

Hydril BOP Rams

Rams you can rely on

HMH provides a full range of industry-leading ram designs for superior performance in our blowout preventers (BOPs) for all surface and subsea applications. These rams 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 shear
- Fixed bore
- Wireline blind shear
- Variable

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

Proven performance around the world

Blind 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 95/8" 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 blind shear* The wireline blind 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



Blind shear



Casing shear



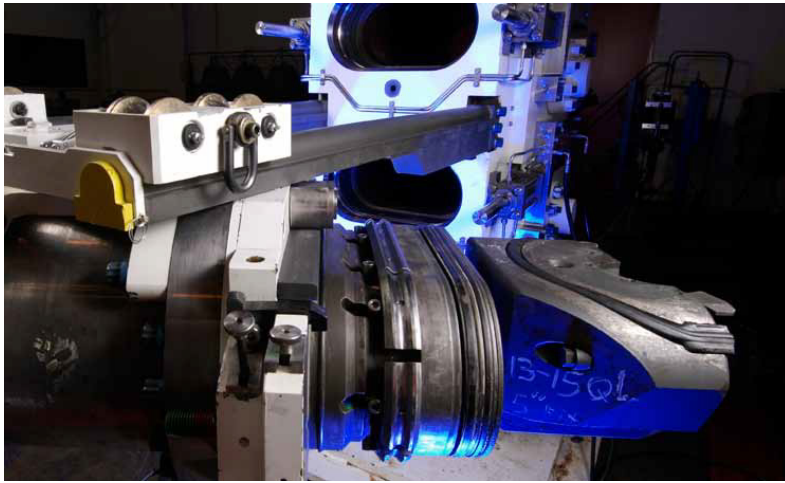
Fixed bore



Wireline blind shear

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.

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.

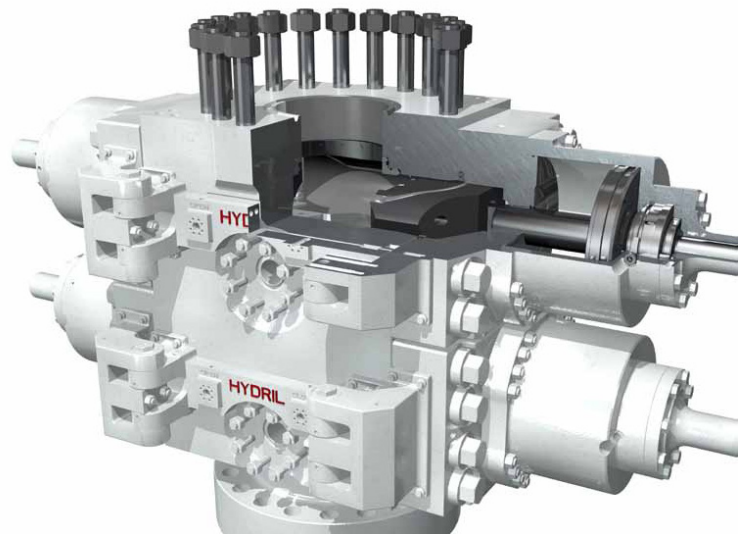
Excellent Compatibility

All Hydril Pressure Control rams have excellent functionality with our proven automatic multiple position locking (MPL) mechanism and the manual lock model. The auto-

matic 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



Variable ram assemblies

Bore size (inches)	Pressure rating (psi)	Seal off range (inches)
7 ⁷ / ₁₆ Sentry	3,000	2 ³ / ₈ - 2 ⁷ / ₈
	5,000	
11	5,000	2 ⁷ / ₈ - 5
13 ⁵ / ₈	5,000	2 ⁷ / ₈ - 5
		3 ¹ / ₂ - 5 ¹ / ₂
		3 ¹ / ₂ - 6
		4 ¹ / ₂ - 7
	10,000	2 ⁷ / ₈ - 5
		3 ¹ / ₂ - 5 ¹ / ₂
		3 ¹ / ₂ - 6
		5 - 7
	15,000	3 ¹ / ₂ - 5
		5 - 7
18 ³ / ₄	5,000	2 ⁷ / ₈ - 5
		2 ⁷ / ₈ - 5 ¹ / ₂
		3 ¹ / ₂ - 5 ¹ / ₂
		4 ¹ / ₂ - 7
	10,000	3 ¹ / ₂ - 5 ¹ / ₂
		4 ¹ / ₂ - 7
	15,000	3 ¹ / ₂ - 5 ¹ / ₂
		4 ¹ / ₂ - 7
		5 ¹ / ₂ - 7 ⁵ / ₈
		5 ¹ / ₂ - 7 ⁵ / ₈
20 ³ / ₄	3,000	2 ⁷ / ₈ - 5
21 ¹ / ₄	2,000	2 ⁷ / ₈ - 5
	5,000	
	2,000	4 ¹ / ₂ - 7
	5,000	

Ram sizes for Hydril Pressure Control blowout preventers

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

*Hanging rams are standard for 135/8-15,000, 183/4-10,000, 183/4-15,000 and are optional for 135/8-5000, 10,000, 203/4-3000, 211 /4-2000, and 211 /4-5000.

**Pipe ram 18" 65/8: This pipe ram is also good for Grant Prideco pipe ram 65/8 V150 drill pipe.



Operator sizes manual or MPL lock

BOP bore size (inches)	Pressure rating (psi)	Standard operator (inches)	Shear ram operator (inches)
71/16	3,000	5½	-
	5,000	5½	-
	10,000	7½	12¾
	15,000	10	12¾
9	3,000	7½	-
	5,000	7½	-
11	3,000	8½	10¾
	5,000	8½	10¾
	10,000	10	12¾
13¾	3,000	10	14¾
	5,000	10	14¾
	10,000	14¾	14¾
	15,000	14¾	14¾*
16¾	10,000	14¾	14¾
18¾	10,000	14¾	14¾
	15,000	15½	15½*
20¾	3,000	10	14¾
21¾	2,000	10	14¾
	5,000	14¾	14¾*

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

18-15 ram BOP elastomer temperature ratings

Ram type	18-15 Compact/Conventional		
	Ram size (inches)	Cold temperature rating (F)	Hot temperature rating (F)
Pipe	All	0	350
Blind shear	N/A	0	350
Wireline blind shear	N/A	20	250
Variable	3½ x 5½	32	250
	4½ x 7	30	350
	5½ x 7½	30	250

