

2⁷/₈-in HSD High Shot Density Perforating Gun System

High shot density with optimal phasing and featuring PowerJet Omega deep penetrating shaped charges and PowerJet Nova deep penetrating shaped charges

APPLICATIONS

- Natural, stimulated, and sand control completions
- Slim holes or completion restrictions
- Deep penetration
- Multiple-interval perforating

The 2⁷/₈-in HSD* high shot density perforating gun system is for operations in slimhole 4¹/₂- to 5¹/₂-in casing but has applications in any completion where downhole restrictions limit gun size, including through-tubing, dual-completion, monobore, and extended-reach operations.

Where deep penetration is critical—for natural completions, penetrating beyond formation damage, or in hard formations—PowerJet Omega* deep penetrating shaped charges and PowerJet Nova* extradeep penetrating charges are used.

For sand prevention, the combination of optimized phasing with high shot density and deep penetrating charges prevents failure of the grains around the perforation cavity and minimizes perforation-to-perforation collapse.

Fracture stimulation requires 120°- or 60°-phased guns with charges that provide a large entrance hole. If the gun can be aligned with the preferred fracture plane (PFP), 180° phasing is used. The standard 2⁷/₈-in gun has a 60° spiral hole pattern and can be loaded with either big hole or deep penetrating charges at up to 6 spf. A 4-spf, 180°-phased gun is also available. For special applications, other phasings and shot densities can be made on request.

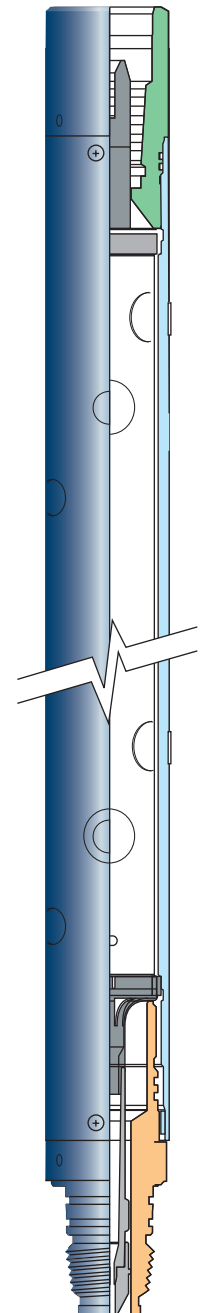
The 2⁷/₈-in HSD guns can be conveyed using wireline, slickline, tubing, or coiled tubing. Multiple guns are easily aligned by using alignment intercarriers.

Mechanical Specifications

Nominal outside diameter, in	2.802
Shots per foot (spf), phasing, °	4, 180 6, 60; 6, L180/60
Shot spacing, in	4 spf: 3 6 spf: 2
Temperature rating, degF [degC]	400 [204] [†]
Pressure rating, psi	25,000
Min. casing size, in	4 ¹ / ₂
Nominal lengths, ft	5, 10, 20, 30
Interval missed between guns, in	12
Loaded 20-ft gun weight in air, lbm	246
Max. outside diameter including burrs, in	Shot in liquid: 2.96 to 3.16 Shot in gas: 3.08 to 3.32
Tensile load, lbf	105,000 [†]

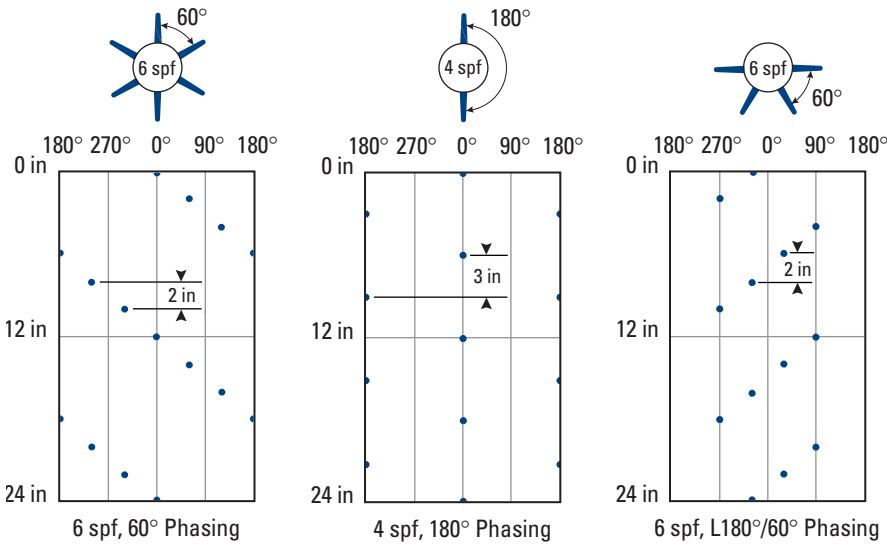
[†] With high-temperature explosives and seals

[‡] Based on worst-case material and machining tolerances



2⁷/₈-in HSD gun, 6 spf, 60° RH spiral phasing.

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Shot patterns for the 2⁷/₈-in HSD gun system for 4¹/₂-in casing.

API Statistics[†]

API RP 19B shot in 4¹/₂-in 11.6-lbm/ft L 80 casing

Charge	Explosive Type, Max. Weight, g	Shots per Foot, Phasing, °	Entrance Hole, in	Burr Height Avg./Max., in	Area Open to Flow, in ² /ft	Penetration, in	Temperature, degF	Target Strength, psi	Test Date
PowerJet Omega 2906 [‡]	HMX, 16.0	6, 60	0.34	0.05/0.08	—	36.0	400	5,859	08/17/2004
PowerJet* 2906 [‡]	HMX, 15.0	6, 60	0.38	0.06/0.08	—	25.3	400	6,989	10/14/2002
PowerJet Omega 2906 [‡]	HNS, 17.6	6, 60	0.31	0.05/0.09	—	24.3	400	5,923	02/05/2008
PowerJet 2906 [‡]	HNS, 19.5	6, 60	0.31	0.06/0.09	—	21.0	400	6,057	07/25/2002
UltraJet*2906 [‡]	HMX, 15.0	6, 60	0.36	0.07/0.09	—	22.1	400	6,356	01/29/2002
HyperJet* 2906 [‡]	RDX, 15.0	6, 60	0.39	0.06/0.09	—	15.0	400	8,091	12/17/2001
38C CleanPACK* [‡]	HMX, 15.0	6, 60	0.70	0.06/0.08	2.31	6.6	400	8,401	06/01/2004
38C CleanPACK	RDX, 15.0	6, 60	0.62	0.09/0.13	1.81	8.4	400	—	—

[†] Entrance hole, penetration, temperature

[‡] API 19B Registered Perforation Systems

www.slb.com/perforating

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