

SPEX Tubing Punch System

The SPEX Offshore (UK) Ltd tubing punch system is designed to provide a series of perforations for circulation or communication through production tubing. The charges are designed to only perforate the tubing without damaging the wellbore casing. This technique can also be applied to any pipe or tubular completion in the well, without causing damage to adjacent casing.

The tubing punch charge perforates a hole in the pipe by means of a specific controlled shaped charge effect. It is designed primarily for annulus circulation purposes whether it is to change well fluids, circulate and clean fallen debris, lift fallen formations to the surface or simply to help with well cleaning procedures.

SPEX has a standard range of tubing punch equipment for most applications of tubing. The carrier system used for tubing punch operations is based on a scalloped gun perforating system. These expendable gun systems are reliable and can be configured to provide any number of perforations.

Equipment Specification – Tubing Punching



The tubing punch gun is based on the ‘Scalloped Gun Perforating System’ used for a wide range of perforating options. The gun system is suitable for all types of well completions and can be provided as continuous zero phased loaded gun lengths or pre-determined loaded and blank intervals. The gun system is designed to minimize the damage to the tubing under normal conditions with minimal expansion to the carrier after punching.

The gun system is designed to be run in conjunction with a variety of initiation systems. Conventional electric wireline may be used to deploy the gun system using a firing head and electric detonator. SPEX offers the Radio Safe coded detonator for use with this service and is approved for use without the need for radio silence in the North Sea.

The gun system can be deployed using the Absolute Pressure Firing head (APFH) for coiled tubing operations. The gun system can also be deployed with slickline using an Electronic Trigger Device.

The scalloped gun perforating system is rated to 20ksi external pressure and explosives can be selected for temperature ratings up to 400 °F.

For standard operations SPEX offers the 1-9/16” and 2” O.D. scalloped gun systems. This is normally loaded with the following charge type to cover a wide range of tubing specifications.

The following table identifies the set-up test data applicable to each of the charges as offered in both the 1-9/16” and 2” punch guns.

CHARGE	PART NO.	TUBING WALL	HOLE DIA
1-9/16” 3.2gr HMX	CIR-1603-4T38	3/8” Wall L-80	0.23” (5.8 mm)
1-9/16” 3.2gr HMX	CIR-1603-4C50	1/2” Wall L-80	0.20” (5.1 mm)
1-9/16” 3.2gr HMX	CIR-1603-4C63	5/8” Wall L-80	0.14” (3.6 mm)
2” 6.5gr HMX	CIR-2106-4T38	3/8” Wall L-80	0.33” (8.4 mm)
2” 6.5gr HMX	CIR-1603-4C50	1/2” Wall L-80	0.31” (7.9 mm)
2” 6.5gr HMX	CIR-1603-4C63	5/8” Wall L-80	0.30” (7.6 mm)
1-9/16” HMX	RTG-1562-451	1/4” – 3/8”	0.39” (9.9 mm)
1-9/16” HMX	RTG-1562-453	3/8” – 1/2”	0.41” (10.4 mm)

Specific testing can be conducted where required for non standard tubing / casing configurations. When running the tubing punch gun assembly it is essential that certain parameters are satisfied to ensure satisfactory results are obtained. These can be identified as:

Decentralization: Since the charge is designed for a limited penetration, it is important that the gun carrier is effectively decentralized and the charge jet is facing (perpendicular) the tubing it is going to punch. If proper decentralization is not achieved the gun penetration will be reduced partially or completely.

Fluid in Annulus: It is strongly recommended that the annulus between the tubing and casing is filled with fluid or at least the fluid level should be above the section to be communicated. Ideally the pressures in the tubing and annulus will be balanced. This measure will ensure that the gun assembly is not thrown up or down at the moment the communication is established.

Casing Standoff: The charge performance is maximized by providing a standoff between the tubing and casing. This can be accomplished by the use of the tubing collar as an annular standoff, which implies that the holes are to be perforated close to the collar, ensuring that it is not done on the collar. A minimum casing standoff of 0.125" is recommended.

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