM 57 TOP DRIVE SAFETY PACKAGE								
1. Drill Pipe to Top Drive Unit	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	7.250"	5.500"	3.500"	56,000	1,000,000	800,000	5,000	10,000
3. Wireline Adaptor Sub	4.125"	NA	3.250"	100	NA	NA	5,000	10,000
4. Top Entry Sub	8.375"	NA	3.250"	56,000	1,000,000	800,000	5,000	10,000
5. Lower Protector Sub (Optional)	8.375"	NA	3.000"	56,000	1,000,000	800,000	5,000	10,000
6. Extended Lateral Sub	7.250"	5.500"	3.500"	56,000	1,000,000	800,000	5,000	10,000
7. Pup Joint (Optional)	7.250"	5.500"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
8. Pump-in Sub	7.125"	NA	3.750"	56,000	1,000,000	800,000	5,000	10,000
9. Locking Swivel or Std. Swivel	7.857	NA	NA	56,000	1,000,000	800,000	5,000	10,000
10. 7 5/8" Full Hole Connection	9.250"	NA	NA	34,200	1,000,000	800,000	5,000	10,000
11. Swivel Locking Mechanism	RATING=70,000 F/Ps TORQUE (TESTED TO 90,000F/Ps)							
12. T.I.W. Valve	8.250"	NA	3.750"	56,000	1,000,000	800,000	5,000	10,000
CONVENTIONAL HT 65 TOP DRIVE SAFETY PACKAGE								
1. Drill Pipe to Top Drive Unit	8.125"	6.625"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
2. Drill Pipe Adaptor Sub	8.000"	6.625"	4.125"	72,000	1,200,000	960,000	5,000	10,000
3. Wireline Adaptor Sub	5.900"	NA	4.125"	100	NA	NA	5,000	10,000
4. Top Entry Sub	9.250"	NA	4.375"	72,000	1,200,000	960,000	5,000	10,000
5. Lower Protector Sub (Optional)	9.000"	NA	4.125"	72,000	1,200,000	960,000	5,000	10,000
6. Extended Lateral Sub	8.000"	6.625"	4.125"	72,000	1,200,000	960,000	5,000	10,000
7. Pup Joint (Optional)	8.125"	6.625"	WT.	PER MFG.	PER MFG.	PER MFG.	PER MFG.	PER MFG.
8. Pump-in Sub	8.125"	NA	4.125"	72,000	1,200,000	960,000	5,000	10,000
9. Locking Swivel or Std. Swivel	9.000"	6.625"	4.125"	72,000	1,200,000	960,000	5,000	10,000
10. 7 5/8" Full Hole Connection	10.750"	NA	NA	PER MFG.	1,200,000	960,000	5,000	10,000
11. Swivel Locking Mechanism	RATING=90,000 F/Ps TORQUE (TESTED TO 100,000F/Ps)							
12. T.I.W. Valve	10.250"	NA	4.125"	72,000	1,200,000	960,000	5,000	10,000
1 CORRECT TORQUE MUST BE APPLIED TO MEET PERFORMANCE SPECIFICATIONS								
2 SYSTEMS RATED FOR 10,000 WPSI X 15,000 PSIT AVAILABLE ON REQUEST								
3 3 1/2" IF TOP DRIVE SAFETY PACKAGE IS NOT AVAILABLE AT THIS TIME								

Articulated Top Entry System

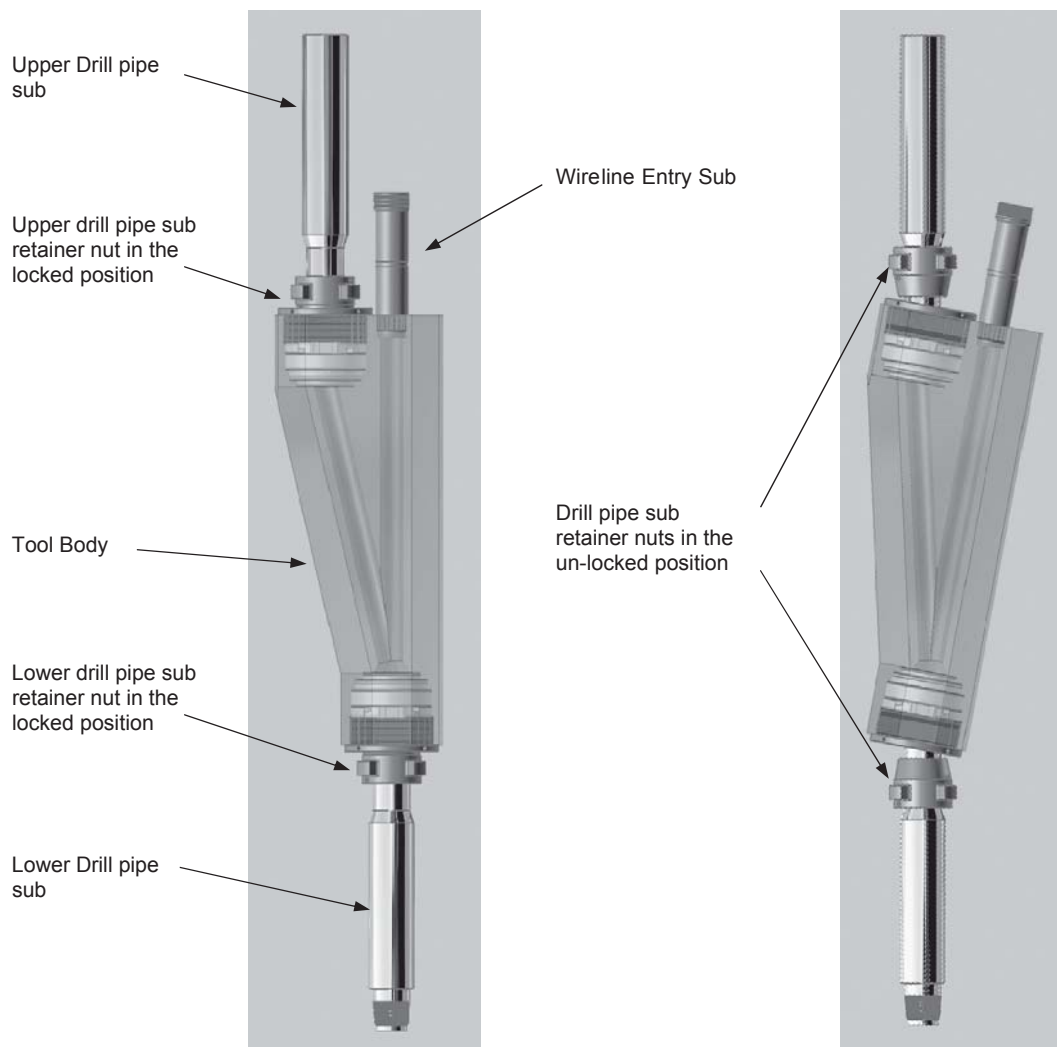


Fig. 1

Fig. 2

Figure 1 Shows the A-TES with the wireline sub aligned with the pipe axis. Both drill pipe retainer subs are run in and in the locked position. The wireline tool may be admitted into the pipe in this position.

Fig. 2. Shows the A-TES with both locking nuts loosened and backed out in the running position. With the pipe under tension the upper drill pipe sub and lower drill pipe sub align with the pipe axis. The pipe can be worked and torqued in this position.

⚠ NOTE: Service of the articulating joints requires special assembly tools and should be performed by STS personnel only.

Articulated Top Entry System

The Articulated Top Entry Sub provides for direct alignment of the Wireline entry sub with the drill pipe axis allowing unrestricted entry of a wireline tool string into the pipe similar to the conventional STS top entry sub. Once in the hole with a wireline tool, the upper and lower drill pipe subs will rotate to line up under pipe tension aligning the load axis with the pipe axis achieving a straight line pull with the pipe. These ball joints are double o-ring sealed and can transmit both right hand and left hand torque while under tension and under pressure.

Figures 1 and 2 on the following page shows the tool in both wire line entry position and articulated position for working the drill pipe.

Tool Specifications

Tool Connections	HT-65
Tool ID	4-1/8"
Working Load Rating	1,200,000 lb @ 5,000 PSI Max internal pressure
Working Pressure	10,000 PSI
Recommended Make Up Torque	58,900 ft-lb
Torsional Yield Strength	99,700 ft-lb *
Test Load	1,600,000 lb @ 0 PSI Internal pressure
	1,400,000 lb @ 10,000 PSI Internal pressure
Test Pressure	15,000 PSI @ no load
Test Torque **	100,000 ft-lb LH & RH
Locking Swivel	
Hydraulic Pressure	3,000 PSI.

** As per Grant Prideco HT65 tool joint specifications*

*** Test torque of the articulating joint applied externally through the drill pipe subs not through the HT-65 tool joints*

Rig Up Procedure

The A-TES is transported with two lock down nuts which secure the top and bottom drill pipe subs preventing them from rotating during transport and rig up. The tool should be lifted out of its transport basket with these lock down nuts run in and secured.

Attach a lift sub into the top drill pipe sub of the tool. Lift the tool out of the basket with the supplied 2 leg sling attached to the pad eyes on the tool body and transfer it to the rig floor. Once the tool is vertical and made up in the string knock the retaining nuts on the upper and lower drill pipe sub loose to allow the tool to align under tension. With the pipe set in the slips and the top drive slacked off, the tool should rotate to align the wireline entry sub with the pipe string. If the tool doesn't rotate into alignment, attach a tugger line to the body and pull it into alignment.

The upper and lower drill pipe subs articulate only in the plane of the tool. They will not rotate side to side.

Air Compressor Kaeser Model M26 92 CFM Skid Mount Unit

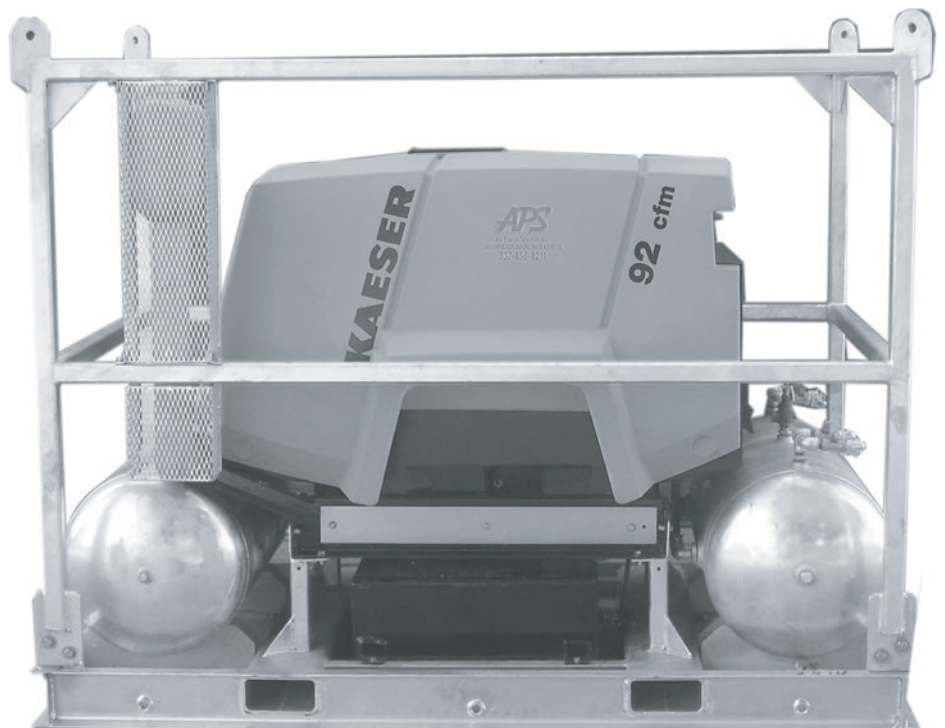
Description:

Kaeser Model M26, 92 CFM Air Compressor with galvanized skid. Skid has 4 point lift that has been pull tested and magnetic particle inspections performed. Skid has 4" x 8" fork pockets for easy loading and unloading. Skid size is 7' 8" x 4' 7". Unit has 120 gallons of air volume and a 30 gallon fuel tank. Unit is equipped with Emergency Shutdown Valve and Spark Arrestor.

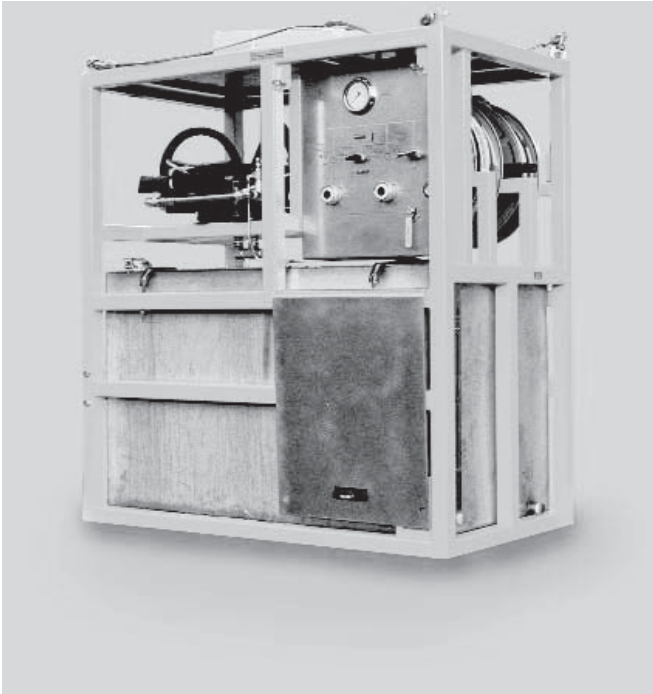
Features:

- Direct drive rotary screw airend: Sigma profile produces more air with less fuel consumption
- Rotomolded polymer canopy is scratch and dent resistant
- 4 micron, 2-stage compressor inlet filter with maintenance indicator
- 10 micron engine air filter with maintenance indicator
- Thermostatically controlled combination valve maintains optimum operating temperature and prevents tool freeze up
- Heavy duty, 3-cylinder Kubota diesel engine complies with Tier 2 emissions standards
- Tool box for convenient storage
- Highly efficient cooling system
- Modulation control
- Lighting package

KAESER
COMPRESSORS



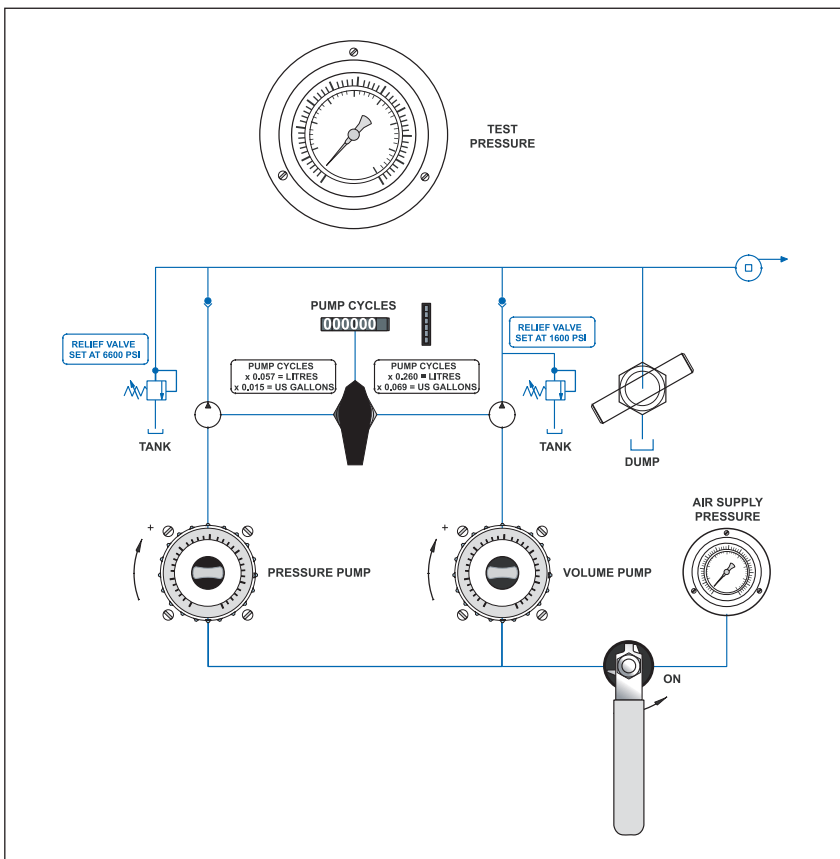
900 Series Pressure Test Unit



These systems have been developed for oil or service company use. Each pumping unit has a large reservoir for injection fluids such as water and glycol. The high volume and high pressure pumps allow rapid fill and pressure build up.

Features:

- 10,000 psi, 15,000 psi or 22,500 psi W.P.
- Air driven high volume and high pressure pumps
- Choice of reservoir capacity (1,000 litre/1,500 litre)
- Stroke counter switchable between pumps
- Output hose and reel
- Air supply hose and reel



Control Panel

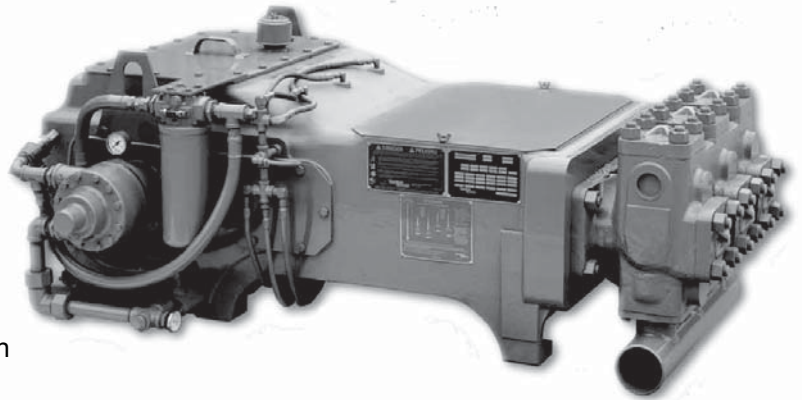
TEEF Triplex Well Service Pump

Specifications - Intermittent Well Service

- Maximum BHP - 165 BPH
- Maximum Jackshift RPM - 300 RPM
- Stroke Length - 5" (203 mm)
- Oil Capacity - 12 gal. (45 liters)
- Maximum Rod Load - 44,000 lbs. (19,960 kg)
- Pump Weight - 2,990 lbs. (1,360 kg)

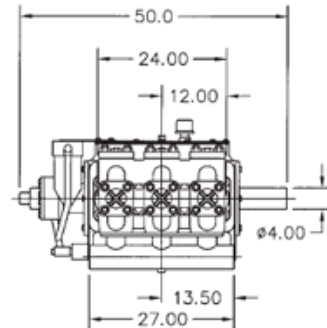
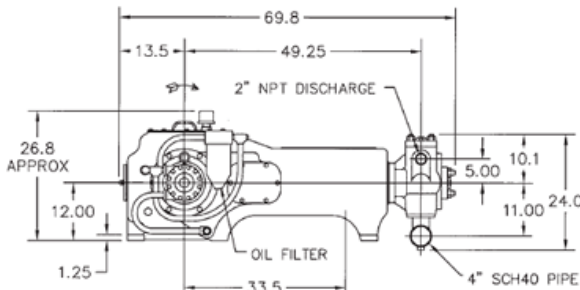
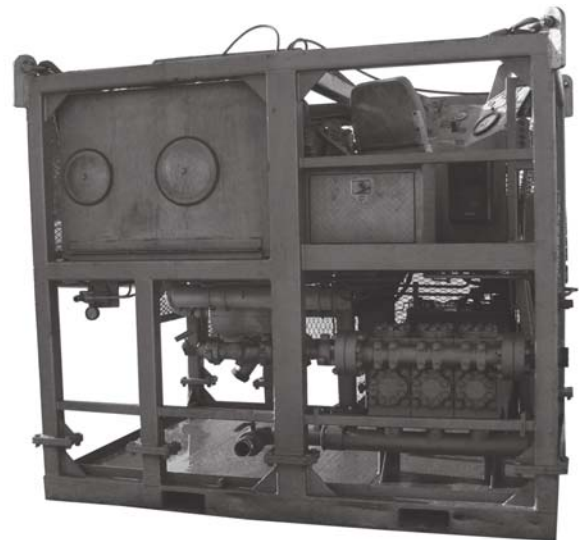
Features

- Eccentric construction
- Left or right-hand shaft extension
- Top and bottom crosshead pressure lubrication
- Pressure lubrication of power end
- Suction and discharge on either side
- Solid connecting rods
- Clamp connections between plungers and crosshead extensions
- Removable stuffing boxes with threaded gland nuts
- Choice of piston and liner construction or plungers with non-adjustable type packing
- 4" steel fabricated suction manifold



Available TEE Pump Units

Unit #	Engine	Weight	Dim.
26080	6V-71 Detroit Diesel	18000#	7'11.5"W 7'8.5"H 9'11.5" L
26081	6V-71 Detroit Diesel	18000#	7'11.5"W 7'8.5"H 9'11.5" L
1001	6V-71 Detroit Diesel	14000#	9'L 8'11"H 6'11.5"W

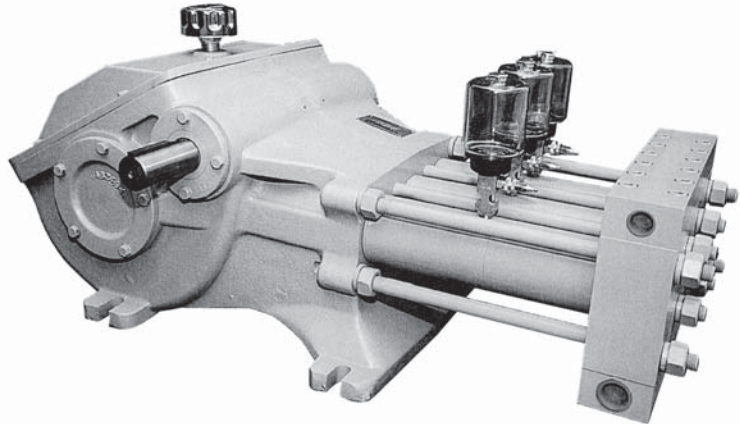


Horse Power	Stroke	Plunger Size	Gallon per Stroke Revolution	Max Flow @ Rated psi	Max Flow @ Min psi
165	5"	2-1/4"	0.086	.30bpm 10000psi	1.83bpm 3100psi

HP-550 Triplex Power Test Pump

Features

- Pressure to 20,000 psi.
- Continuous Duty Operation,
- Internal Helical Gear Reduction.
- Durable and Compact.
- Quiet Running.
- Splash Lubrication.
- Easy Field Maintenance.
- High Output Efficiency.
- High Quality Materials and Workmanship.
- Corrosion Resistant Hardware.



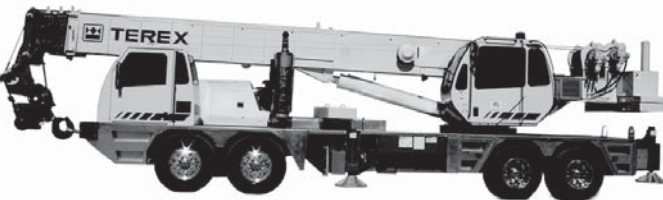
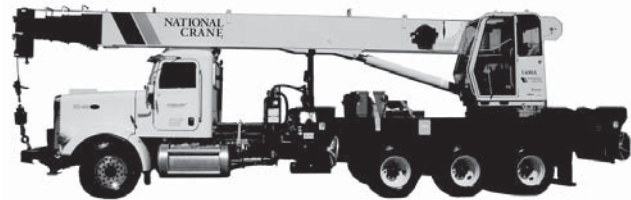
Available HP-550 Pump Units

Unit #	Engine	Weight	Dimensions
51731	Perkins 4 cycle	6,000#	4' 2" W 6' 6" H 7' 6" L

Horse Power	Stroke	Plunger Size	Gallon Per Stroke Revolution	Max Flow @ Rated psi	Max Flow @ Min psi
80	3-3/4"	5/8"	0.0047	8.36gpm 20000psi	.38gpm 20000psi

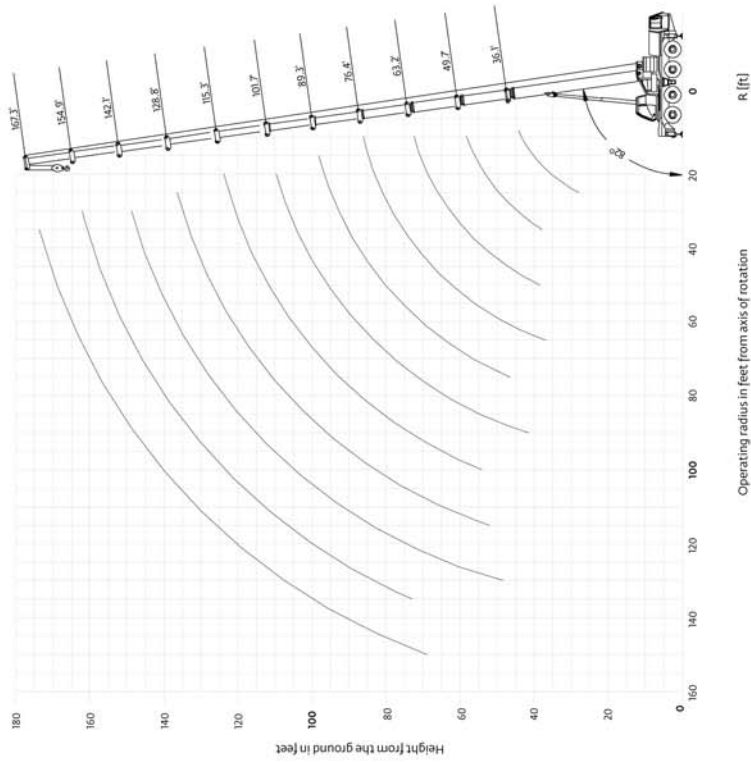
Crane Trucks

Manufacturer	Model	Application	Lifting Capacity	Boom Capacity	Jib Extension
National	9125	WL/SL/PS/GP/TT	25 Tons	125 ft	N/A
National	1400	WL/SL/PS/GP/TT	33 Tons	125 ft	N/A
National	1800	WL/SL/PS/GP/TT	40 Tons	127 ft	N/A
Terex	560-1	WL/SL/PS/GP/TT	60 Tons	110 ft	33 ft



Working Ranges

36 ft - 167 ft main boom

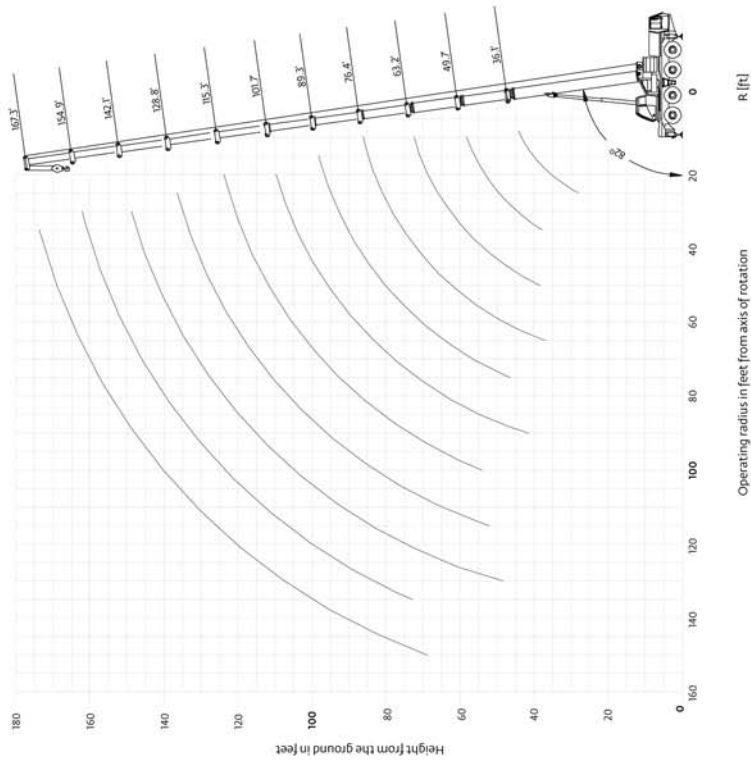


Operating radius in feet from axis of rotation	H
Hook block	3200 mm (10.5 ft)
80 U.S.T. 7 sheave quick-reeling	3000 mm (9.8 ft)
55 U.S.T. 5 sheave quick-reeling	2900 mm (9.5 ft)
35 U.S.T. 3 sheave quick-reeling	2800 mm (9.2 ft)
15 U.S.T. 1 sheave quick-reeling	2550 mm (8.4 ft)
6 U.S.T. 7 single headache ball	2350 mm (7.7 ft)



Tip heights shown in the working range diagram do not consider loaded boom deflection.

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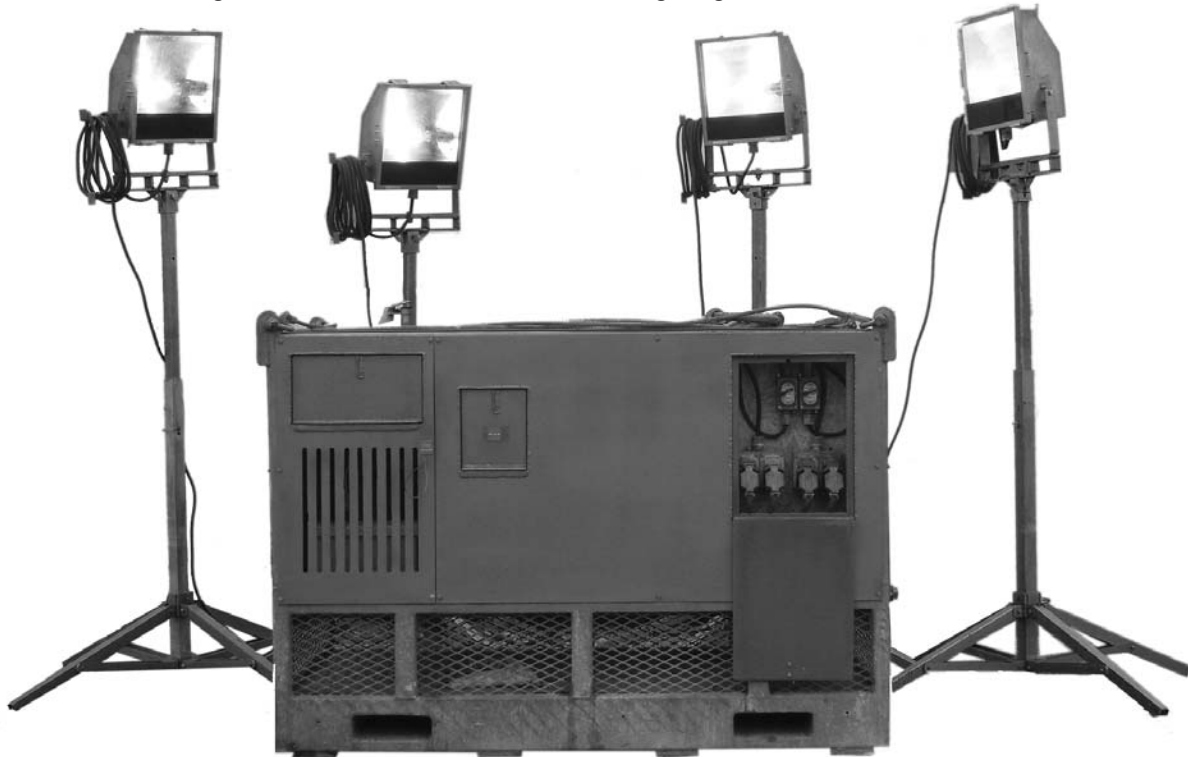


Tip heights shown in the working range diagram do not consider loaded boom deflection.

Auxiliary Equipment: Light Plants

Light Plant Specifications

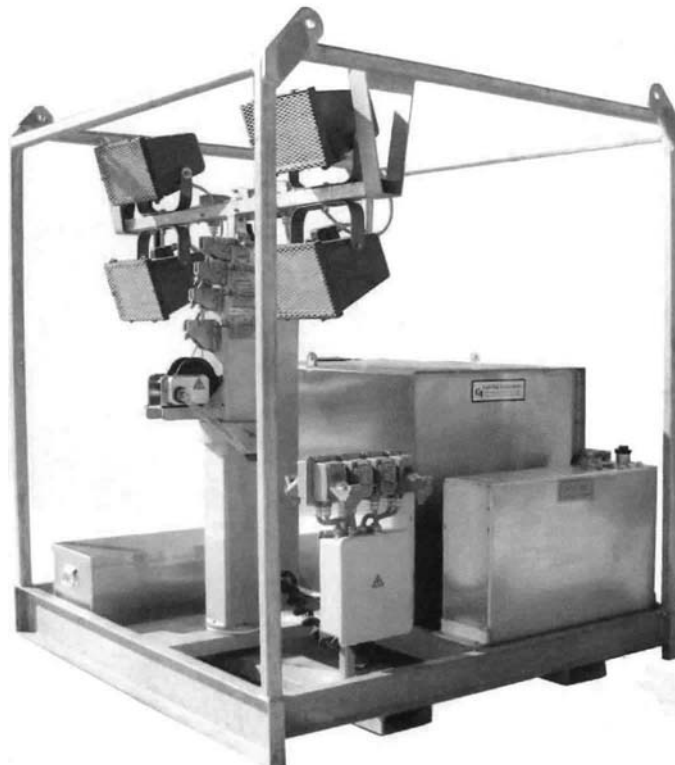
Light Plant includes 4 lights and stands - Class 1 Division 1 lighting



Gulf Engine & Equipment, Inc.

Light Plant Specifications

- Kubota 3 Cylinder Diesel
- Hi Temp/Low Oil Shutdown
- Aluminum Enclosure
- 30 Gallon Fuel Tank
- Offshore Galvanized Skid
- Newage 8KW 1 Phase Generator
- 4 - 400 Watt Halogen Exp. Lights
- Circuit Breaker Protection
- 16ft Telescoping Boom



STS JOB ORDER

No. _____

DATE/TIME CALLED		OIL COMPANY	
DATE/TIME REQUIRED		STS D.T. #	BLOCK
WIRELINE CO. NAME		CUST. NAME	RIG #
CUSTOMER NAME		CUST. PHONE #	PARISH

OPEN HOLE/CASED HOLE	GIT PACKAGES	DRILL PIPE & TUBING
HYDRIL STOP FLANGE	GIT PKG 5K, 10K, OR 15K	SIZE
HYDRIL SIZE	LINE SIZE	SWIVEL
LUBRICATOR SIZE, TYPE & SERVICE	LENGTH OF LUBRICATOR	PUMP IN SUB WITH HALCO
LENGTH OF LUBRICATOR	LARGEST OD TOOL	TWI
PUMP IN SUB WITH HALCO	TREE CONNECTION	TOP SUB
PACK OFF TYPE	AIR COMPRESSOR	PUP JOINT
BASKET	TEST PUMP	PACK-OFF
LINE SIZE	BALL CHECK VALVE	LINE SIZE
LARGEST OD OF TOOL TO BE COVERED	HEAD CATCHER	BASKET
HIGHEST PRESSURE POSSIBLE	OTHER ACCESSORIES	OIL, JAR, SPANG JAR, PULLING TOOL
FISHING KIT	PUMP IN SUB WITH HALCO	BROACH, SWEDGE, LEAD BLOCK
DRILL PIPE SIZE		LARGEST OD OF TOOL
HOLE SIZE		HIGHEST PRESSURE POSSIBLE
FISH SIZE		ANY OTHER ACCESSORIES
ANY OTHER ACCESSORIES		

DIRECTION OF LOCATION:	ACCESSORIES REQUESTED:
VERBALLY READ BACK ORDER TO CUSTOMER: <input type="checkbox"/> YES	CAN THIS ORDER BE FILLED AS REQUESTED? <input type="checkbox"/> YES <input type="checkbox"/> NO (WHY?)
AUTHORIZED BY:	

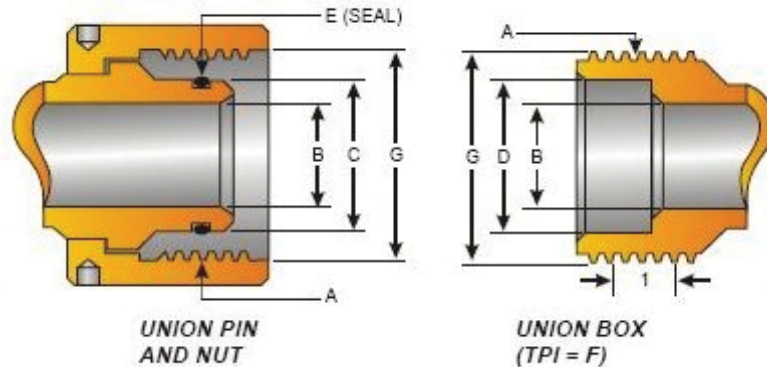
Bowen Unions

Assy No.	Thread	Seal Dia.	Lub. ID	Nut OD	WP	Service	O-Ring	Size	BU Ring	Anti-Extrusion
5,000										
12685	4.75-4	3.750	2.50-3.0	5.250	5,000	STD	568340	340		
12120	5.5-4x2	4.375	3.00	6.3125	5,000	STD	568345	345		
20280	6-4x2	4.875	4.00	6.750	5,000	STD	568349	349		
36040	7"-5	5.250	4.00	9.500	5,000	STD	568427	427		
12410	8.25-4x2	6.750	5.00	9.500	5,000	STD	568438	438		
64524	8.875-4x2	7.250	5.50	10.000	5,000	STD	568440	440		
51890	9.875-4x2	8.000	6.00	10.875	5,000	STD	568433	433		
10,000										
44105	4.75-4	3.750	2.50-3.0	5.250	5,000	H2S	568340	340		
25865	5.5-4x2	4.375	3.00	6.3125	5,000	H2S	568345	345		
32991	6-4x2	4.875	4.00	6.750	5,000	H2S	568349	349		
68817	7"-5	5.250	4.00	9.500	5,000	H2S	568427	427		
44092	8.25-4x2	6.750	5.00	9.500	5,000	H2S	568438	438		
68823	8.875-4x2	7.250	6.00	10.000	5,000	H2S	568440	440		
60735	9.875-4x2	8.000	6.50	10.875	5,000	H2S	568433	433		
75763	13-4	9.500	7.00	15.000	5,000	H2S	568447	447		
15,000										
17885	4.75-4	3.750	3.00	6.000	10,000	STD	568340	340		
17880	5.5-4x2	4.875	3.00	6.750	10,000	STD	568349	349		
22550	8.25-4x2	6.000	4.00	9.375	10,000	STD	568433	433		
68321	8.875-4x2	6.500	5.00	10.375	10,000	STD	568437	437		
68064	10.625-4x2	8.000	6.00	12.250	10,000	STD	568433	433		
77960	13-4	9.500	7.00	15.000	10,000	STD	568447	447		
20,000										
37691	6.3125-4	4.375	2.50	7.250	10,000	H2S	568345	345		
50058	7"-5	4.750	3.00	7.750	10,000	H2S	568348	348		
50991	8.25-4x2	6.000	4.00	9.375	10,000	H2S	568433	433		
152237	9.875-4x2	6.500	4.00	11.500	10,000	H2S	568437	437		
66220	8.875-4x2	6.500	4.50	10.375	10,000	H2S	568437	437		
	9.15-4x2	6.750	5.50		10,000	H2S		438		
149142	10.625-4x2	8.000	6.00	12.250	10,000	H2S	568433	433		
15,000										
29923	6.3125-4	4.375	2.50	7.250	15,000	STD	568345	345		
148124	8.25-4x2	6.000	3.00	9.375	15,000	STD	568433	433		
57422	8.875-4x2	6.000	4.00	10.375	15,000	STD	568433	433		
20,000										
59980	6.3125-4	3.750	2.50	7.250	15,000	H2S	568340	340		
58158	7"-5	4.375	3.00	7.750	15,000	H2S	568345	345		
79770	8.875-4x2	5.500	4.00	10.375	15,000	H2S	568429	429		
156021	12.00-2	7.500	5.13	13.500		H2S				
20,000										
157026	12.00-2	6.000	3.00	13.250	20,000	H2S	568433/020	433	227/230	46380/090
	14-2	7.000	4.06	15.500	20,000	H2S	568439/020	439		

Otis Quick Union Chart

Quick Union Connections are used to assemble lubricators and related equipment and they are designed to be assembled by hand. Otis type and Bowen Type designs are commonly used.

An O-Ring on the pin section forms the seal when made up into the box. The collar has an internal ACME threads to match the external threads on the box. This threads mix-up quickly by hand.



QUICK UNION IDENTIFICATION CHART

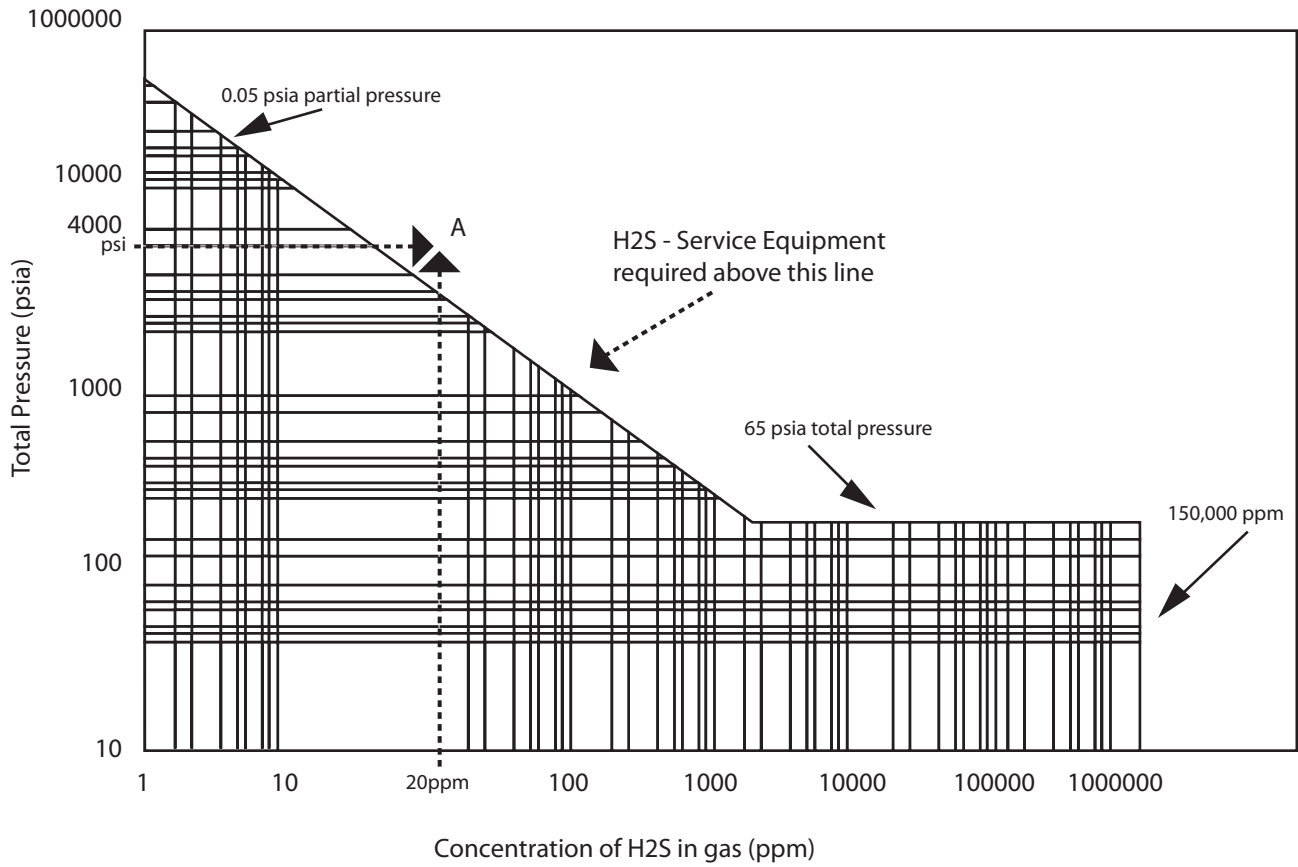
ACT (A)	W.P. (PSI)	SERV	B	C	D	E	F	G	PART NO.
5.000-4 ACME TYPE O	5000	STD	2.50 3.00	3.494	3.5	50236	4	5.000	440100
5.000-4 ACME TYPE O	10,000	STD	2.50 3.00	3.494	3.5	50338	4	5.000	440100
5.000-4 ACME TYPE O	15,000	STD	2.50	3.494	3.5	50338*	4	5.000	440101
5.750-4 ACME TYPE O	5,000 10,000	H2S	2.50 3.00	3.994	4.00	50342*	4	5.750	440200
6.250-4 ACME TYPE O	15,000	H2S	2.50	3.994	4.00	50342*	4	6.250	440301
6.500-4 ACME TYPE O	5,000 10,000	STD	4.00	4.744	4.750	50348	4	6.500	440400
7.500-4 ACME TYPE O	15,000	H2S	3.00	5.494	5.500	50354*	4	7.500	440701
8.250-4 ACME TYPE O	5,000 10,000	STD	5.00	6.182	6.188	50435	4	8.250	440800
8.375-A ACME TYPE O	5,000 10,000	H2S	4.00	5.244	5.250	50427	4	8.375	440900
8.750-4 ACME TYPE O	5,000	STD	6.38	7.494	7.500	50441	4	8.750	441100
9.000-4 ACME TYPE O	5,000 10,000	H2S	5.00	6.744	6.750	50438	4	9.000	441200
9.500-4 ACME TYPE O	15,000	H2S	4.00	6.244	6.250	50435*	4	9.500	441601
9.500-4 ACME TYPE O	5,000	H2S	6.38	7.994	8.000	50443	4	9.500	441400
11.500-4 ACME TYPE O	10,000	H2S	6.38	8.244	8.250	50444	4	11.500	441800



* SEAL GROOVE
WILL HAVE THIS
CONFIGURATION

Type O Union Are Interchangeable With Otis Unions

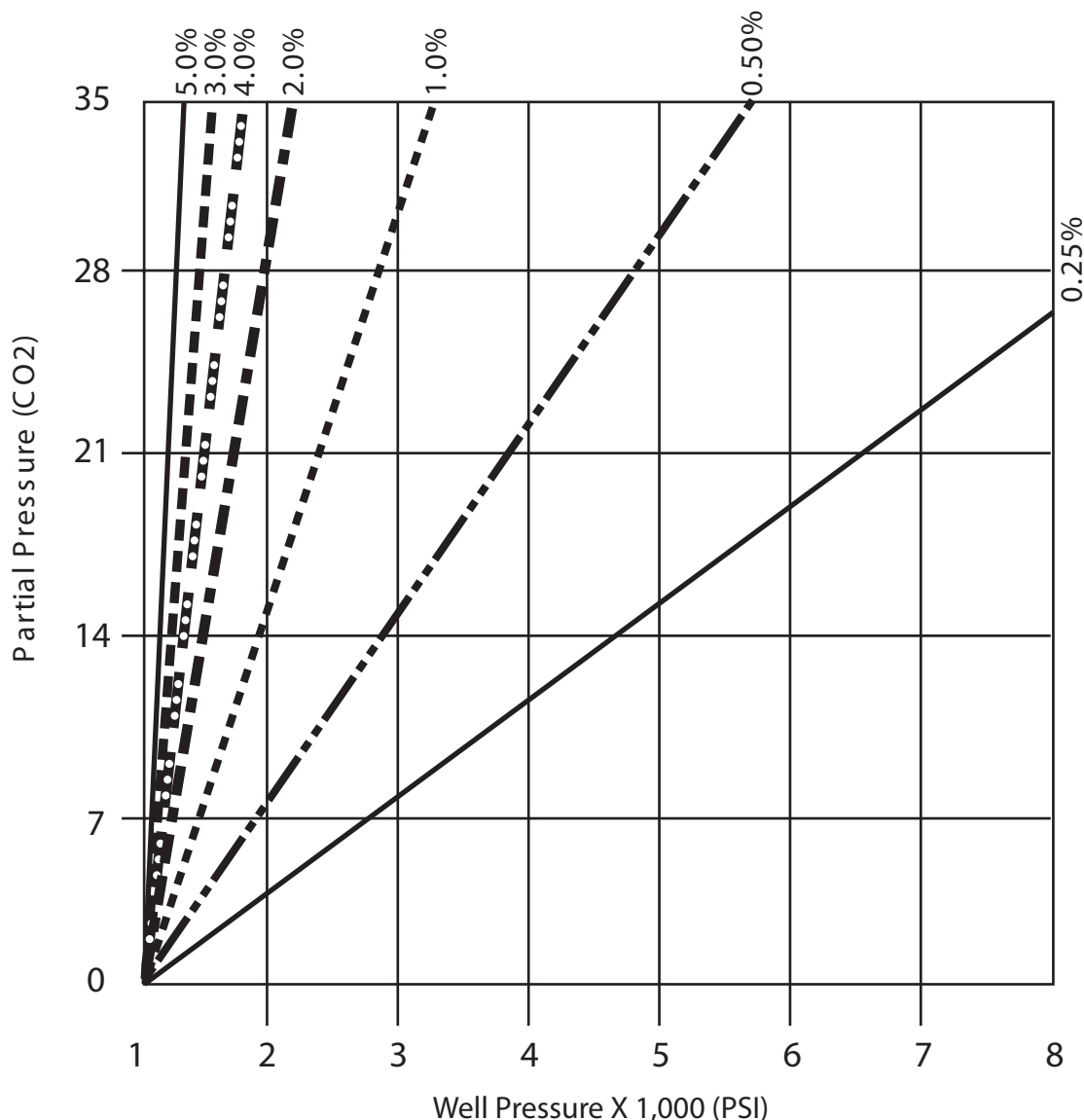
H₂S Service Equipment (pressure vs. concentration)



Corrosive Index for Carbon Dioxide

Well Pressure (PSI) X %CO2 = Partial Pressure										
Partial Pressure (CO2)	5%	0.05	0	75	150	225	300	375	450	525
	4%	0.04	0	60	120	180	240	300	360	420
	3%	0.03	0	45	90	135	180	225	270	315
	2%	0.02	0	30	60	90	120	150	180	210
	1%	0.01	0	15	30	45	60	75	90	105
	0.50%	0.005	0	7.5	15	22.5	30	37.5	45	52.5
	0.25%	0.0025	0	3.75	7.5	11.25	15	18.75	22.5	26.25
			0	1500	3000	4500	6000	7500	9000	10500
Well Pressure (PSI)										

Note: % CO2 Must Be Expresses As A Decimal

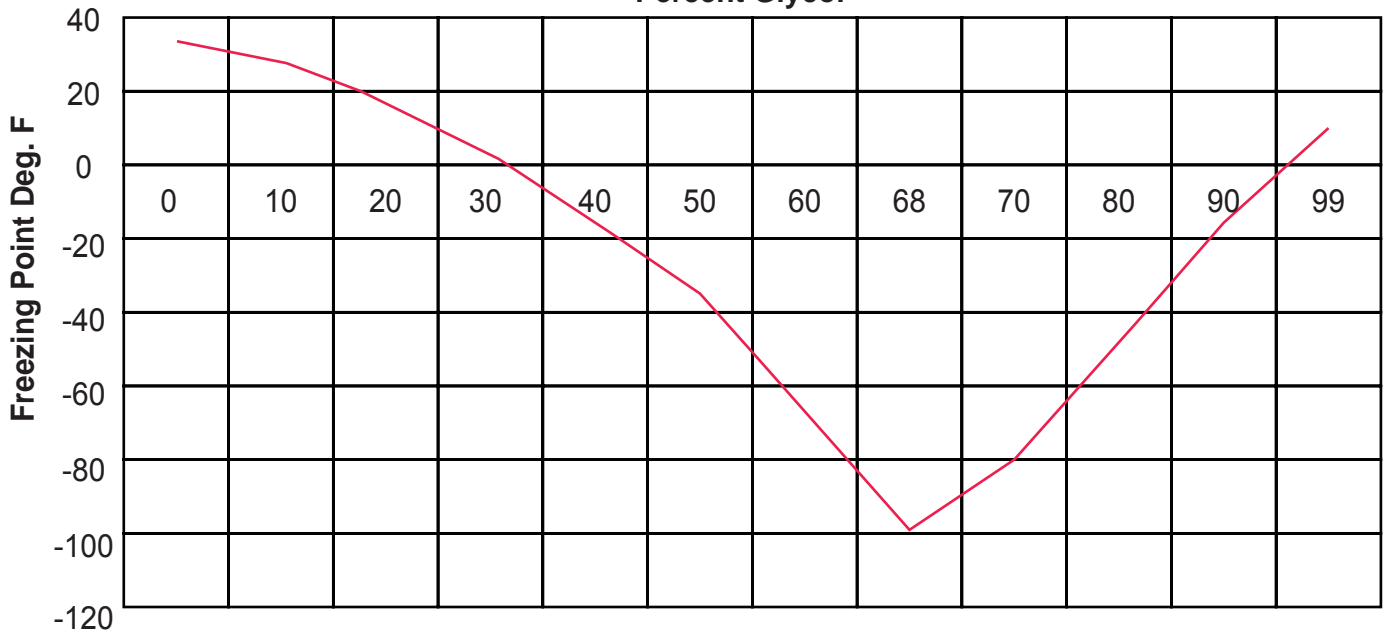


Partial Pressures "0" to "7" are non-corrosive
 Partial Pressures "7" to "30" are corrosive
 Partial Pressures above "30" are highly corrosive

Glycol Mixing Chart

Glycol Mixing Chart				
Glycol%	Deg C	Deg F.		
0	0	32		
10	-3	27		
20	-9	16		
30	-17	1		
40	-27	-17		
50	-38	-36		
60	-55	-67		
68	-73	-99		
70	-62	-80		
80	-45	-49		
90	-27	-17		
99	-13	9		

Glycol Water Freezing Point
Percent Glycol



Wireline Grease

Typical Application Chart

	C	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	C	
OCR	F	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	F	
766/10			766/10																	
766/12				766/12																
766/16							766/16													
766/20										766/20										
766/24													766/24							
766/28																	766/28			