



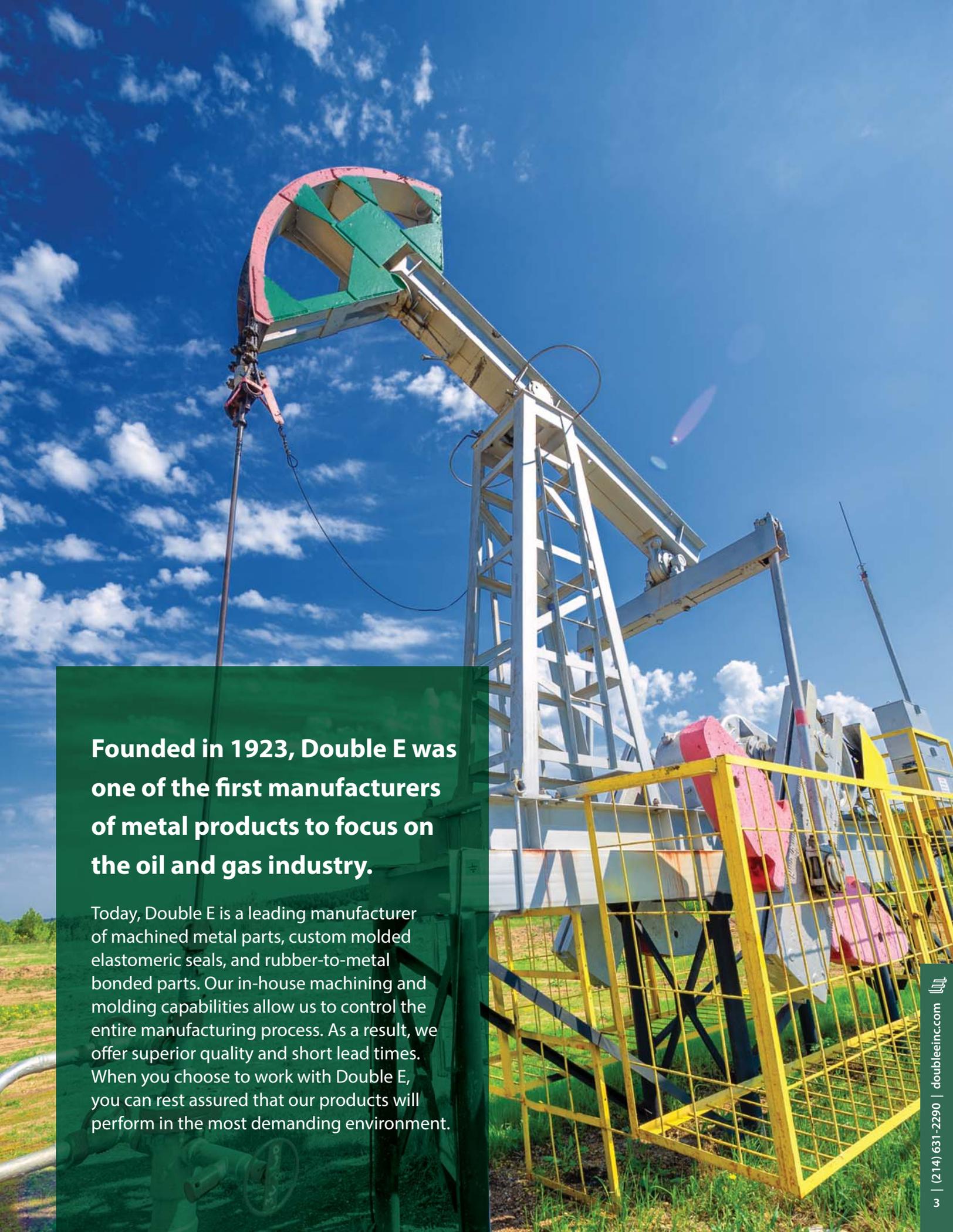
DOUBLE E
A Datwyler Company



1261 Profit Drive, Dallas, Texas 75247 | (214) 631-2290 | doubleeinc.com

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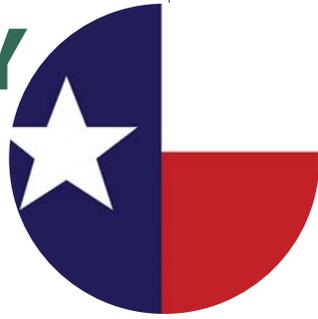
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Founded in 1923, Double E was one of the first manufacturers of metal products to focus on the oil and gas industry.

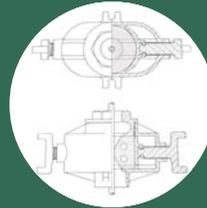
Today, Double E is a leading manufacturer of machined metal parts, custom molded elastomeric seals, and rubber-to-metal bonded parts. Our in-house machining and molding capabilities allow us to control the entire manufacturing process. As a result, we offer superior quality and short lead times. When you choose to work with Double E, you can rest assured that our products will perform in the most demanding environment.

OUR HISTORY



1923

Double E opens in San Antonio, Texas, and manufactures machined metal parts for the oil and gas industry.



1935

Double E moves to Dallas, Texas, and adds molded rubber parts to its product line.



1945-2000

Double E expands its product line with on-shore production equipment and continues to strengthen its machined metal and molded rubber part offerings.



2011

Parco, Inc., a leading manufacturer of high-performance seals, acquires Double E.

2012

Double E modernizes its manufacturing facility.

2013-2014

Double E achieves ISO 9001 certification and completes production expansion and modernization.



2015-Present

Double E continues to expand machining capabilities while maintaining best in class customer service and on time delivery of quality parts.

CUSTOM CAPABILITIES

Machined Metal Parts

Double E offers unsurpassed quality and quick turnaround on custom machined metal parts. We are a leader in custom machining services and offer turnkey metal machining for both simple and complex parts. Using the latest in machining technology, we can maintain the tightest tolerances while offering superior lead times and responsive service.

MACHINED METAL PARTS

Materials

- Bar tubing, castings, forgings, flat stock
- Aluminum and brass
- Ductile iron
- Carbon steel (1018, 1026)
- Alloy steel (4130, 4140, 8620)
- Stainless steel (303, 304, 316, 410, 416, 17-4)
- Corrosion-resistant alloys

Sizes

- 20 inches maximum outside diameter (OD)
- $\frac{1}{16}$ inch minimum inside diameter (ID)
- 30 inches maximum length



Custom Molded Rubber Seals

Double E manufactures a variety of custom molded rubber seals for the oil and gas industry. We have the resources in-house to design, engineer, and mold custom rubber products to your exact specifications. Double E's custom molded product line includes packing elements (packers), which are commonly used in the oil field industry for drilling or well completion systems.

CUSTOM MOLDED RUBBER SEALS

Materials

- Aflas®
- Ethylene-propylene (EPR, EPDM)
- Fluocarbon (FKM)
- Hydrogenerated nitrile (HNBR)
- Neoprene
- Nitrile (Buna-N)

Packing Element Sizes

- 3 to 12 inches outside diameter (OD)
- 1 to 8 inches inside diameter (ID)
- ¼ to 8 inches in length

Other Custom Molded Sizes

- 0.500 to 20 inches outside diameter (OD)
- 0.050 to 2 inches in thickness



Rubber-to-Metal Bonded Parts

In addition to our extensive metal machining and rubber molding experience, Double E is also an industry leader in manufacturing rubber-to-metal bonded parts. These parts are used for high pressure applications.

RUBBER-TO-METAL BONDED PARTS

Materials

- Various metals
- Various elastomers

Sizes

- 0.500 to 8 inches outside diameter (OD)
- 0.050 to 0.500 inches in thickness



BLOW OUT PREVENTERS



Double E Blow Out Preventers (BOPs) are used to pack off a pumping well. Our BOPs can be permanently installed between the pumping head and tubing head or stuffing box. Double E BOPs can seal on the polished sucker rod. They can also pack off a pumping well that does not have rods when equipped with suitable rams.

Double E pressure-tests every BOP housing at twice its pounds per square inch (PSI) rating to ensure optimal performance. All Double E BOPs can be manually or hydraulically operated. We offer BOPs for standard, H₂S, and high temperature service.

We offer four types of BOPs. All four types are available in a wide selection of pressure ratings and ram sizes. You also have a choice of flanged or threaded connections. Thread sizes range from 2 $\frac{3}{8}$ inches to 7 inches.

Our sour service BOPs can be certified to the National Association of Corrosion Engineers (NACE) requirements. Like all Double E products, if we don't have the model you need, we can develop one for you.

LP15

Double E's LP15 BOP has the unique ability to close on 0 to 1½ inches rod size. Double E's ram system further enhances safety. To prevent separation failures, our sturdy pin and socket design uses a rubber element and a ductile iron plate to resist pressure thrusts.

The LP15 has a versatile design that can be used up to 3,000 PSI. Our most common vertical bores (VB) of 1.90 and 2.44 inches are rated to 2,000 psi. We stock versions with vertical bores of 1.90, 2.44, and 2.90 inches and thread sizes of 2¾ to 3½ inches. The LP15 is also available by request in a vertical bore of 3.90 inches.

We offer standard and H₂S service versions. LP15 BOPs include one housing, two caps, two rams, and two screws (see Figure 1).

LP

Double E's low pressure (LP) BOP is one of the most widely used Blow Out Preventers in the industry. With a 1,500 psi rating, the LP can be used on most on-shore wells. Like the LP15, Double E's LP BOP can close on 0 to 1½ inches rod size. The LP BOP is available in vertical bores of 1.90 and 2.44 inches, and thread sizes of 2¾ to 2⅞ inches, the LP can be used with rod sizes up to 1¾ inches.

Offered for both standard and H₂S service, our LP BOPs include one housing, two caps, two handles, two rams, and two screws (see Figure 2). The built-in handles allow users to operate the BOP without additional tools. When higher working pressures are expected the LP BOP can be easily converted to our HP6 model to withstand 3,000 PSI by changing out the rams.

HP6

The HP6 was developed to protect against blowouts when working with wireline or small tubing. Rated to 3,000 psi, you can rely on Double E's HP6 BOP.

The HP6 is offered with vertical bores of 1.90 and 2.44 inches, thread sizes of 2¾ to 3½ inches, and can be used with rod sizes up to 1¾ inches. The HP6 has a 0 to ¾ inch wireline capability. We offer both standard and H₂S service versions. Our HP6 BOPs include one housing, two caps, two rams, two handles, and two screws (see Figure 2).

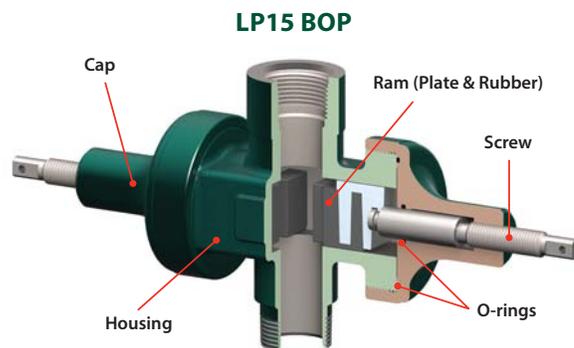
HP10

When extreme pressure resistance is required, you can rely on the HP10. This BOP is rated for pressures up to 5,000 PSI but is still small enough to easily install and maneuver. The HP10 BOP is fitted with an equalizer valve to allow operators to bleedoff pressure to avoid a pressure kick and use less force when closing on the rams.

The HP10 can be made for a variety of sizes, with rams that seal on 0 to 1½ inches for smaller wireline or rod models, and can close on 3½ inch tube in the larger models. The HP10 is available in the same sizes as the HP6, as well as larger sizes with a vertical bore up to 6½ inches.

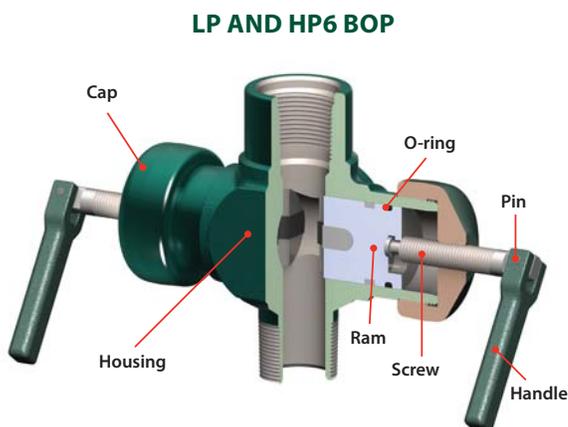
The most popular size HP10 has a vertical bore of 4.81 inches, a thread size of 5½ inches, and can be used with a ⅝ inch wireline. Each HP10 BOP includes one housing, two caps, two rams, two screws, and two line guides (see Figure 3).

FIGURE 1



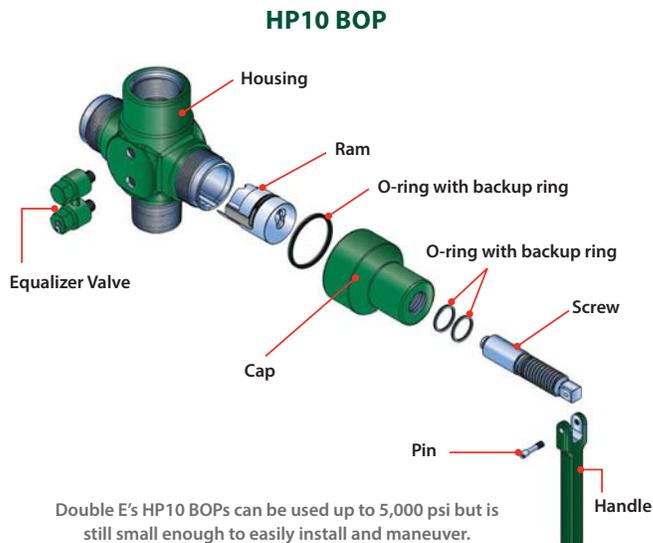
Double E's LP15 BOP can be used up to 3,000 psi and close on 0 to 1½" rod size.

FIGURE 2



Double E's LP and HP6 production BOPs are some of the most widely used in the industry.

FIGURE 3



Double E's HP10 BOPs can be used up to 5,000 psi but is still small enough to easily install and maneuver.

BOP RAMS

Double E's unique ram designs allow for outstanding pressure resistance. Each of our rams are available for standard or H₂S service (see Figure 4).

LD-DF

This steel-reinforced, dome-faced rubber ram will close on rods up to 1½ inches in diameter. The LP-DF ram will also seal with no rod or wire in the hole. The LP-DF ram is rated up to 1,500 PSI.

LP

For a precise seal on your rod or pipe, specify our LP ram. The LP can be molded to include a gap for the exact size of your rod or pipe. The LP ram is rated up to 1,500 PSI.

LP15

The LP15 ram offers a unique design which closes on all rod sizes up to 1½ inches. That design prevents separation failures that can occur with bonded assemblies. The LP15 ram is rated up to 2,000 PSI. On larger sizes, the LP15 ram is rated up to 3,000 PSI.

HP6-FF

This steel ram is molded with a rubber seal across the flat surface and holds securely at pressures up to 3,000 PSI. The HP6-FF ram is best suited for high pressure applications when no rod is used.

HP6

Like the LP ram, the HP6 ram is manufactured to seal on the outside diameter of your rod or pipe. The HP6 ram is rated up to 3,000 PSI.

HP10

For use with the HP10 BOP, the HP10 ram is rated up to 5,000 PSI. This ram is available for standard, H₂S, or high temperature service.



DOUBLE E BLOW OUT PREVENTERS MEET YOUR NEEDS

1. Trouble Free Performance

Made from heat-treated alloy steel, Double E's BOPs offer superior performance in your demanding applications.

2. Large Selection

Our BOPs are available for use up to 5,000 psi and with rod sizes up to 3½ inches. We offer BOPs for standard, H₂S, or high temperature service, with vertical bores of 1.90, 2.44, 2.90 and 5.81 inches, and with thread sizes from 2¾ to 7 inches.

3. Inventory

With 26 different types of BOPs and three types of replacement rams in stock, you can receive the part you need as soon as the next business day.

KEY FEATURES FOR BLOW OUT PREVENTERS

- Double E offers BOPs for standard, H₂S, and high temperature service.
- Our sour service BOPs can be certified to NACE requirements.
- All BOP's can be converted to be hydraulically activated.
- We can develop a BOP to fit your requirements.

LP15	LP	HP6	HP10
<ul style="list-style-type: none"> • 2,000 or 3,000 PSI depending on size • Closes on 0–1½ inches rod size • Pin and socket style ram reduces separation failure • Easy to upgrade to H₂S 	<ul style="list-style-type: none"> • Up to 1,500 PSI • Closes on 0–1¾ inches rod size • Convenient handles require no tools to operate • Easy upgrade to HP6 	<ul style="list-style-type: none"> • Up to 3,000 PSI • Closes on 0–1¾ inches rod size • Convenient handles require no tools to operate • Easy to maintain in the field 	<ul style="list-style-type: none"> • Up to 5,000 PSI • Easy to install and maneuver • Equalizer valve allows bleed off of pressure

STOCKED BLOWOUT PREVENTERS

Type	Vertical Bore (in.)	Rod/Wireline Size (in.)	Thread (in.)	Service
LP	2.44	0-1½	2⅞ EU	Standard
LP	2.44	1¼	2⅞ EU	Standard
LP	2.44	1½	2⅞ EU	Standard
LP	2.44	1¾	2⅞ EU	Standard
LP	2.44	1½	2⅞ EU	H ₂ S
LP	1.90	0-1½	2⅜ EU	Standard
LP	1.90	1½	2⅜ EU	Standard
LP	1.90	0-1½	2⅜ EU	H ₂ S
LP	1.90	1½	2⅜ EU	H ₂ S
LP15	1.90	0-1½	2⅜ EU	Standard
LP15	2.44	0-1½	2⅞ EU	Standard
LP15	2.44	0-1½	2⅞ EU	Standard
LP15	2.90	0-1½	2⅞ EU	Standard
LP15	2.90	0-1½	2⅞ EU	H ₂ S
HP6	2.44	1½	2⅞ EU	Standard
HP6	2.44	1½	2⅞ EU	H ₂ S
HP6	2.44	1¼	2⅞ EU	H ₂ S/Hi-temp
HP6	2.44	1½	2⅞ EU	H ₂ S/Hi-temp
HP6	2.44	1½	3 LP	Standard
HP6	2.44	0-¾	2⅞ EU	Standard
HP6	2.44	1¼	2⅞ EU	Standard
HP6	2.44	1½	2⅞ EU	Standard
HP6	1.90	0-¾	2⅜ EU	Standard
HP6	1.90	1¼	2⅜ EU	Standard
HP6	1.90	0-¾	2⅜ EU	H ₂ S

SUCKER ROD STRIPPERS



Double E's adjustable Sucker Rod Strippers remove oil and paraffin from virtually any size rod or piping as they are being pulled. That stripping action provides a clean and safe work environment which saves time and money during lifting operations. With an easy to open cap, field operators can quickly change out the rubber packing to adjust to different size rods. If we don't have a Sucker Rod Stripper model for your application, we can develop one for you.

Stocked Sucker Rod Strippers

1. Standard Sucker Rod Stripper

Double E's standard Sucker Rod Stripper is made of durable ductile iron. At 58 pounds, its 9½ inch high body has a minimum bore of 2¾ inches and female thread of 3 inch LP down. Adapters are available for alternate thread sizes (see Figure 1).

2. Sucker Rod Stripper with Rod Table

Double E also offers a modified version of its popular Sucker Rod Stripper. The modified version comes with a pre-installed rod table. That rod table reduces downtime and maintenance costs by providing a convenient location to store tools during well maintenance (see Figure 2).

3. Inventory

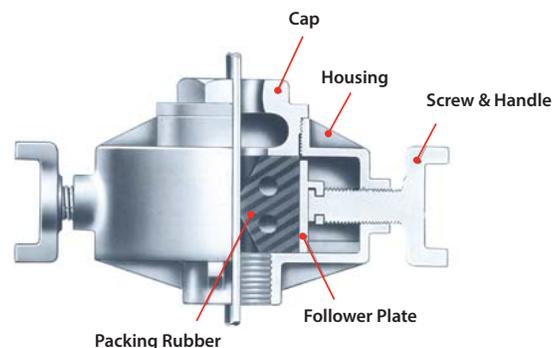
We stock two popular sizes of Sucker Rod Strippers. In addition to our standard version, Double E stocks a modified Sucker Rod Stripper with a pre-installed rod table. We also stock replacement rubber packings which can be used with both versions (see Figure 3).

ROD STRIPPERS

Type	Weight (lbs.)	Height (in.)	Minimum Bore (in.)	Thread Size (in.)
Standard	58	9½	2¾	3 LP
With Rod Table	77	9	2¾	3 LP

FIGURE 1

STANDARD SUCKER ROD STRIPPER



Not a pressure containing device

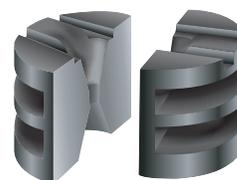
FIGURE 2

SUCKER ROD STRIPPER WITH ROD TABLE



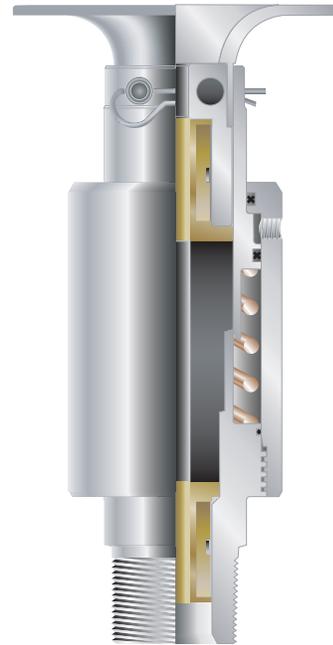
FIGURE 3

RUBBER PACKING



Our 2WR medium-hard rubber packing is available for all rod sizes.

OIL SAVERS



Double E developed the Hydraulic Action Oil Saver. Today, Double E continues to lead the wireline industry with four models. Each of these models offer superior line wiping efficiency, safe and secure pressure control, and the assurance of a long, trouble-free life. Double E's Oil Savers are available for a variety of slickline, wireline, and tubing applications in sizes up to 1 3/4 inches. If we don't have an Oil Saver model for your application, we can develop one for you.

Type C

Double E's Type C Oil Saver is made from heat-treated alloy steel. Our most popular Oil Saver weighs 20 pounds and is 13½ inches high. Its minimum bore is 1⅝ inches. It is available in thread sizes of 2⅜, 2⅞, and 3½ inch EU. The lightweight design also allows for easy handling (see Figure 1).

Type CL

With an identical design as a Type C Oil Saver, Double E's Type CL Oil Saver is larger in weight and size. Each Type CL weighs 29 pounds, is 15½ inches high, and has a minimum bore of 1⅜ inches. It is available in 2⅞ inch EU and 3 inch LP threads. Double E can also supply dual Type C or CL Oil Savers in a tandem assembly for applications where a single Oil Saver is insufficient.

Type 410

An ideal match for any wireline operation, Double E's Type 410 Oil Saver is constructed of corrosion-resistant stainless steel. It features a stair-step rubber design that allows for even wear and excellent longevity. By simply removing a U-bolt, the rubber can be changed quickly from the top. The Type 410 Oil Saver weighs 42 pounds and is 15½ inches high. Its minimum bore is 1⅜ inches. It is available in thread sizes of 2⅜ or 2⅞ inch EU and 3 inch LP (see Figure 2).

Type CT

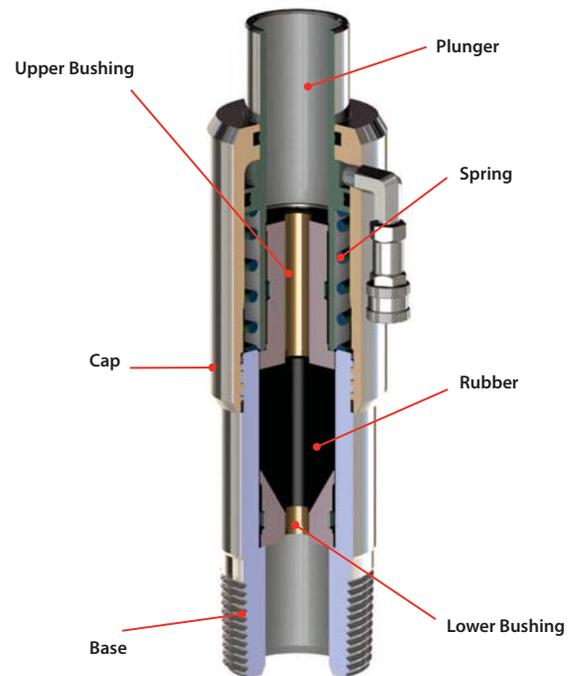
With a standard 2⅜ or 2⅞ EU threaded female up x male connection down, the Type CT oil saver can be easily incorporated on to any existing oil saver to create a dual tandem packoff system. The CT can be built with a type C rubber, or with the larger type CL rubber for longer service life. Each Type CT is designed with an NPT port in the lower plunger for cleanout between the packoffs.

OIL SAVER TYPE

Description	C	CL	410	MT	CT
Test Pressure (psi)	10,000	10,000	10,000	5,000	10,000
Working Pressure (psi)	5,000	5,000	5,000	2,500	5,000
Weight (lbs.)	20	29	42	47	35 45
Height (in.)	13½	15½	15½	15½	15 18½
Elastomer	45-Duro Natsyn				
Bushing Material	Brass	Brass	Brass	Brass	Brass
Minimum Bore (in.)	1⅝	1⅜	1⅜	2	15/8
Standard Thread Size (in.)	2⅜ EU	2⅞ EU	2⅜ EU	2⅞ EU	2⅜ EU
	2⅞ EU	3 LP	2⅞ EU	2½ LP	2⅞ EU
			3 LP	3½ LP	3 LP

FIGURE 1

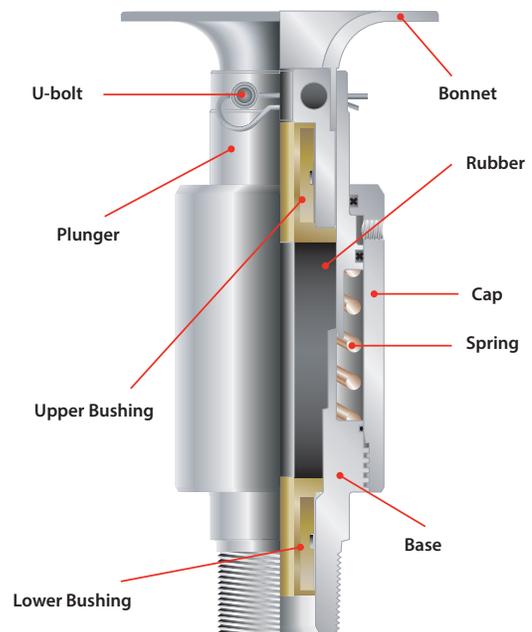
TYPE C & CL HYDRAULIC OIL SAVER



Double E's Type C and CL Oil Savers are identical in design and differ only in size and weight.

FIGURE 2

TYPE 410 HYDRAULIC OIL SAVER



Our Type 410 Oil Saver is an ideal match for any wireline operation.

Type MT

To provide a better seal and improve wear resistance, Double E's Type MT Oil Saver has the largest rubber on the market. The large rubber also eliminates the need for a tandem stripper. Designed for easy use, Double E's Type MT features identical top and bottom brass bushings, a snap ring for simplified assembly, a large inside diameter for passing a 2 inch swab, and a heavy spring for fast pressure release. The Type MT Oil Saver weighs 47 pounds and is 15½ inches high. It is available in thread sizes of 2¾ inch EU and 2⅞ or 3 inch LP (see Figure 3).

Stocked Oil Savers

Double E stocks the three most popular versions of its Oil Savers. In addition, Double E has a large inventory of replacement rubbers and bushings available for same day shipment.

Type C

1. 2⅞ Inch EU, ⅝ Inch Wireline Model

As Double E's most popular Oil Saver, the 2⅞ inch EU, ⅝ inch wireline model sets the standard. Each Oil Saver is precision machined and includes a plunger, upper and lower bushing, spring, cap, rubber, and base.

2. 2⅞ Inch EU, 7/32 Inch Wireline Model

This widely used model includes all the components of the 2⅞ inch version, but contains a rubber for a 7/32 inch size wireline.

Type CL

1. 2⅞ Inch EU, ⅝ Inch Wireline Model

This model, Double E's primary Type CL Oil Saver, includes all the components of the 2⅞ inch, ⅝ Inch Wireline Type C Oil Saver, but it is 15½ inches high and weighs 29 pounds.

Stocked Oil Saver Replacement Rubbers

(see Figure 4)

- | | |
|------------------------------------|------------------------------------|
| 1. Type C for 7/32" size wireline | 5. Type 410 for ⅝" size wireline |
| 2. Type C for ⅝" size wireline | 6. Type MT for 7/32" size wireline |
| 3. Type CL for 7/32" size wireline | 7. Type MT for ⅝" size wireline |
| 4. Type CL for ⅝" size wireline | 8. Type MT for ⅞" size wireline |

Stocked Oil Saver Replacement Bushings

(see Figure 5)

1. Lower bushing

For Type C or Type CL Oil Savers for ⅜, 7/32, or ¼ inch wireline

2. Lower bushing

For Type C or Type CL Oil Savers for ⅝, ⅞, or ¾ inch wireline

3. Upper bushing

For Type C Oil Saver or lower bushing for Type 410 Oil Saver for ⅜, 7/32, or ¼ inch wireline

4. Upper bushing

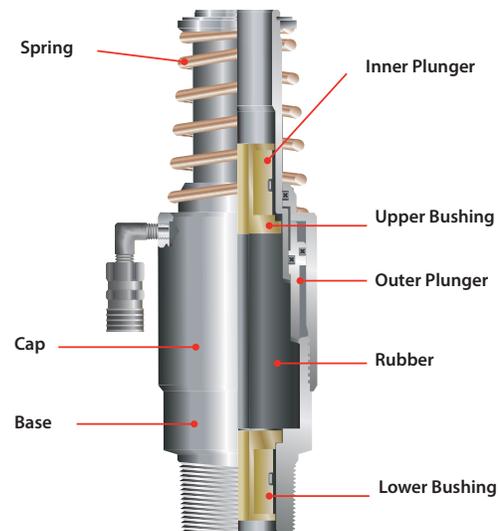
For Type C Oil Saver or lower bushing for Type 410 Oil Saver for ⅝, ⅞, or ¾ inch wireline

5. Upper bushing

In Type CL Oil Saver or upper or lower bushing in Type MT Oil Saver for ⅝, ⅞, or ¾ inch wireline

FIGURE 3

TYPE MT HYDRAULIC OIL SAVER



Double E's Type MT Oil Saver provides industry leading sealing action and wear resistance.

FIGURE 4

REPLACEMENT RUBBER



Replacement rubbers are available for immediate shipment for most wireline sizes for Type C, CL, 410, and MT Oil Savers.

FIGURE 5

REPLACEMENT BUSHING



Double E stocks replacement bushings for most wireline sizes for Type C, CL, 410, and MT Oil Savers.

DOUBLE E OIL SAVERS MEET YOUR NEEDS

1. Trouble Free Performance

Made from heat-treated alloy steel (Type C or Type CL) or corrosion resistant stainless steel (Type 410 or Type MT), Double E's Oil Savers will provide reliable, trouble free performance for your demanding applications.

2. Large Selection

With four models available, Double E has an Oil Saver to meet your needs. Our Oil Savers are available in heights ranging from 13½ to 15½ inches, weights of 20 to 47 pounds, minimum bores of 1⅞ to 2 inches, and thread sizes of 2¾ to 2⅞ inches EU or 2⅞ inch to 3 inch LP.

3. Inventory

With three Oil Savers, eight replacement rubbers, and five replacement bushings in stock, you can receive the part you need as soon as the next business day.

STUFFING BOXES



Stuffing Boxes prevent oil from escaping from a well, while diverting oil to a field storage tank. Double E offers some of the most high performance Stuffing Boxes available. While most Stuffing Boxes are suited to only 1,500 PSI, our dual-packed Type PC Stuffing Boxes perform well in environments up to 3,000 PSI. We also have a type PC model for wells with pressures up to 5,000 PSI. At only 20 pounds and 9 inches high, our Stuffing Boxes are easy to handle and allow for a longer stroke length.

Our Stuffing Boxes are available in a variety of thread/flanged connections and for rod sizes of 1 1/8 inch to 1 1/2 inch. If we don't have a Stuffing Box for your application, we can develop one for you. The top section of Double E's Stuffing Boxes perform the normal packing operation. The bottom section contains a body, piston, and lower packing. When pressurized, the piston causes the lower packing to seal against the polished rod, preventing oil loss (see Figure 1).

Stocked Stuffing Boxes

Double E stocks four versions of its popular Type PC Stuffing Boxes. All four are configured for a 1 1/2 inch rod. In addition, Double E has a large inventory of replacement packings and bushings available for same day shipment.

Standard Service Stuffing Boxes

1. 2 3/16 Inch Flanged Base Model

Double E's most popular Stuffing Box, the 2 3/16 inch flanged base model, sets the standard. Each Stuffing Box is precision machined and includes a body, bushing, cap, base, lower plate, lower and upper packing, and piston.

2. 2 7/8 Inch EU Base Model

This popular model includes all the components of the 2 3/16 inch version, but has a 2 7/8 inch EU base.

3. 3 Inch LP Base Model

This model includes all the components of the 2 3/16 inch version, but has a 3 inch LP base.

H₂S Service Stuffing Box

1. 3 1/2 Inch EU Base Model

Double E's primary H₂S service Stuffing Box, includes all the components of the 2 3/16 inch standard service version, but contains a lower and upper packing that are H₂S resistant and suitable for high temperatures. In addition, this model features a 3 1/2 inch EU base.

Stocked Stuffing Box Replacement Parts

1. Upper Packings

Double E carries a large inventory of 1 1/2 inch upper packings for both standard and H₂S service.

2. Lower Packings

Double E also carries a large inventory of 1 1/2 inch lower packings for both standard and H₂S service.

3. Bushings

Double E carries a large inventory of 1 1/2 inch bushings.

DOUBLE E STUFFING BOXES MEET YOUR NEEDS

1. Improve Performance

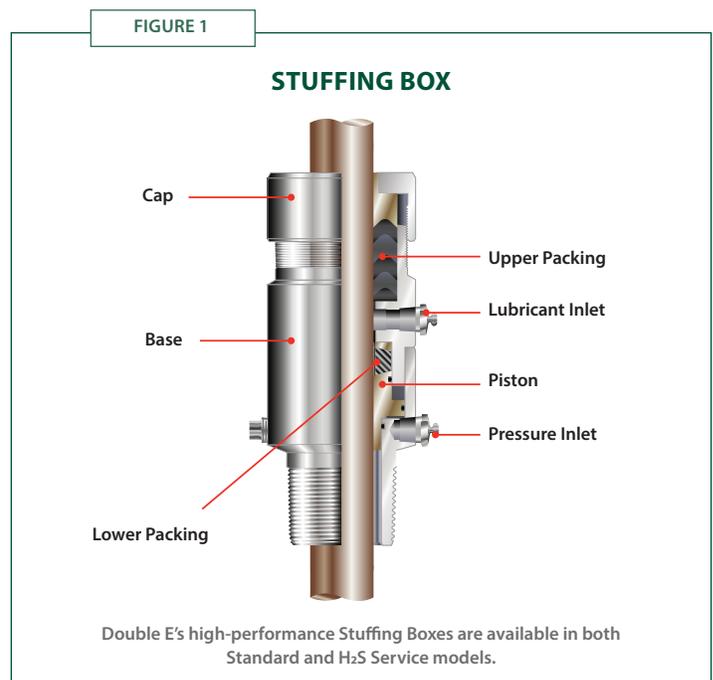
With a 3,000 psi working pressure rating, Double E's Stuffing Boxes will perform under the most demanding conditions.

2. Custom Thread Sizes

If our standard stuffing boxes do not meet your requirements we can design one for you with thread sizes from 2 3/8 to 4 1/2 inches.

3. Inventory

With our four most popular Standard and H₂S Service Stuffing Boxes in stock, you can receive the part you need as soon as tomorrow. We also carry replacement packings and bushings to minimize downtime on your well.



ROD GUIDES



Extend the Life of Your Rods and Tubing

Double E's popular Rod Guides act as a wear resistant bushing to space rod couplings from the tubing bore (see Figure 1). Our unique wrap around design creates a double-lock grip on the rod. That grip is strong enough to prevent slippage in most well conditions. Double E Rod Guides are easy to install. The diagonal slots slip over the rod and easily snap into place. With both Nylon and Rubber Rod Guides available, Double E has the guide you need for any environment.

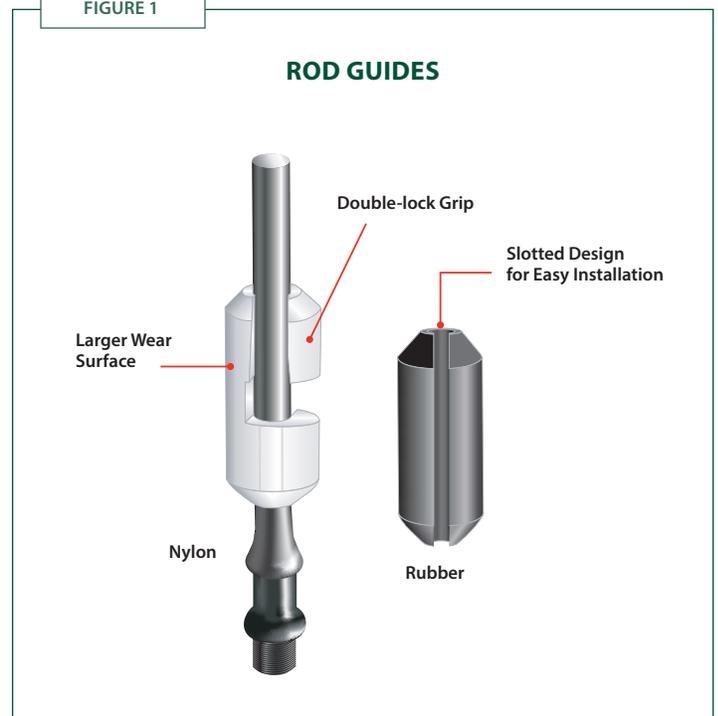
Nylon Rod Guides

Our twist-on Nylon Rod Guides use a tough, abrasion resistant material. That material also resists aggressive well fluids, including hydrogen sulphide and carbon dioxide solutions. Our Nylon Rod Guides are suitable for environments up to 160° F and are available for 2½ inch, 2¾ inch, 2⅞ inch, and 3½ inch tubing.

Rubber Rod Guides

Double E's Rubber Rod Guides utilize a sleek, slotted design. That simple design allows for easy installation in the field. Our Rubber Rod Guides are suitable for environments up to 250° F and are available for 2¾ inch and 2⅞ inch tubing.

FIGURE 1



DOUBLE E ROD GUIDES MEET YOUR NEEDS

1. Reduce Lifting Costs

Regular use of Double E Rod Guides will reduce lifting costs. By centering the rods and eliminating buckling, Double E Rod Guides enable a longer pumping stroke.

2. Minimize Rod and Tubing Wear

Consistent use of Double E Rod Guides will substantially reduce rod and tubing wear. Our larger wear surface allows our Rod Guides to last longer than other brands.

3. Inventory

We stock 10 popular sizes of Nylon Rod Guides and 7 popular sizes of Rubber Rod Guides.

ROD GUIDES

Material	Tubing (in.)	Outside Diameter (OD)		Box	
		Sucker Rod (in.)	Guide (in.)	Quantity	Weight (lbs.)
Nylon	2½	⅝	1.850	50	16
	2¾	⅝, ¾, ⅞	1.850	50	16
	2⅞	¾, ⅞, 1	2.200	50	23
	3½	¾, ⅞, 1	2.750	50	44
Rubber	2¾	⅝, ¾, ⅞	1.750	25	11
	2⅞	⅝, ¾, ⅞, 1	2.125	25	16

ELASTOMER GUIDE

HIGH PERFORMANCE MATERIALS FOR OIL FIELD SEALS

Double E manufactures a variety of custom molded rubber seals for the oil and gas industry. We have the resources in-house to design, engineer, and mold custom rubber products to your exact specifications. This guide will assist you in choosing the appropriate elastomer for your sealing application. Figure 1 identifies Double E's most popular compounds.

Popular Elastomers

The following four elastomers are the most common in oil field applications. Variations in mechanical properties and seal performance exist among the compounds of a given elastomer, so price and suitability can vary.

Nitrile

Nitrile is the standard to which all the other elastomers are compared. Nitrile compounds are copolymers of acrylonitrile and butadiene.

Acrylonitrile provides resistance to petroleum based fluids such as oils and fuels, while butadiene contributes low-temperature flexibility. Standard nitrile is also known as Buna N rubber. Because they are versatile and inexpensive, nitriles are the most popular industrial seal material.

Nitrile compounds provide excellent service with gasoline, crude oil, power steering fluid, hexane, toluene, water, water-based hydraulic fluids, and dilute bases such as sodium hydroxide. Because nitriles contain unsaturated carbon-carbon bonds in the base polymer, they are not suitable for exposure to ozone, sunlight, and weathering. More than 50% of sealing needs can be met using nitrile.

Individual nitrile compounds have service temperatures within the range from -65 to + 250° F, including certain compounds formulated for lower temperatures.

Fluorocarbon

Fluorocarbon elastomers command a substantial share of the seal market. Fluorocarbons withstand a very broad spectrum of chemicals over a temperature range second only to that of silicone compounds.

Fluorocarbons are commonly rated for continuous service temperatures from -20 to + 400°F, with intermittent exposures as high as 500°F.

In spite of their higher cost, fluorocarbons have replaced nitriles in many applications because of their superior resistance to compression set, high temperature, and a wide range of chemicals.

Fluorocarbon compounds have service temperatures from -20 to + 450°F.

FIGURE 1

POPULAR COMPOUNDS

Material Type	Recommended Temperature Range	Double E Compounds
Nitrile (NBR)	-30 to 200°F	R1A, R1B, R1C, R1D, R1E, R1F
Hydrogenated Nitrile (HNBR)	-30 to 300°F	R5AA, R5AG, R5W
Fluorocarbon (FKM)	-15 to 450°F	R5T, R5U
Aflas (TFE/P)	40 to 400°F	R5AJ

Hydrogenated Nitrile

Hydrogenated Nitrile (HNBR), like conventional nitrile, is made from acrylonitrile and butadiene monomers. After polymerization, a carbon-carbon double bond from the butadiene molecule is still present in the backbone of the nitrile polymer. These regions of unsaturation make the base polymer susceptible to uncontrolled cross-linking by heat, ozone, hydrogen sulfide, sour crude and other oxidizing agents. Degradation of ordinary nitriles includes increased hardness, loss in elongation and tensile strength, and surface cracking. This weakness in the nitrile polymer can be eliminated by saturating (reacting with hydrogen) the remaining carbon-carbon double bond. Hydrogenated nitriles significantly outperform conventional nitriles in resisting heat and sour crude oil.

HNBR compounds have a service range of -40 to + 325° F. They are recommended when upgrading from nitriles or as an economical alternative to more expensive fluorocarbon elastomers.

Aflas®

Aflas® is a trade name for tetrafluoroethylene propylene copolymer. Aflas® compounds have almost universal resistance to both acids and bases, steam, acid gases, crude oil and many types of corrosion inhibitors. Serviceability extends to 400° F for long-term exposure. With combined resistance to corrosion inhibitors and heat, Aflas® seals are able to resist the extremes of heat and pressure present in aggressive downhole oil well environments. Aflas® seals have very low rates of gas permeation and are highly resistant to explosive decompression, making them excellent choices for downhole packing elements.

Aflas® compounds have service temperatures from -10 to + 400° F.



RELY ON DOUBLE E

Double E is a leading manufacturer of high performance oil well production tools.

We specialize in Blow Out Preventers, Oil Savers, Stuffing Boxes, Sucker Rod Strippers, and Rod Guides. Double E also makes custom-machined metal parts, custom-molded elastomeric products, including rubber-to-metal bonded parts. Founded in 1923, Double E was one of the first manufacturers of metal products to focus on the oil and gas industry. Our 30,000 square-foot facility is located in Dallas, Texas.

When you choose to work with Double E, you can rest assured that our products will perform in your most demanding applications. For more information, visit us online at www.doubleeinc.com or e-mail us at sales@doubleeinc.com.

For more information on any of our products please contact a Double E customer service representative.

1261 Profit Drive, Dallas, Texas 75247 | (214) 631-2290 | doubleeinc.com

