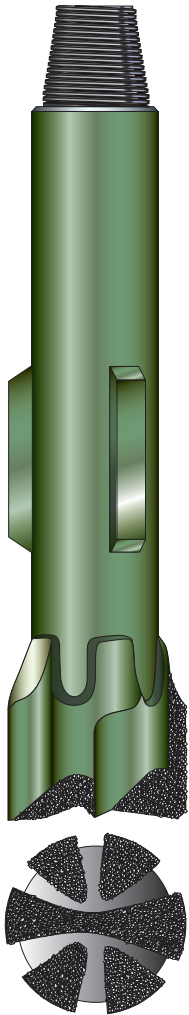


# Carbide Mills



M&M has developed a broad line of tungsten carbide faced mills that will handle almost any well clean-up application. We've got tools for simple cement removal, ones which will dress tubulars or remove downhole restrictions and ones which turn the toughest downhole tools and bit cones into pieces which can be circulated from the well.

Our mills are made using precision-machined, high strength alloy steel. Cutting surfaces are dressed with tungsten carbide particles sized for optimum metal removal and long life. The carbide is held in place by a high strength brazing compound for maximum toughness. Most mills have an API connection to provide maximum tensile strength and internal flow area. External flow passages allow circulation of fluid at high rates to cool and clean the mill while allowing debris to be circulated from the wellbore.

Tools are available for clean-out work in most casing and tubing sizes; many are in stock for immediate delivery. The mills most commonly used include:

- **Junk Mill**- Designed to mill up or dress off downhole tools including packers & bridge plugs, tubing and similar objects. It also works well where there is a combination of junk and cement.
- **Deep Throat Mill** – With a three-blade design, it is most often used for drilling cement, especially where small amounts of junk may coexist.
- **Watermelon or String Mill** – These mills have connections on both ends to allow running in combination with a tapered mill. They are used to remove obstructions in the casing and for reaming out liners and whipstock windows. Tapered sections at the top and bottom ends ease entry into restrictions.
- **Pilot Mill** - Used to dress off or mill up tubular junk down hole, such as casing and wash pipe; the extended pilot section allows for greater milling efficiency.
- **Tapered Mill** – Designed specifically for milling through collapsed casing, tight spots or other types of downhole obstructions including liner tops and whipstock windows.
- **Piranha Mill** - Accommodates more tungsten carbide to provide greater wear life. Designed for applications where there are large amounts of junk and is ideal for cemented drill pipe and packers.
- **Concave or Cone Buster Mill** – The design of the face of this mill helps keep the fish centered during milling operations. It is especially well suited for drilling up bit cones and other loose objects.
- **Diamond Point** – Typically used to bevel off ends of cut casing or liner tops for smoother entries. It may also be used for washing though packed sand and similar type fill with either a spudding or rotating action.

