





**Sara manufactures a diverse range of oilfield equipment in its manufacturing facility in India, using the latest design techniques and CNC machines. These products are available through distributors worldwide, including Sara's subsidiary company (STS Products, Inc.) in Houston and various Sara locations.**





## Quality and Innovation

Sara's quality system is accredited under ISO-9001 certification.



Sara is an API approved manufacturer to manufacture and monogram its products under various API certifications.



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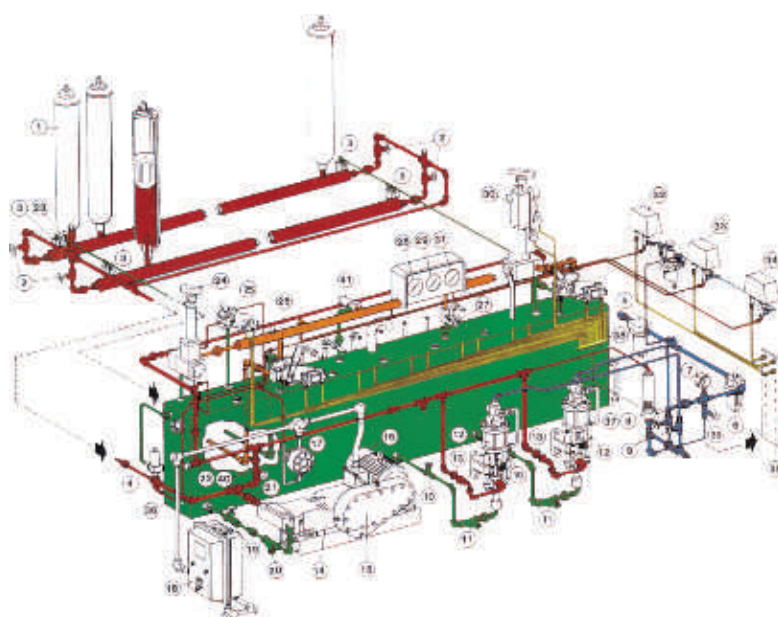
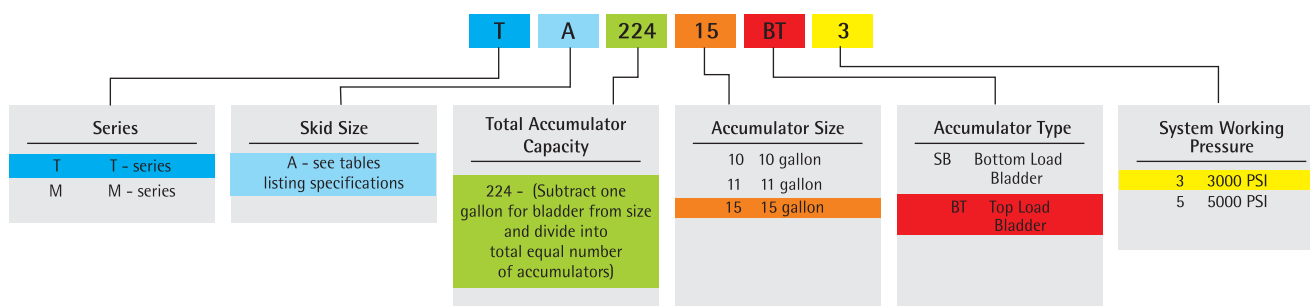
[ssae@sarasae.com](mailto:ssae@sarasae.com)

## BOP Accumulator Units

Sara's BOP Accumulator Units meet or exceed the design specification as specified in API 16D. Each control system is specifically engineered to assure reliable control of the BOP stack with adequate reserve for continuous operation under emergency conditions. Sara welcomes the opportunity to assist you in the proper selection of standard equipment or custom design to meet your application and certification requirements.



### Model Number Identification System



- Rig Air Pressure
- Regulated Instrument Air, 18 PSI
- Fluid-atmospheric Pressure
- Fluid-regulated, 1500 PSI
- Fluid-high Pressure, 3000 PSI
- Remote Air Signals

This system shown here is for Air Remote Control Panel operation. Sara systems that are designed to meet API 16D must have Air-Electric Remote Control Panels if they are used on Offshore Drilling Rigs.



## Remote Panels

### Air Remote Panels

Air Remote Panels control rig air pressure to the hydraulic control manifold to operate the manifold functions. An air interface module is required on the accumulator unit and an air interconnect is required to connect the air remote panel to the interface module. Air remote offered in several standard models to meet usual requirements and are available for any special application upon request.

Air-electric panels additionally have explosion proof light stations for each BOP stack function (bypass / internal override included, when applicable) to indicate open or close status of the hydraulic control manifold valves.

### PLC Panel with Touchscreen Display

- Programmable Logic Controls (PLC) based system
- LCD color touchscreen provides pressure readout
- Electrical indication lights for valve position
- Audible and visual alarm for low system pressure, low rig-air and low reservoir fluid level
- 24 VDC electrical backup
- Wireless and wired configurations
- Logs, functions, and alarms

### Features

- Explosion proof for Class I Div. I or Class I Div. II
- Air cooler for higher temperatures
- Logging of functions and alarms
- Air and battery back up
- Minimum rig-up time; no air hose
- Printer port for report generation

### Functions

- Visual indications of valve position
- Audible and visual alarm for low accumulator pressure, low manifold pressure, low rig air pressure and low reservoir fluid level
- Push buttons from open/close function with master push button for two hand operation
- Push buttons for high/low function of bypass valve
- Push buttons for raise/lower annular regulator pressure setting
- Push button for lamp test

### Options

- Wireless modem for remote communications allows unit status to be monitored remotely
- Communication via optic fiber cable
- Sunlight viewable screen



System Configuration



Alarm Logs and Pressure Trends



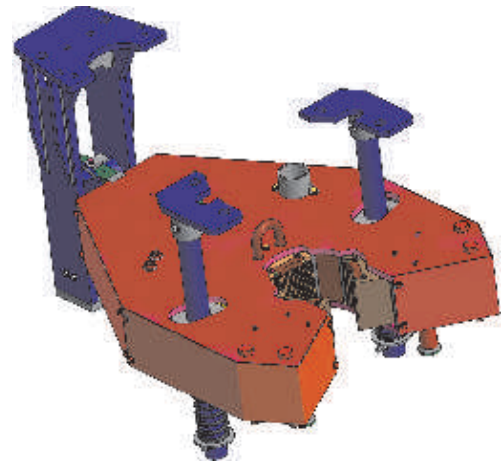
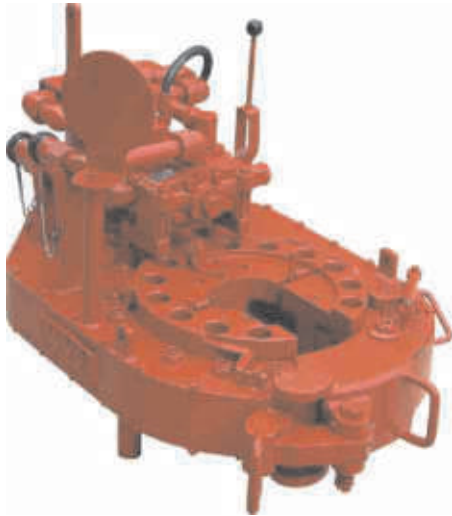
System Setting

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## Hydraulic Tongs



Sara Tongs are available in a variety of models, sizes and types to handle casings, drill collars, sucker rods and tubing including chrome tubulars and can be supplied with hydraulic or manual backup assemblies

CAPACITY	4-1/2"	5-1/2"	7-5/8"	8-5/8"	9-5/8"	10-3/4"	13-5/8"	13-5/8" HT	20"
FOR CASING & TUBING SIZE O.D.	5/8" to 4-1/2"	2-3/8" to 5-1/2"	2-3/8" to 7-5/8"	2-1/16" to 8-5/8"	2-7/8" to 9-5/8"	4" to 10-3/4"	4" to 13-5/8"	4" to 13-5/8"	8-5/8" to 20"
TORQUE	High Gear	2,100 ft. lbs.	2,000 ft. lbs.	4,250 ft. lbs.	5,100 ft. lbs.	3,500 ft. lbs.	4,000 ft. lbs.	4,000 ft. lbs.	7,100 ft. lbs.
	Low Gear	8,000 ft. lbs.	15,000 ft. lbs.	25,000 ft. lbs.	25,000 ft. lbs.	18,000 ft. lbs.	20,000 ft. lbs.	25,000 ft. lbs.	35,000 ft. lbs.
MAX RPM	High 180	High 90	High 78	High 48	High 47/95	High 100	High 95	High 48	High 20
	Low 50	Low 15	Low 13	Low 10	Low 9/18	Low 25	Low 20	Low 9	Low 8
SIZE Width X Length	22.5x 39"	25.5"x 54"	30"x 60"	34"x 52"	28"x 49"	32"x 56"	34"x 59"	34"x 59"	43"x 76"
WEIGHT	600 lbs.	940 lbs.	1,490 lbs.	1,455 lbs.	1,750 lbs.	1,150 lbs.	1,255 lbs.	1,260 lbs.	2,800 lbs.
HYDRAULIC REQUIREMENTS	High Speed	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI	65 GPM at 1,000 PSI
	Low Speed	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI	30 GPM at 2,500 PSI

Consult Factory for Specific Configurations

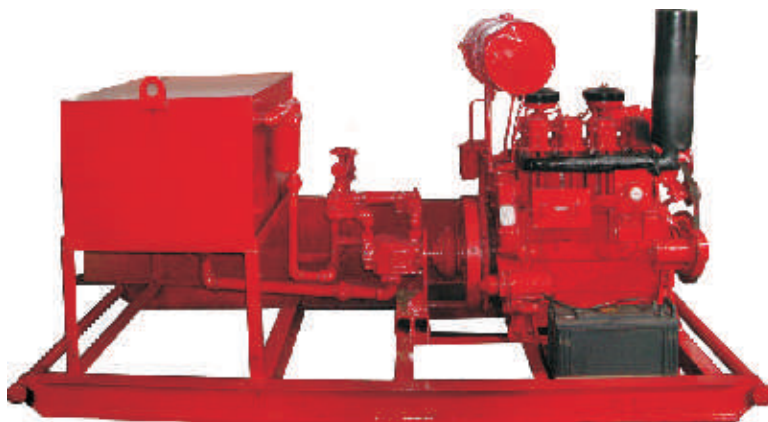
## Computerized Torque Control System

Microprocessor based systems for providing computerized analysis of each joint and complete string. Provides graphic analysis of torque Vs. turn, torque Vs. time and various other options.





## Power Units



### Zone I Electric Power Unit

#### TECHNICAL SPECIFICATIONS

- Pump: Variable delivery axial piston pump
- Engine: 50 hp (37kw) Eexd electric motor
- Cooler: thermostatically controlled hydraulic oil cooler
- Electric Supply: 3 phase 415/480 volts 50/60 Hz
- Hydraulic Output: 2,500 psi (172 bar) or 35 gpm (160 liters per minute).

#### DIMENSIONS

- Size: 4' 9" long x 4' 9" wide x 4' 9" high  
(1,500 mm long x 1,500 mm wide x 1,500 mm high)
- Weight: 5,060 lbs (2,300 kg).

### Zone II Diesel Power Unit

#### TECHNICAL SPECIFICATIONS

- Cooler: Combined water cooled manifold / exhaust cooler
- Flame Arrestors: Exhaust gas flame and spark arrestors, inlet air flame arrestor, crank case vent flame arrestor
- Fan and Fan Belts: Non-metallic radiator fan and anti-static fan belts
- Protection Device : Over-speed protection device operating an inlet air cut-off
- Pressure & Temperature Trips: Low lubricating oil pressure, high cooling water temperature and high exhaust temperature trips

- Caps: Screw caps to dipstick and oil filter caps
- Engine: 6 Cylinder Diesel
- Hydraulic Output: 2,500 psi (172 bar) or 35 gpm (160 litres per minute)
- Starter: Air-operated.

#### DIMENSIONS

- Size: 8' 9" long x 4' 3" wide x 5' 6" high  
(2,700 mm long x 1,300 mm wide x 1,700 mm high)
- Weight: 6,600 lbs (3,000 kg).

### Non-zoned Diesel Power Unit

#### TECHNICAL SPECIFICATIONS

- Engine: 6 cylinder diesel
- Hydraulic Output: 2,500 psi (172 bar) or 35 gpm (160 litres per minute)
- Starter: Air or spring-operated.

#### DIMENSIONS

- Size: 7' 8" long x 4' 3" wide x 4' 9" high  
(2,400 mm long x 1,300 mm wide x 1,500 mm high)
- Weight: 4,510 lbs (2,050 kg).



## Hammer Unions

### Material

Sara unions are manufactured from steel forgings using materials appropriate to specific pressure ratings.

### End Connections

Sara Unions are available in a choice of end connections. API line pipe threads are standard. Butt weld ends and Socket weld ends can be provided. The customer shall specify the schedule of pipe while ordering.

### Integral Union Connections

Sara manufactures a line of high pressure integral union connections in pressure ratings to 15,000 PSI CWP, including but not limited to Crosses, Ells, Tees.

### Sour Services

Sour service is available and all H<sub>2</sub>S service parts of Sara unions conform to the latest NACE specifications.

### Interchangeability

All Sara union components of the same size and figure number are Weco interchangeable. All Sara union nuts have 3 hammer lugs.

### Low Temperature Service

Sara unions can be supplied for low temperature applications with suitable impact value testing.

### Traceability

Sara unions are supplied with full traceability documentation for each component.

### Other Wing Unions
















Sara also manufactures a range of Hex Unions, Hammerseal Tank Unions and Flat Face Unions where the sealing is dependent on an O-Ring fitted between the grooves machined on the mating metal parts.





## Hammer Unions

### Hammer Union Quick Reference Chart

Assembly Colour Key for Standard Service	Fig. No.	Pressure Rating (psi)				Nominal Pipe Size (in mm.)													
		Standard Service		Sour Gas Service		1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"		
		Cold Working	Test	Cold Working	Test	25	32	40	50	65	80	100	125	150	200	250	300		
	50		500	750	NA	NA						✓	✓						
	100		1,000	1,500	NA	NA			✓	✓	✓	✓	✓	✓	✓				
	200		2,000	3,000	NA	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	206		2,000	3,000	NA	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	207		2,000	3,000	NA	NA					✓	✓		✓					
	211		2,000	3,000	NA	NA			✓		✓								
	400		2,500	3,750	2,500	3,750								✓	✓	✓	✓		
	400		4,000	6,000	4,000	6,000			✓		✓	✓							
	600		6,000	9,000	NA	NA	✓		✓		✓	✓							
	602		6,000	9,000	6,000	9,000	✓	✓	✓		✓	✓							
	1002		10,000	15,000	7,500	11,250	✓	✓	✓		✓	✓	✓	✓					
	1003		10,000	15,000	7,500	11,250			✓		✓	✓	✓						
	1502		15,000	22,500	10,000	15,000	✓		✓		✓	✓	✓						
	2002		20,000	30,000	NA	NA			✓		✓	✓							
	2202		NA	NA	15,000	22,500			✓		✓	✓							

\*Please reconfirm from plant for specific cold working pressure and test pressure as pressure rating varies for some sizes/connections and might not match with above listed ratings.

### Other Products

Sara manufactures an assortment of other products having usage in varied oilfield applications.

In addition to the Frac Subs shown below, Sara also manufactures Flange to Wing Adapters, Wing to Wing Adapters, Flanged Tees and Crosses.



Frac Subs

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## Swivel Joints



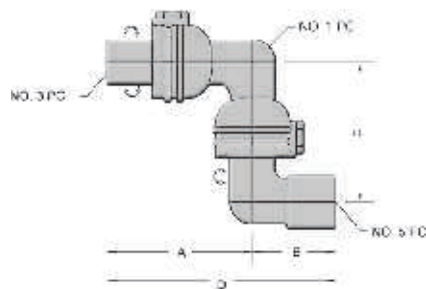
Available in sizes  $\frac{3}{4}$ " through 3" up to 15,000 PSI non-shock cold working pressure, Sara Swivel Joints offer the following features:

- Minimum flow restriction
- Heavy duty hex head style ball loading plug
- Grease retainer ring (ensures clean ball race)
- Standard packing units (operating temperature to 2,250°F)
- High temperature packing units (operating temperature to 4,500°F)
- Superior hardened ball races ensure uniform surface hardness and depth for longer life under severe thrust and radial loading
- Standard Swivel Joints are provided with API line pipe threads
- Other end connections are available on request
- Available for standard and sour service
- All sizes are available in 8 styles, for 360° rotation in 1, 2 or 3 planes

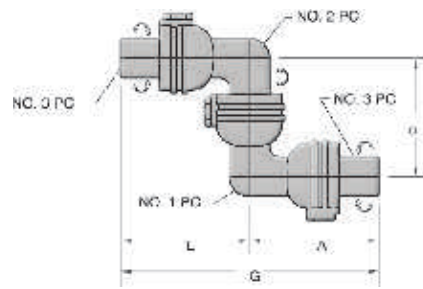
### Quick Reference Chart

Model	Color Code	NSCWP	End Connections	Standard Service SIZE (in)						Sour Service SIZE (in)					
				$\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	1	2	3	$\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	1	2	3
Low Pressure	BLUE	1,000	Female Line Pipe Threads					✓	✓						
High Pressure	OLIVE GREEN	6,000	Fig. 602 Union											✓	✓
	SILVER	6,000	Female Line Pipe Threads	✓	✓	✓	✓	✓	✓						
Extra High Pressure Long Sweep	OLIVE GREEN	7,500	Fig. 1002 Union											✓	✓
	OLIVE GREEN	10,000	Fig. 1502 Union											✓	✓
	BLACK	10,000	Female Line Pipe Threads					✓	✓						
	OLIVE GREEN	15,000	Fig. 2202 Union											✓	✓
	RED	15,000	Fig. 1502 Union					✓	✓						
	LIGHT BLUE	20,000	Fig. 2002 Union					✓	✓						

### Short Radius Swivel Joints



**STYLE NO. 50**  
(Two Planes of Rotation)

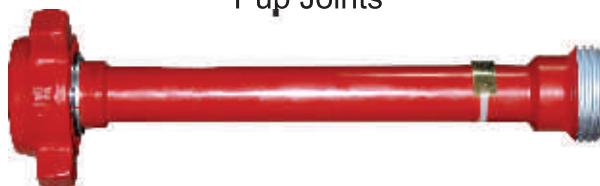


**STYLE NO. 10**  
(Three Planes of Rotation)



## Swivel Joints

### Pup Joints



Available with integral or welded union end connections from 10,000 to 15,000 PSI NSCWP for standard and sour service.

### Steel Hose Assemblies

High pressure cementing and circulating hoses incorporate swivel joints of forged steel with superior quality hardened ball races and high pressure type packing units.



One wing union and two style 50 or style 10 swivel joints with threaded ends



- One wing union and one each style 50 and style 10 swivel joints with integral wing union ends
- Four wing unions and two style 50 or style 10 swivel joints with integral wing union ends
- Four wing unions and two style 50 or style 10 swivel joints

### Long Radius Swivel Joints



STYLE NO. 10  
MxM Union Ends



STYLE NO. 50  
MxF Union Ends



STYLE NO. 10  
MxF Union Ends



STYLE NO. 10  
Threaded Ends



STYLE NO. 50  
Threaded Ends

## Spools and Adapters

Sara manufactures a wide range of Drilling Spools and Double Studded Adapter Flanges conforming to API-16 A and 6A in line with specific customer requirements.



**Adapter Spools**  
Order Formula: Nominal size and working pressure



**Drilling Spools**  
Order Formula: Nominal size, working pressure, end connections and outlet sizes



**Double Studded Adapter Flanges**



**Spacer Spools**  
Order Formula : Nominal size, working pressure and connections



**Studs and Nuts**  
Order Formula : Nominal size, working pressure and end connections



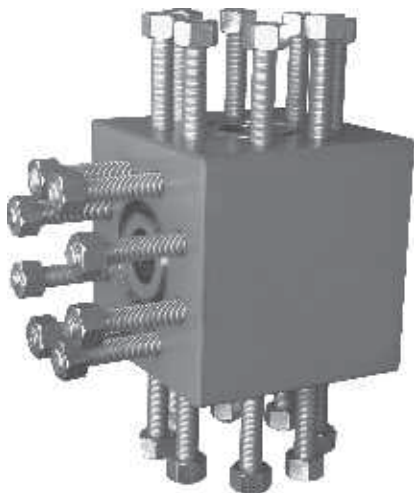
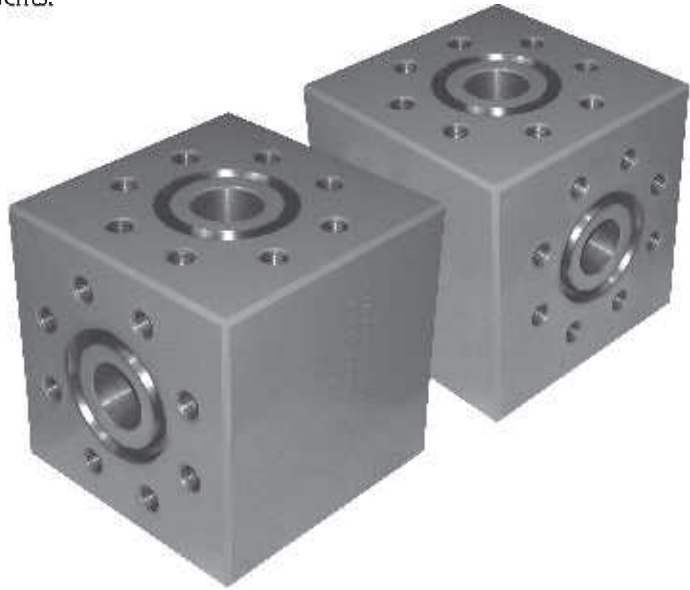
## Flanges, Tees, and Crosses

Sara manufactures a wide range of High Pressure Flanges, Tees, Crosses conforming to API 6A and in line with specific customer requirements.



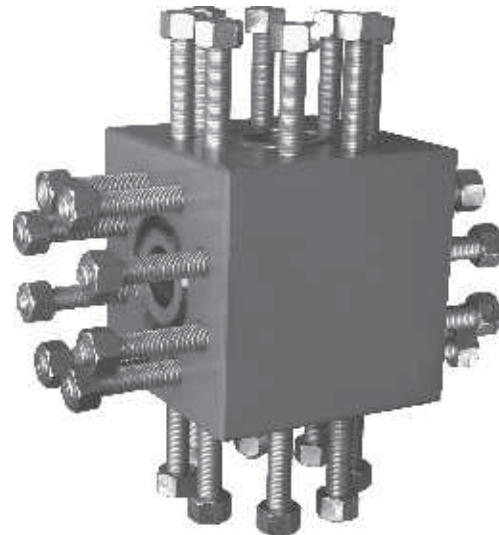
**Weld Neck Flanges**

Order Formula: Nominal size, working pressure and pipe schedule



**Studded Tees**

Order Formula: Nominal size and working pressure



**Studded Crosses**

Order Formula: Nominal size and working pressure

## Ring Joint Gaskets



Sara metallic Ring Joint Gaskets are suitable for high pressure and high temperature applications. The Joint Gaskets are available in R, RX, BX styles and in oval/octagonal profiles. In addition, these units are manufactured in accordance with specific tolerances on CNC machines.

Sara Ring Joint Gaskets fully comply with the ASME B16.20 standard and the API spec 6A requirements (where applicable).

Sara is authorized to monogram Ring Joint Gaskets as per API-6A (PSL4).

The units are manufactured in a variety of standard and special materials.

### Sara Ring Joint Gaskets, Model R or RX

For flanges in accordance with ASME B16.5 and BS 1560

Nominal Pipe Dimension (inches)	Ring Number at Pressure Rating (lbs)						
	150	300	400	600	900	1500	2500
1/2	-	R11	-	R11	-	R12	R13
3/4	-	R13	-	R13	-	R14	R16
1	R15	R16	-	R16	-	R16	R18
1 1/4	R17	R18	-	R18	-	R18	R21
1 1/2	R19	R/RX20	-	R/RX20	-	R/RX20	R/RX23
2	R22	R/RX23	-	R/RX23	-	R/RX24	R/RX26
2 1/2	R/RX25	R/RX26	-	R/RX26	-	R/RX27	R28
3	R29	R/RX31	-	R/RX31	R/RX31	R/RX35	R32
3 1/2	R33	R34	-	R34	-	-	-
4	R36	R/RX37	R/RX37	R/RX37	R/RX37	R/RX39	R38
5	R40	R/RX41	R/RX41	R/RX41	R/RX41	R/RX44	R42
6	R43	R/RX45	R/RX45	R/RX45	R/RX45	R/RX46	R/RX47
8	R48	R/RX49	R/RX49	R/RX49	R/RX49	R/RX50	R51
10	R53	R/RX53	R/RX53	R/RX53	R/RX53	R/RX54	R55
12	R56	R/RX57	R/RX57	R/RX57	R/RX57	R58	R60
14	R59	R61	R61	R61	R62	R/RX63	-
16	R64	R/RX65	R/RX65	R/RX65	R/RX66	R67	-
18	R68	R/RX69	R/RX69	R/RX69	R/RX70	R71	-
20	R72	R/RX73	R/RX73	R/RX73	R/RX74	R75	-
24	R76	R77	R77	R77	R78	R79	-

### Sara Ring Joint Gaskets, Model BX

For flanges in accordance with API spec 6A, model 6BX

Nominal Pipe Dimension (inches)	Ring Number at Pressure Rating (lbs)					
	2,000	3,000	5,000	10,000	15,000	20,000
1 11/16	-	-	-	BX150	BX150	-
1 13/16	-	-	-	BX151	BX151	BX151
2 1/16	-	-	-	BX152	BX152	BX152
2 9/16	-	-	-	BX153	BX153	BX153
3 1/16	-	-	-	BX154	BX154	BX154
4 1/16	-	-	-	BX155	BX155	BX155
5 1/8	-	-	-	BX169	-	-
7 1/16	-	-	-	BX156	BX156	BX156
9	-	-	-	BX159	BX157	BX157
11	-	-	-	BX158	BX158	BX158
13 5/8	-	-	BX160	BX159	BX159	BX159
16 3/4	-	-	BX162	BX162	-	-
18 3/4	-	-	BX163	BX164	BX164	-
21 1/4	-	-	BX165	BX166	-	-
26 3/4	BX167	BX168	-	-	-	-
30	BX303	BX303	-	-	-	-

### Sara Ring Joint Gaskets, model R or RX

For flanges in accordance with API spec 6A, model 6B

Nominal Pipe Dimension (inches)	Ring Number at Pressure Rating (lbs)		
	2000	3000	5000
2 1/8	R/RX23	R/RX24	R/RX24
2 9/16	R/RX26	R/RX27	R/RX27
3 1/8	R/RX31	R/RX31	R/RX35
4 1/16	R/RX37	R/RX37	R/RX39
5 1/8	R/RX41	R/RX41	R/RX44
7 1/16	R/RX45	R/RX45	R/RX46
9	R/RX49	R/RX49	R/RX50
11	R/RX53	R/RX53	R/RX54
13 5/8	R/RX57	R/RX57	-
16 3/4	R/RX65	R/RX66	-
20 3/4	-	R/RX74	-
21 1/4	R/RX73	-	-

### Sara Ring Joint Gaskets, model R or RX

For flanges in accordance with ASME B16.47 series A (MSS-SP44)

Nominal Pipe Dimension (inches)	Ring Number at Pressure Rating (lbs)	
	300 - 600	900
12	R/RX57	R/RX57
14	R61	R62
16	R/RX65	R/RX66
18	R/RX69	R/RX70
20	R/RX73	R/RX74
22	R81	-
24	R77	R78
26	R93	R100
28	R94	R101
30	R95	R102
32	R96	R103
34	R97	R104
36	R98	R105



## High Pressure Test Units

High Pressure Test Units are provided in working pressure ranges from 5,000 to 30,000 PSI.

These units are recommended for high pressure testing of BOP stacks, choke and kill lines, Christmas trees and any other type of equipment requiring high pressure static testing. Test Units are available in unit-mounted, portable, skid-mounted and high flow electric driven styles. Accessories include stand-mounted chart recorders and high pressure hose assemblies.

### Specifications

Model Number	Maximum Pressure (PSI)	Approximate Dimensions						Approximate Weight	
		Length		Width		Height			
		in.	cm.	in.	cm.	in.	cm.	lbs.	kgs.
S 10G-M	10000	42	107	30	76	46	117	430	195
S 15G-M	15000	42	107	30	76	46	117	430	195
S 20G-M	20000	42	107	30	76	46	117	430	195
S 30G-M	30000	42	107	30	76	46	117	445	202

Model Number	Maximum Pressure (PSI)	Approximate Dimensions						Approximate Weight	
		Length		Width		Height			
		in.	cm.	in.	cm.	in.	cm.	lbs.	kgs.
T 10G-M	10,000	54	137	30	122	61	132	920	418
T 15G-M	15,000	54	137	30	122	61	132	920	418
T 20G-M	20,000	54	137	30	122	61	132	920	418
T 30G-M	30,000	54	137	30	122	61	132	920	418

Model Number	Maximum Pressure (PSI)	Approximate Dimensions						Approximate Weight	
		Length		Width		Height			
		in.	cm.	in.	cm.	in.	cm.	lbs.	kgs.
P05 G-M	5,000	38	97	28	71	42	107	223	101
P06 G-T	6,000	38	97	28	71	42	107	223	101



Skid-mounted Self-contained Test Unit Model No. T 15g-m



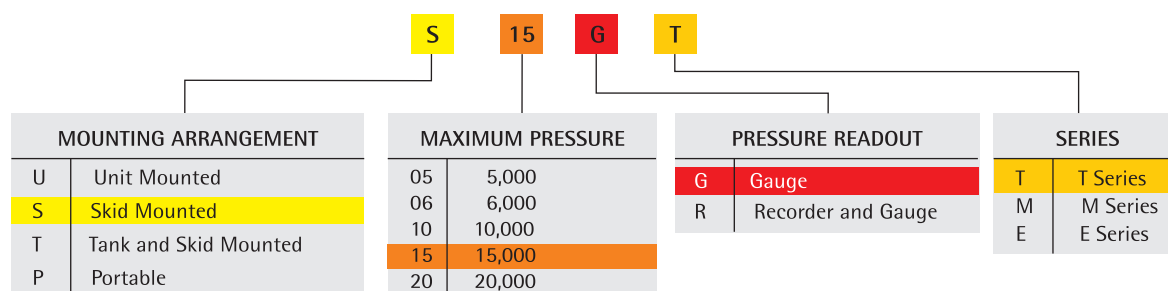
Portable Test Units

### Model Number Identification

All High Pressure Test Units are equipped with a nameplate containing the unit model. This number contains the mounting arrangement, maximum pressure readout and series identification.

### Stand Mounted Recorder

Stand Mounted Recorders are available to assist with documenting test performance of equipment being tested with all styles of High Pressure Test Units. These are provided in 15,000, 20,000 and 30,000 PSI models complete recording coverage.



## Manifolds

Sara manufactures a range of Manifolds for applications like choke & kill, standpipe and high pressure pumping in sizes up to 4-1/16" and pressures up to 15,000 PSI.

Customized manifolds to specific requirements can be ordered.



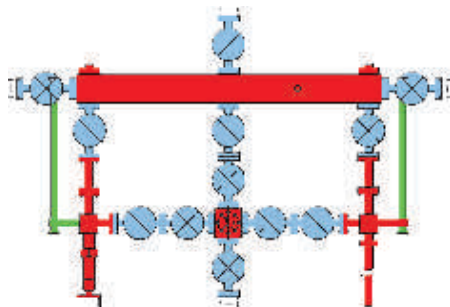
Choke Manifold



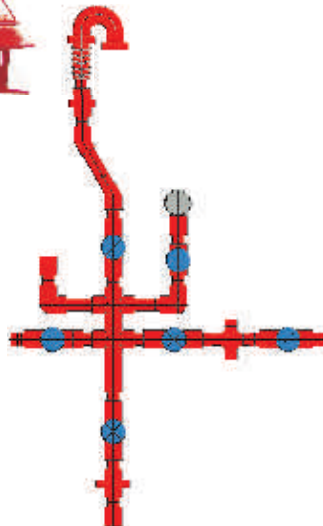
Kill Manifold



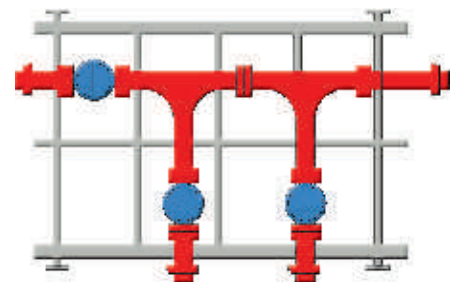
Console



Choke Manifold



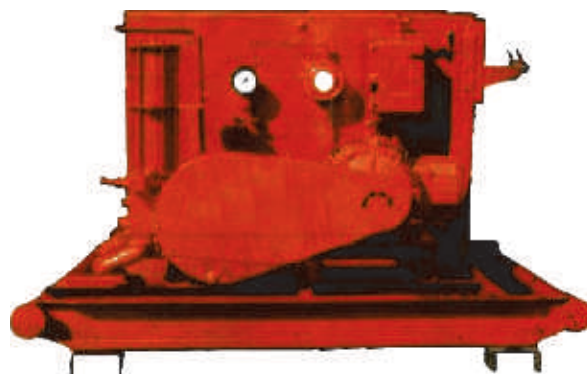
Standpipe Manifold



Discharge Manifold



## Pressure Wash Units



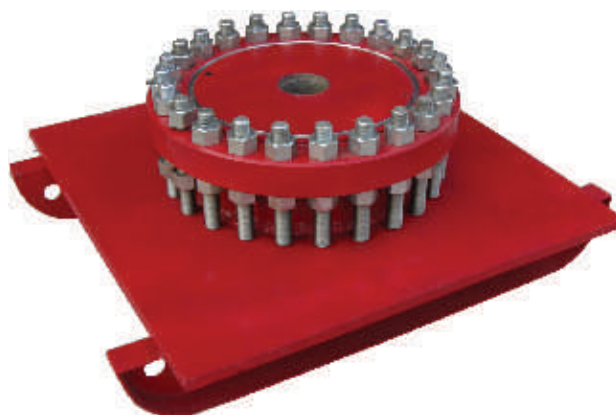
Pressure Wash Units are specifically designed to provide an efficient and versatile method of cleaning heavy equipment by means of a high pressure jet of water.

The unit consists of a triplex reciprocating plunger type pump driven by an explosion proof electric motor to pressurize water, an accumulator to prevent pressure surge, auto electric pressure switch to adjust the water at desired pressure (1500

psi max.), a rectangular reservoir for storage of the atmospheric water supply for the pressure pumps, relief valve, shut off valves, strainer, filter and pressure gauge, all manifolded and mounted on an oil field type skid. The unit is provided with a hand control pressure gun with a 50-foot hose.

Air operated units, not requiring electric power, are also available.

### Test Stump













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