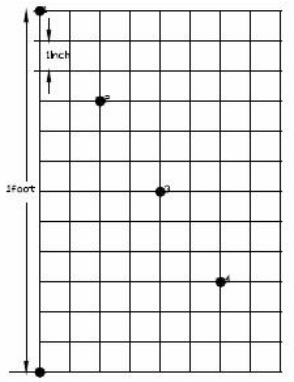
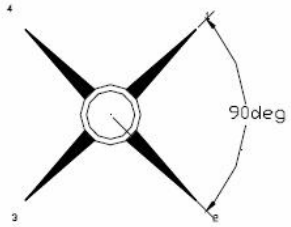
4 1/2” (114.3 mm) EXPENDABLE HIGH SHOT DENSITY GUN SYSTEM, 5 to 12 SPF

Gun Specifications

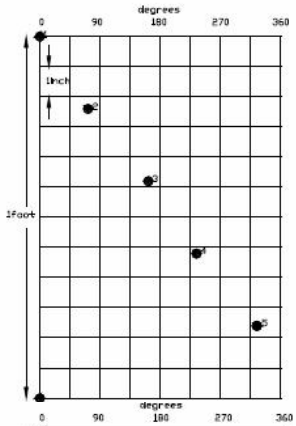
	(Imperial)	(Metric)
GUN SIZE	4.50 inches	114.3 mm
GUN PHASING	60 degrees	60 degrees
SHOT DENSITY	1 to 12 shots/ft	3 to 17.0
SHOT SPACING	2.4 inches	60.96 mm
GUN LENGTH	20, 10, 5 ft	6, 3, 1.5 meter
GUN WEIGHT	566, 303, 180 lbs	257, 138, 82 kg
MAXIMUM PRESSURE	17,000 psi	1172 bar
MAXIMUM SAFE PULL	235,000 lbs	106,800 kg
MINIMUM PRESSURE	0 psi in water	0 bar in water
MAXIMUM O.D. AFTER FIRING	4.74 inches	120 mm
TEMPERATURE	See Time Temperature Curve	

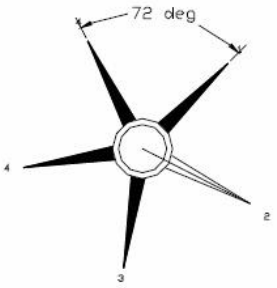
1. The guns may be conveyed on wire-line, slick-line, regular or coiled tubing.
2. The weight includes the charges and one tandem connector.
3. The gun can be shot without splitting at atmospheric pressure if it is immersed in water.
4. The gun is available in lengths up to 20ft (6metre), special lengths can be accommodated on request.
5. The system can be supplied in nominal imperial or nominal metric lengths.
6. The maximum O.D. corresponds to the maximum measured gun diameter including burrs and swell, on a gun fired at atmospheric pressure immersed in water.
7. The 4-1/2” (114.3 mm) gun system may be loaded with RDX or HMX charges. The same load tube assemblies can be used with either Deep Penetrating (D.P.) charges or Big Hole (B.H.) charges allowing Salt and Pepper Loading.
8. The 4-1/2” (114.3 mm) system is recommended for use in 7” (177.8mm) and 7-5/8” (194mm) casings.
9. The guns are made for standard service. For operations in H2S environments, special equipment must be specified.



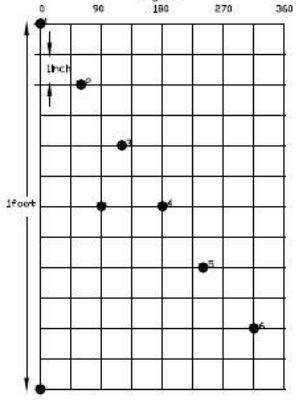


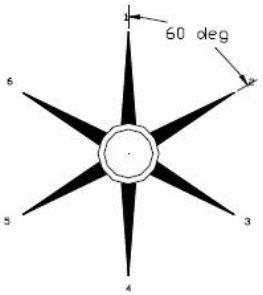
4 SHOTS PER FOOT
90 DEGREE PHASED
37GRAM & 39 GRAM CHARGES



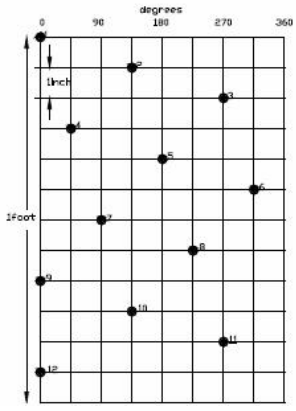


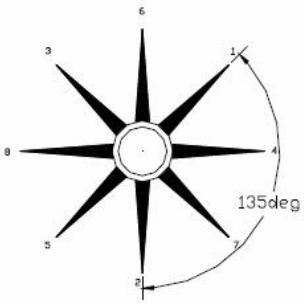
5 SHOTS PER FOOT
72 DEGREE PHASED
37GRAM & 39 GRAM CHARGES





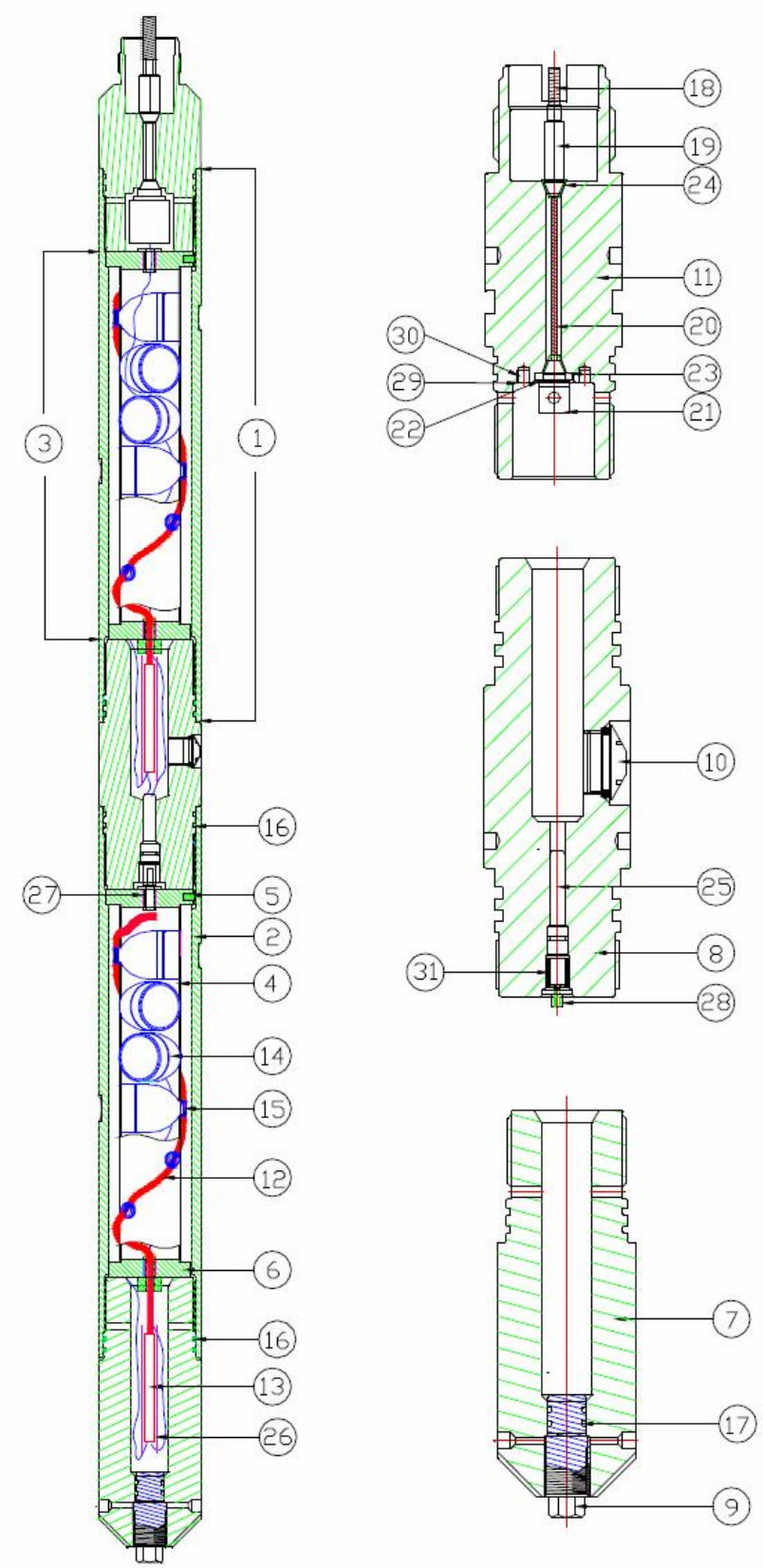
6 SHOTS PER FOOT
60 DEGREE PAHSED
37 GRAM CHARGES ONLY



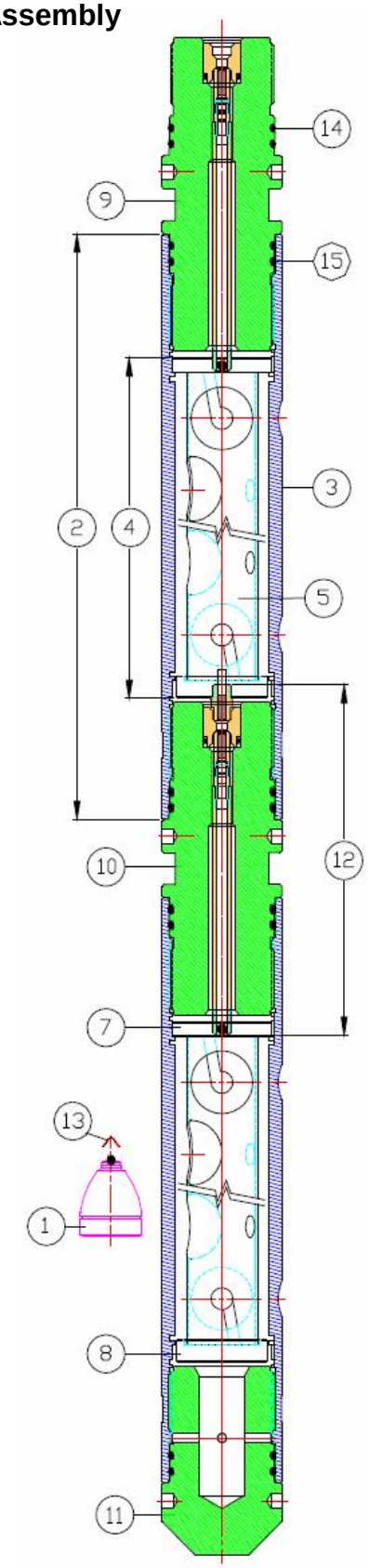


12 SHOTS PER FOOT
135 DEGREE PHASED
22.7 GRAM CHARGES ONLY

4 1/2” HSD, Wireline System Assembly



4 1/2” HSD, TCP System Assembly



ITEM	DESCRIPTION
1	Charge, HSD 39g HMX DP w Plastic Jacket
	Charge, HSD 39g HMX SDP w Plastic jacket
	Charge, HSD 39g HMX SDP
	Charge, HSD 39g HMX BH
	Charge, HSD 39g RDX SDP
	Charge, HSD 39g RDX BH
	Charge, HSD 37g HMX SDP
	Charge, HSD 37g HMX BH
	Charge, HSD 37g RDX SDP
	Charge, HSD 37g RDX BH
	Charge, HSD 22.7g HMX DP w Plastic Jacket
	Charge, HSD 22.7g HMX SDP w Plastic jacket
	Charge, HSD 22.7g HMX SDP
	Charge, HSD 22.7g HMX BH
	Charge, HSD 22.7g RDX SDP
	Charge, HSD 22.7g RDX BH
2	4-1/2"Carrier Assy, 6 ft, 4spf, 90° phase
	4-1/2"Carrier Assy, 11 ft, 4spf, 90° phase
	4-1/2"Carrier Assy, 16 ft, 4spf, 90° phase
	4-1/2"Carrier Assy, 21 ft, 4spf, 90° phase
	4-1/2"Carrier Assy, 6 ft, 5spf, 72° phase
	4-1/2"Carrier Assy, 11 ft, 5spf, 72° phase
	4-1/2"Carrier Assy, 16 ft, 5spf, 72° phase
	4-1/2"Carrier Assy, 21 ft, 5spf, 72° phase
	4-1/2"Carrier Assy, 6 ft, 6spf, 60° phase
	4-1/2"Carrier Assy, 11 ft, 6spf, 60° phase
	4-1/2"Carrier Assy, 16 ft, 6spf, 60° phase
	4-1/2"Carrier Assy, 21 ft, 6spf, 60° phase
	4-1/2"Carrier Assy, 6 ft, 12spf, 135/45° phase
	4-1/2"Carrier Assy, 11 ft, 12spf, 135/45 phase
	4-1/2"Carrier Assy, 16 ft, 12spf, 135/45° phase
	4-1/2"Carrier Assy, 21 ft, 12spf, 135/45° phase

ITEM	DESCRIPTION
2	4-1/2" Spacer with Dummy Tube, 6 ft
	4-1/2" Spacer with Dummy Tube, 11 ft
	4-1/2" Spacer with Dummy Tube, 16 ft
	4-1/2" Spacer with Dummy Tube, 21 ft
5	Top Alignment Plate
6	Bottom Alignment Plate
9, 10	4-1/2" Tandem Sub TCP
11	4-1/2" Bottom Sub TCP
12	Booster Transfer Kit
13	Charge Clip (for clip type charges)
13a	Plastic Jkt (for jacket retained charges)
15	O-rings, 2-241 Viton (4 required per connection)
7	Bottom Nose Wireline
8	Wireline Tandem Sub
9	Arming Plug
10a	Selective Port Plug w O Ring
	Wireline Adapter Head
4a	O-rings, Nitrile (4 required per connection)
	O-rings, Nitrile 2- 119 (2 required per Arming Plug)
	Selective Switch
12	Detonating Cord T150 RDX
	Detonating Cord T190 HMX
	Detonator Fluid Desensitized. RDX DFC 10
	Detonator Fluid Desensitized. RDX DN0015FD
	Detonator Fluid Desensitized. HMX DN0026FD

For TCP use VITON O Rings

For Wireline use Nitrile O rings.

Time Temperature Curve

Oiltech manufactures charges with the highest quality RDX and HMX explosives. HNS determine the type of shaped charge and detonating cord to be used. See Chart 1 on temperature vs. time curve. These two factors determine the appropriate O-ring seal material appropriate in the assembly. Refer to Chart 2. Oiltech recommends Viton 90D o-rings for Tubing Conveyed Perforating (TCP) systems and Nitrile 75D for wireline application.

Chart 1: Temperature vs. Time for Common Explosive Materials

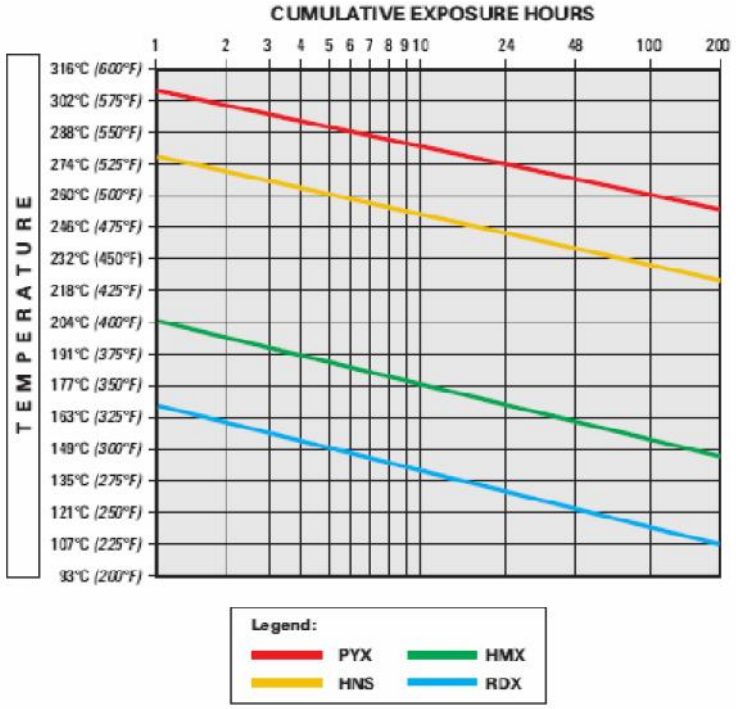


Chart 2: O-ring Seals Selection

		Crude Oil	Water Based Drilling Mud	Oil Based Drilling Mud	CaCl Brines	H2S 7%	H2S 15%	Bromides
Nitrile 75 D	275°F / 135°C	OK	OK	OK	OK	NO*	NO	NO
Viton 90 D	450°F / 232°C	OK	OK	OK	OK	OK	Up to 300°F	OK
Kalrez	550°F / 288°C	OK	OK	OK	OK	OK	OK	OK

*Not recommended for prolonged exposure to H2S environment, but can be used for short term exposure.