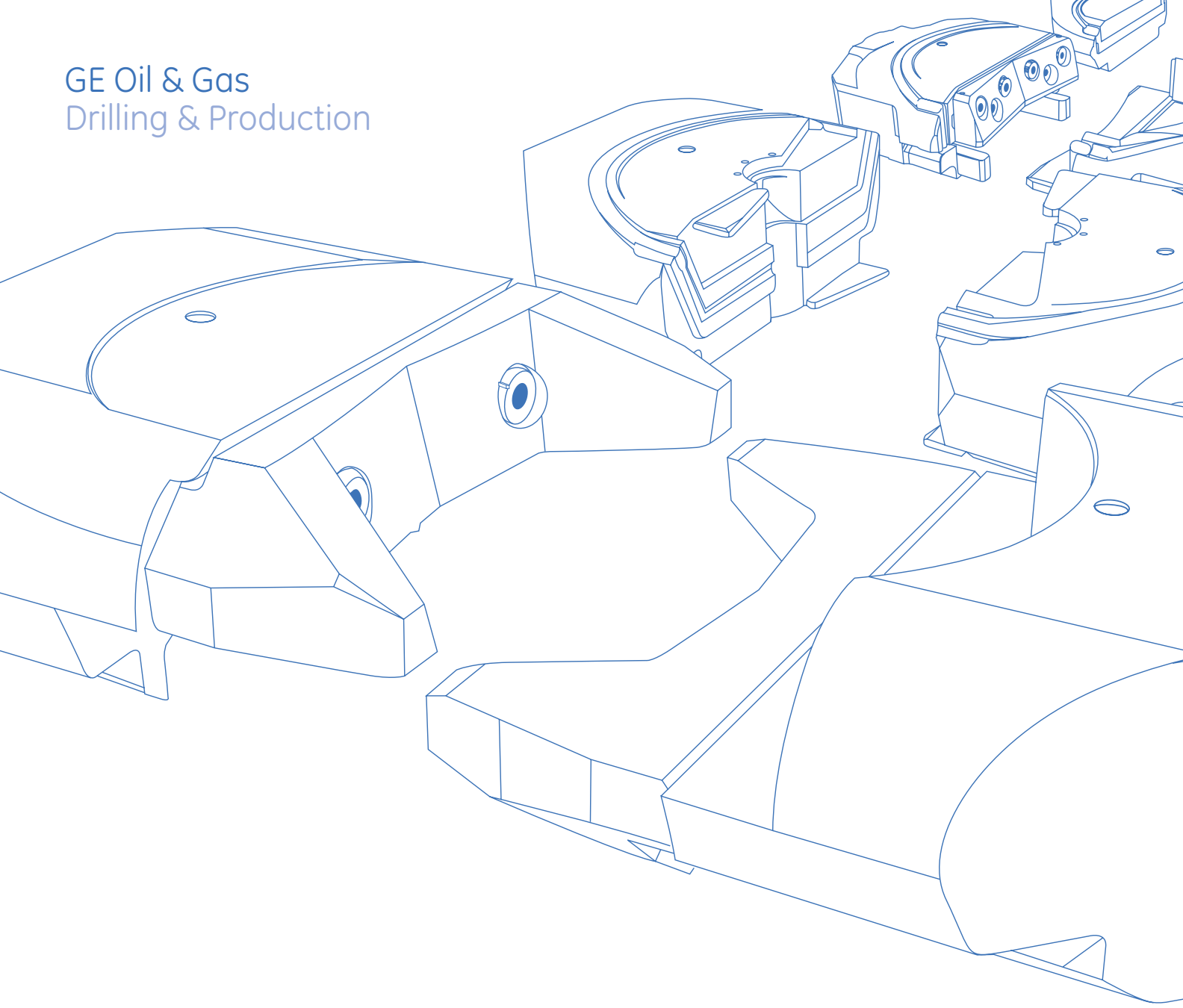
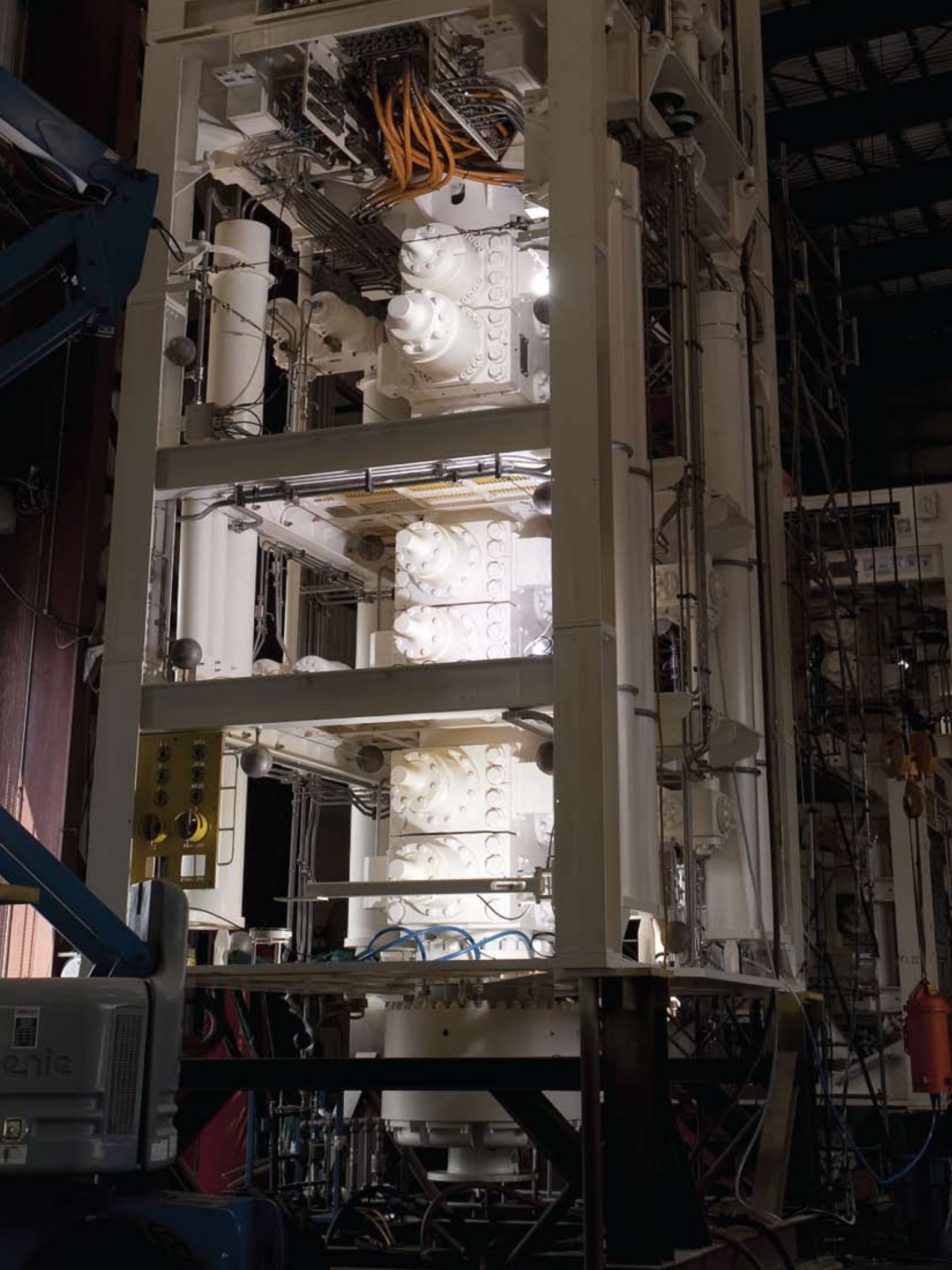
GE Oil & Gas
Drilling & Production



Rams you can rely on

Industry-leading designs for blowout prevention in all surface and subsea applications



Rams you can rely on

GE Oil & Gas, Drilling & Production provides a full range of industry-leading ram designs for superior performance in our blowout preventers (BOPs) for all surface and subsea applications. They protect personnel and equipment by reliably stopping unexpected surges of oil, gas and drilling mud from the well bore. They seal the annulus around drill pipe, casing or tubing; or they can shear the drill string.

Our portfolio includes these types of rams:

- Blind
- Blind shear
- Casing
- Casing shear
- Fixed bore
- Pipe
- Tubing
- Variable
- Wireline shear

Blind rams can be provided on all our BOP models, while shear rams may require larger than standard operator size.

Blind ram

Our blind rams have the ability to completely shut off an open hole while holding full-rated pressure at 350°F.

Blind shear

Our blind shear rams will completely shut off the well after they have completed the shear. They will hold the full rated pressure and are rated per API standards to 350°F. These rams are recommended for all applications using 9⅝" diameter pipe and below.

Casing shear

Unlike blind shears, casing shears do not have sealing capability. However, their advantage is the capability to shear larger pipes – almost any round pipe that will fit through the BOP bore can be sheared by the Hydril Pressure Control casing shear ram.

Fixed bore

Our Hydril Pressure Control fixed bore rams have the ability to seal on any API casing size, drill pipe or tubular.

Wireline shear

The wireline shear is a special type of blind shear ram. Its distinctive design keeps the upper and lower blades in very close proximity to each other, allowing the unit to shear small cables along with the pipe.

Blind ram

Blind shear ram

Casing ram

Casing shear ram

Fixed bore ram

Wireline shear ram

Where versatility & reliability meet:

the Hydril Pressure Control variable ram

Our Hydril Pressure Control variable rams (HVRs) are designed to securely and reliably close and seal on a wide range of pipe sizes.

Universal seal-off
The HVR has a universal seal-off feature that is especially useful on a drill string that does not have a constant diameter over its length or when multiple diameters of drill pipe are used. Two BOPs with variable rams can be used on a tapered string to provide a backup for all drill-pipe sizes. This application eliminates having one pipe ram for small diameter pipe and one for large diameter pipe.

If a BOP stack is assembled with a blind or blind shear ram and two sets of HVRs, the HVRs will seal over the BOP's complete range providing the backup seal-off capability needed on a tapered string. Our Hydril Pressure Control variable ram is therefore ideally suited to subsea use by expanding the seal-off capability of each cavity within a BOP.

Variable ram

Ram BOP Features & Benefits

Large volume of feedable rubber
The ram-block upper seal provides a large volume of feedable rubber to deliver a long and dependable service life.

Excellent compatibility
All Hydril Pressure Control rams have excellent functionality with our proven automatic multiple position locking (MPL) mechanism and the manual lock model. The automatic MPL ensures a positive mechanical lock at all positions of the variable ram. This means that the MPL automatically compensates as packer position changes as a result of wear over time, or if the ram blocks are changed to accommodate a different pipe size.

Tested in the lab. Proven in the field.
The functional reliability of our Hydril Pressure Control rams has been proven by extensive testing in the lab and commercial use on wells operated around the world. Lab testing conducted per API 16A procedures includes: fatigue testing that has simulated over 1.5 years of service by numerous cyclic operations, pressure tests of the ram packers, and temperature testing to determine the high and low temperature limits of our standard packers.

VARIABLE RAM ASSEMBLIES

Bore Size (inches)	Pressure Rating (psi)	Seal Off Range	Part Number
7 1/16 Sentry	3,000	2⅜ - 2⅞	3117555
	5,000		
11	5,000	2⅞ - 5	3146207
13⅝	5,000	2⅞ - 5	3118935
		3½ - 5½	3104815
		3½ - 6	3112085
		4½ - 7	3112083
	10,000	2⅞ - 5	3118954
		3½ - 5½	3104817
		3½ - 6	3104348
		5 - 7	3117613
	15,000	3½ - 5	3112535
		5 - 7	3112536
18¾ Conventional	5,000	2⅞ - 5	3112204
		4½ - 7	3112205
18¾ Compact	5,000	2⅞ - 5½	3117341
		3½ - 5½	3118836
		4½ - 7	3117342
18¾	10,000	3½ - 5½	3118836
		4½ - 7	3117342
	15,000	3½ - 5½	3116833
		5 - 7	3116836
		4½ - 7	3118844
20¾	3,000	2⅞ - 5	3112204
		4½ - 7	3112205
21¼	2,000	2⅞ - 5	3112204
	5,000		
	2,000	4½ - 7	3112205
	5,000		

RAM SIZES FOR HYDRIL PRESSURE CONTROL BLOWOUT PREVENTERS

Pipe Size	Bore Size (inches)						
	7 1/16	9	11	13 5/8	18 3/4	20 3/4	21 1/4
Wireline Shear					●		
Blind Shear			●	●	●	●	●
Blind	●	●	●	●	●	●	●
1.315	●	●	●	●	●	●	●
1.660	●	●	●	●	●	●	●
1.9	●	●	●	●	●	●	●
2 1/16	●	●	●	●	●	●	●
2 3/8	●	●	●	●	●	●	●
2 7/8	●	●	●	●	●	●	●
3 1/2*	●	●	●	●	●	●	●
4*	●	●	●	●	●	●	●
4 1/2*	●	●	●	●	●	●	●
5*	●	●	●	●	●	●	●
5 1/2*	●	●	●	●	●	●	●
5 7/8		●	●	●	●	●	●
6 5/8		●	●	●	●**	●	●
7		●	●	●	●	●	●
7 5/8			●	●	●	●	●
8 5/8			●	●	●	●	●
9 5/8			●	●	●	●	●
10 3/4				●	●	●	●
13 3/8					●	●	●
16					●	●	●

* Hanging rams are standard for 13 5/8-15,000, 18 3/4-10,000, 18 3/4-15,000 and are optional for 13 5/8-5000, 10,000, 20 3/4-3000, 21 1/4-2000, and 21 1/4-5000.

** Pipe ram 18" 6 5/8: This pipe ram is also good for Grant Prideco pipe ram 6 5/8 V150 drill pipe.

OPERATOR SIZES MANUAL OR MPL LOCK

BOP Bore Size (inches)	Pressure Rating (psi)	Standard Operator (inches)	Shear Ram Operator (inches)
7 1/16	3,000	5 1/2	-
	5,000	5 1/2	-
	10,000	7 1/2	12 3/4
	15,000	10	12 3/4
9	3,000	7 1/2	-
	5,000	7 1/2	-
11	3,000	8 1/2	10 3/4
	5,000	8 1/2	10 3/4
	10,000	10	12 3/4
13 5/8	3,000	10	14 1/4
	5,000	10	14 1/4
	10,000	14 1/4	14 1/4
	15,000	14 1/4	14 1/4*
16 3/4	10,000	14 1/4	14 1/4
18 3/4	10,000	14 1/4	14 1/4
	15,000	15 1/2	15 1/2*
20 3/4	3,000	10	14 1/4
21 1/4	2,000	10	14 1/4
	5,000	14 1/4	14 1/4*

* 19" and 22" shear ram operators available on special request.

18-15 RAM BOP ELASTOMER TEMPERATURE RATINGS

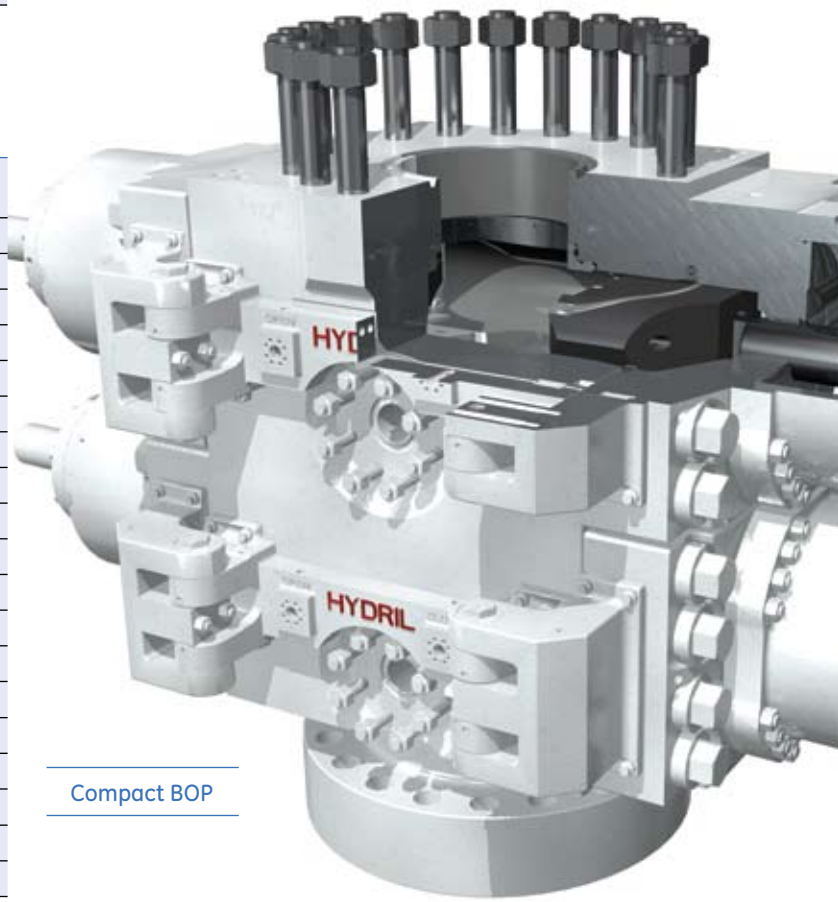
18-15 Compact/Conventional			
Ram Type	Ram Size	Cold Temperature Rating (F)	Hot Temperature Rating (F)
Pipe	All	20	500
Blind Shear	N/A	20	350
Variable	3 1/2 x 5 7/8	32	250
	4 1/2 x 7	30	350
	5 1/2 x 7 5/8	30	180

13-15 QUIK-LOQ RAM BOP ELASTOMER TEMPERATURE RATINGS

13-15 Quik-Loq™			
Ram Type	Ram Size	Cold Temperature Rating (F)	Hot Temperature Rating (F)
Pipe	All	10	350
Blind Shear	N/A	40*	300
Variable	3 1/2 x 5	40*	180*
	5 x 7	40*	300

Note: All temperature data and testing follows API 16A 2nd Ed. Guidelines and Procedures

* Denotes API 16A Temperature Rating of 'X' (Untested)



Compact BOP

GE Oil & Gas

Drilling & Production
3300 North Sam Houston Parkway East
Houston, Texas 77032
T +1 281 449 2000

Americas Regional Headquarters
4424 West Sam Houston Parkway North
Houston, Texas 77041
P.O. Box 2291
Houston, Texas 77252-2291
T +1 713 683 2400
F +1 713 683 2421

For complete contact information,
please refer to our website.

24/7 customer support: +1 281 449 2000
geoilandgas.com/drilling

GE imagination at work