

3-3/8" Expendable High Shot Density Gun System

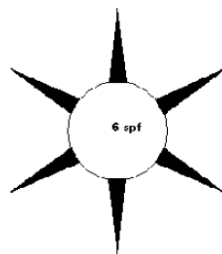
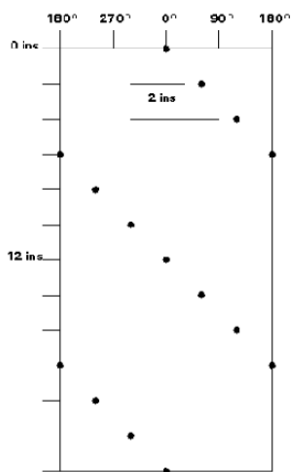
3-3/8" (86 mm), 6 SPF, 60° Phased

Specifications

| | (Imperial) | (Metric) |
|---------------------------|----------------------------|------------------|
| GUN SIZE | 3.375 inches | 86 mm |
| GUN PHASING | 60 degrees | 60 degrees |
| SHOT DENSITY | 6 shots/ft | 19.7 shots/meter |
| SHOT SPACING | 2 inches | 50.8 mm |
| GUN LENGTH | 20, 10, 5 ft | 6, 3, 1.5 meter |
| GUN WEIGHT | 330, 180, 104 lbs | 150, 82, 47 kg |
| MAXIMUM PRESSURE | 20,000 psi | 1379 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 | 3.61 inches | 91.69 mm |
| TEMPERATURE | See Time Temperature Curve | |

1. The guns may be conveyed on wireline, slick-line, and 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 3-3/8" (86 mm) gun system may be loaded with RDX, HMX or XHT charges. The same load tube assemblies can be used with either Deep Penetrating (D.P.) charges or Big Hole (B.H.) charges.
8. The 3-3/8" (86 mm) system is recommended for use in 4-1/2" (114mm) or 5-1/2" (140mm) casings.
9. The guns are made for standard service. For H2S environments, special equipment must be used.

3-3/8" (86 mm), 6 SPF, 60° Phased RH Spiral Shot Pattern

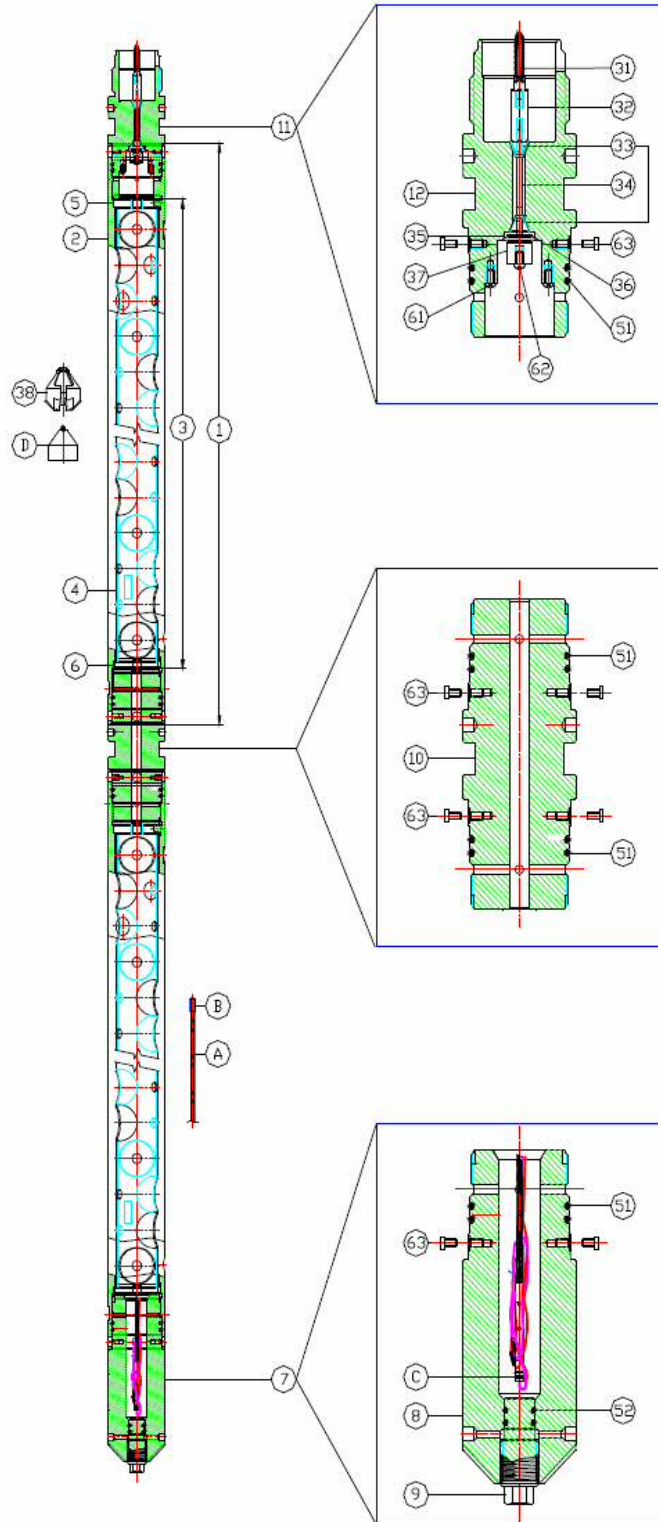


The diagram on the left shows the shot pattern made in a 5-1/2" (138 mm) casing by a centered 3-3/8" (86 mm), 60° phased, RH Spiral, 6 spf gun.

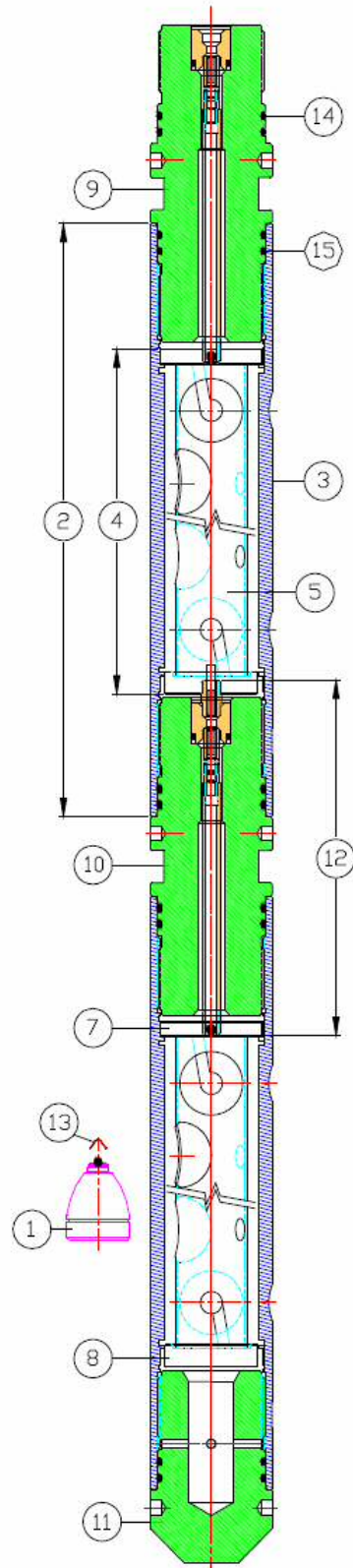
Each mark on the grid represents an individual shot, separated from the next by 60° radially and 2 inches (50.8 mm) vertically.

3 3/8" HSD, 6SPF Wireline System Assembly

□ : DETAILED DRAWING
 — : ALTERNATIVE



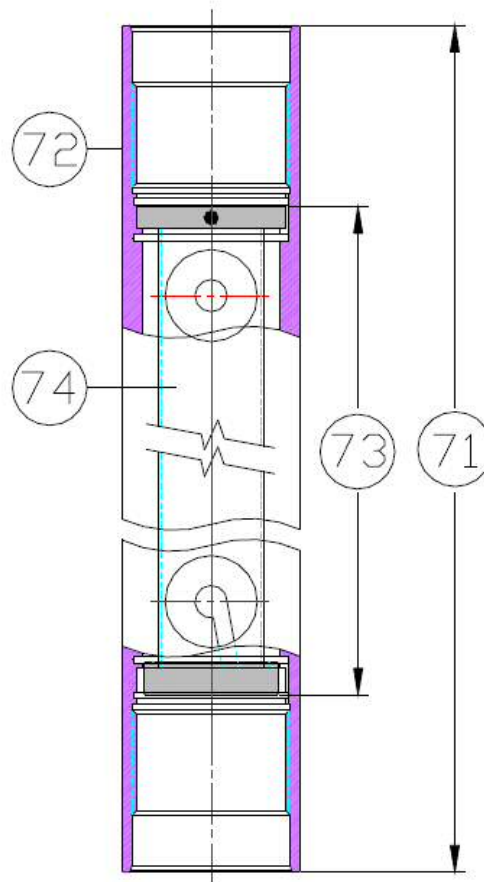
3 3/8" HSD, 6SPF Tubing Conveyed Perforating (TCP) System Assembly



3 3/8" HSD, 6SPF Wireline Assembly Parts

| Item | Description |
|--|---|
| 3.38" 6SPF 60deg Carrier System | |
| 12 | 3-3/8" Carrier Assy 6ft 6spf 60° phase |
| | 3-3/8" Carrier Assy 11ft 6spf 60° phase |
| | 3-3/8" Carrier Assy 16ft 6spf 60° phase |
| | 3-3/8" Carrier Assy 21ft 6spf 60° phase |
| 2 | 3-3/8" Carrier 6ft 6spf 60° phase |
| | 3-3/8" Carrier 11ft 6spf 60° phase |
| | 3-3/8" Carrier 16ft 6spf 60° phase |
| | 3-3/8" Carrier 21ft 6spf 60° phase |
| 3 | 3-3/8" Load Tube Assy 6ft 6spf 60° phase |
| | 3-3/8" Load Tube Assy 11ft 6spf 60° phase |
| | 3-3/8" Load Tube Assy 16ft 6spf 60° phase |
| | 3-3/8" Load Tube Assy 21ft 6spf 60° phase |
| 4 | 3-3/8" Load Tube 6ft 6spf 60° phase |
| | 3-3/8" Load Tube 11ft 6spf 60° phase |
| | 3-3/8" Load Tube 16ft 6spf 60° phase |
| | 3-3/8" Load Tube 2ft 6spf 60° phase |
| 5 | 3-3/8" Top Alignment Plate |
| 6 | 3-3/8" Bottom Alignment Plate |
| Wireline System | |
| 7 | 3-3/8" WL Bottom Nose – Assy |
| 8 | 3-3/8" WL Bottom Nose – Body |
| 9 | 3-3/8" WL Bottom Nose – Plug |
| 10 | 3-3/8" WL Grooved Tandem Sub |
| 11 | 3-3/8" WL Adapter Firing – Assy |
| 12 | 3-3/8" WL Adapter Firing – Body |
| Accessories | |
| 31 | Spring Contact Assy |
| 32 | Cone Nut (Hex) |
| 33 | Cone Insulator |
| 34 | Head Contact Rod |
| 35 | Rubber Seal |
| 36 | Contact Cone Washer |
| 37 | Contact Cone (Hex) |
| 38 | Plastic Jacket 34B |

| O-Ring | |
|-------------------|---|
| 51 | O-Ring 2-232 N75D |
| | O-Ring 2-232 V90D |
| 52 | O-Ring 2-116 N75D |
| | O-Ring 2-116 V90D |
| | |
| Screw | |
| 61 | Ground Screw 6 - 32UNC - 3/8"L |
| 62 | Round Head Screw 0.25" - 20UNC - 3/8"L |
| 63 | Hex Socket Head Cap Screw 0.25" - 20UNC |
| | |
| Explosives | |
| A | Detcord, Circular, 80 grain, RDX or HMX |
| B | Detcord End Seal (Aluminium) |
| C | Detonator, 56 Ohm, Fluid Desensitized, 170C or 200C |
| D | Charge, RDX, HMX, HNS (34B) |



| Optional | |
|----------|--|
| 71 | 3-3/8" Spacer w/ Dummy Tube 6ft |
| | 3-3/8" Spacer w/ Dummy Tube 11ft |
| | 3-3/8" Spacer w/ Dummy Tube 16ft |
| | 3-3/8" Spacer w/ Dummy Tube 21ft |
| 72 | 3-3/8" Spacer (Heavy Blast Sleeve) 2ft |
| | 3-3/8" Spacer 6ft |
| | 3-3/8" Spacer 11ft |
| | 3-3/8" Spacer 16ft |
| | 3-3/8" Spacer 21ft |
| 73 | 3-3/8" Dummy Tube Assy 6ft |
| | 3-3/8" Dummy Tube Assy 11ft |
| | 3-3/8" Dummy Tube Assy 16ft |
| | 3-3/8" Dummy Tube Assy 21ft |
| 74 | 3-3/8" Dummy Tube 6ft |
| | 3-3/8" Dummy Tube 11ft |
| | 3-3/8" Dummy Tube 16ft |
| | 3-3/8" Dummy Tube 21ft |

Time Temperature Curve

Oiltech manufactures charges with the highest quality RDX and HMX explosives. HNS and PYX charges are also available on request. The downhole temperature will 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

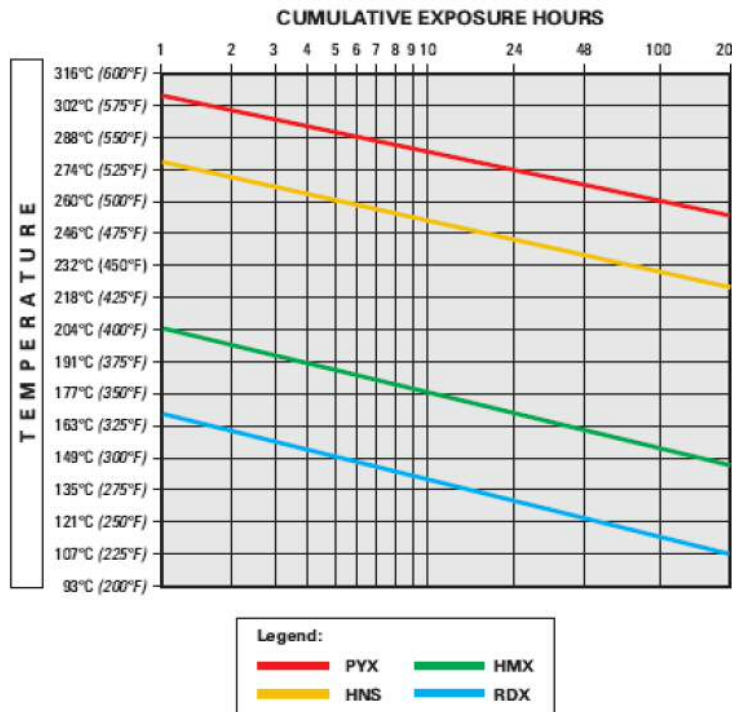


Chart 2: O-ring Seals Selection

| | | 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.