RIDGE BACK Burr Mill (RBBM)

Specialized Tools: Casing Cleaning Tools

The RIDGE BACK* Burr Mill (RBBM) tool is a M-I SWACO casing cleanup tool developed for use in perforated casing or liner to remove perforation burrs and to ensure the safe passage of completion equipment.

Advantages

A unique feature of the RIDGE BACK Burr Mill tool is the ability to turn it off once the milling/cleaning operation is complete if other extensive rotation is anticipated before pulling out of the hole. This is achieved by circulating a ball down, and shifting an internal support sleeve, to remove the expanding force on the milling ribs. These ribs are then held recessed into the tool and away from the pipe ID.

Full circulation through the ID of the tool is possible before and after the support sleeve is moved. The tool can also be used to clear off equally stubborn ID-restricting materials (e.g., heavy pipe scale) from the inside of casing/liner to regain full pipe ID.

Operation

At least one MAGNOSTAR* tool should be run above the RIDGE BACK Burr Mill tool to collect the milled material. In addition, consideration should be given to running a RAZOR BACK* tool and a WELL PATROLLER* unit above the top MSTAR tool. It should be run at a maximum run-in-hole/pull-out-of-hole speed of 150 ft/min (46 m/min). If the string is to be rotated at the same depth for more than 30 min, it is recommended that the RIDGE BACK Burr Mill unit be deactivated. This is achieved by dropping and circulating a ball to the tool and applying pressure to shift the internal support sleeve. It should be noted that when the tool is deactivated, it cannot be reactivated.

Features

- One-piece mandrel
- Cleans by rotation and up/down pipe movement
- Supplied with drill-pipe box-up/pin-down connections
- Available in all common casing/liner sizes
- Milling ribs can be deactivated by ball drop to minimize casing wear during periods of prolonged rotation

Advantages

- Provides advanced wellbore cleanup in the post-perforating well phase, where a high degree of casing or liner ID smoothness through the perforated interval is required
- Completely removes perforation burrs, preventing damage to completion equipment, including expandable screens/expandable pipe used in complex/smart completions
- Capability to turn off tool once the milling/cleaning operation is complete to avoid casing wear

How it works

The RIDGE BACK Burr Mill tool is built on a one-piece drill-pipe mandrel and is equipped with three expandable milling ribs that make contact with the full ID of the casing/liner. The right-hand face of the milling rib is dressed with a carbide compound so that the expanding force, coupled with right-hand rotation, ensures perforation burrs are removed from the ID of the pipe.

The lower end of the tool has a fixed-mill sleeve (Figure 1), also dressed with a carbide compound to remove a proportion of the perforation burrs before the expandable mill ribs remove the remainder of the burrs to reinstate the full pipe ID. The upper end of the tool has a fixed stabilizer sleeve to provide balanced support to the mill ribs.

Removal of perforation burrs is achieved by running in hole and pulling out of hole through the perforated interval at a predetermined speed (10 ft/min [3 m/min]), while rotating at the recommended 60 rpm. This ensures sufficient contact time between the mill ribs and each perforation to effectively remove all burrs and leave the pipe ID smooth and free of restrictions.

Figure 1. Lower fixed mill sleeve.

Figure 2. Burrs on tubular ID prior to cleaning with RIDGE BACK Burr Mill.

Operating parameters

Tool size, in.	Maximum rotating speed in compression, rpm	Maximum rotating speed in tension (activated), rpm	Maximum rotating speed in tension (deactivated), rpm	Deactivation pressure, psi (bar)
7 – 8¹⁄₁₆	60	60	100	1,800 (124)
9⅝ – 10¾	60	60	120	830 (57)

These are general guidelines only and are subject to review, if required, for individual circumstances.