

Tubing Cutter – Radial Cutting Torch

The Radial Cutting Torch (RCT) is recommended for tubing cutting using the Expro slickline trigger, without the need for radio silence or explosives. Another application is the standard e-line operation with surface DC power for activation.

The cutting tool package consists of:

Electronic Trigger

The electronics package controls the output from a battery pack. This initiates the thermal generator to ignite the RCT. The firing sequence only initiates when all pre-programmed downhole parameters are met and all safety barriers are overcome.

Surface Safety Switches

Individual mechanical pressure and temperature switches form short circuits across the firing head to ensure surface safety. Well pressure and temperature 'open' the switches at a pre-determined depth and 'close' them on retrieval. These switches ensure that the device cannot fire on or near surface.

Radial Cutting Torch

The RCT is a patented cutting device used to sever tubing, casing, drill pipe and coil tubing. It utilises a proprietary mixture of powdered metals contained inside the torch body which burn at very high temperature on ignition by the gas generator. The resultant molten plasma is then ejected through the nozzle section and onto the target tubing.

Applications

- Severing of tubing, casing, drill pipe or coiled tubing
- Punching of large diameter tubing slots for circulation



Benefits

- Cost effective service run on slickline
- Efficient pipe cutting alternative to explosives or hazardous chemicals
- Classified as a flammable solid, organic, UN1325 Section 4.1
- No special storage, handling, or disposal problems
- Operates in temperatures of 260°C on E-line
- Causes no flaring or swelling in tubing
- Cuts all stainless steels, Monel, Inconel and plastic coated pipe
- Can be run through small restrictions to cut larger diameter pipe
- Can be used in close contact pipe conditions
- Can cut in dry pipe conditions
- New patented pressure balance anchor system eliminates movement, slipping, or sticking problems associated with other anchors
- Minimised downtime
- Shipped almost anywhere in the world within 24 hours
- The complete system is safe to use in radio sensitive areas

Operation

The RCT assembly is lowered into the well on slickline to the desired depth. Once all parameters are met, the Expro slickline triggers the thermal generator with a resistant coil. The generator creates heat to ignite the main load. Highly energised molten plasma is produced in the torch causing an increase in internal pressure.

Once the pressure in the torch exceeds that of the wellbore, the sleeve covering the nozzle slides down exposing the nozzle to the wellbore. The highly energised plasma escapes the torch body through the nozzles and is diverted 90 degrees toward the inside diameter of the tubing. At this point, the molten plasma has the consistency and cutting action of a 6000°F (3316°C) sand blaster.

The highly energised by-products act as sand blast beads that impart heat and erosion to the cut area, which enables the RCT to cut effectively, even under high stand-off conditions. The cutting process is completed in approximately 25 milliseconds.

Technical specifications

| Target dimension | Standard pressure 0 to 4,000 psi | Standard pressure 4,001 to 10,000 psi |
|---|--------------------------------------|--|
| 2-1/16" O.D. & 2-3/8" O.D., 4.7 to 5.95 lb/ft | RCT-SP-1375-200 or RCT-SP-1500-200 | RCT-SP-1375-300 or RCT-SP-1500-300 |
| 2-7/8" O.D., 6.4 to 8.7 lb/ft | RCT-SP-1688-200 | RCT-SP-1688-300 or RCT-SP-1500-999XP |
| 2-7/8" O.D., 9.7 to 11.7 lb/ft | RCT-SP-1688-300 or RCT-SP-1500-999XP | RCT-SP-1688-400 or RCT-SP-1500-999XP & extension |
| 3-1/2" O.D., 9.3 to 12.95 lb/ft | RCT-SP-1750-999XP or RCT-SP-2000-200 | RCT-SP-1750-999XP & extension or RCT-SP-2000-300 |
| 3-1/2" O.D., 13.3 to 15.5 lb/ft | RCT-SP-1750-999XP or RCT-SP-2000-300 | RCT-SP-1750-999XP & extension or RCT-SP-2000-400 |
| 4" O.D., 9.5 to 14.0 lb/ft | RCT-SP-1750-999XP or RCT-SP-2000-300 | RCT-SP-1750-999XP & extension or RCT-SP-2000-400 |
| 4-1/2" O.D., 9.5 to 15.5 lb/ft | RCT-SP-2500-200 | RCT-SP-2500-300 |
| 4-1/2" O.D., 16.6 to 19.2 lb/ft | RCT-SP-2500-300 | RCT-SP-2500-400 |
| 5" O.D., 11.0 to 19.5 lb/ft | RCT-SP-2937-200 | RCT-SP-2937-300 |
| 5-1/2" O.D., 14.0 to 23.0 lb/ft | RCT-SP-3375-300 | RCT-SP-3375-400 |
| 5-7/8" O.D., 23.4 lb/ft DP | RCT-SP-3375-300 or RCT-SP-4000-200 | RCT-SP-3375-400 or RCT-SP-4000-300 |
| 6-5/8" O.D., 20.0 to 32.0 lb/ft | RCT-SP-4000-300 | RCT-SP-4000-400 |
| 7" O.D., 17.0 to 32.0 lb/ft | RCT-SP-5000-200 | RCT-SP-5000-300 |
| 7-5/8" O.D., 24.0 to 42.0 lb/ft, 7-3/4" O.D., 37 lb/ft | RCT-SP-5000-300 | RCT-SP-5000-400 |
| 8-5/8" O.D., 24.0 to 40.0 lb/ft, 9-5/8" O.D., 32.3 to 53.5 lb/ft, 9-7/8" O.D., 62.8 lb/ft | RCT-SP-7000-300 | RCT-SP-7000-400 |