

# Aegis armor cladding

Improve erosion resistance of steel-bodied bits

## How it improves drilling performance

Aegis\* armor cladding extends the life of our steel-bodied bit designs, which translates to more runs. Bit blades can be taller and the nozzle evacuation area does not have to follow the blade contour.

- Improves hydraulics in soft-rock drilling for better cuttings evacuation
- Comprises superior material versus hardfacing strip
  - Improves protection for cutters
  - Expands use and performance—improved reliability and erosion
  - Merges the benefits of matrix and steel
  - Increases ROP

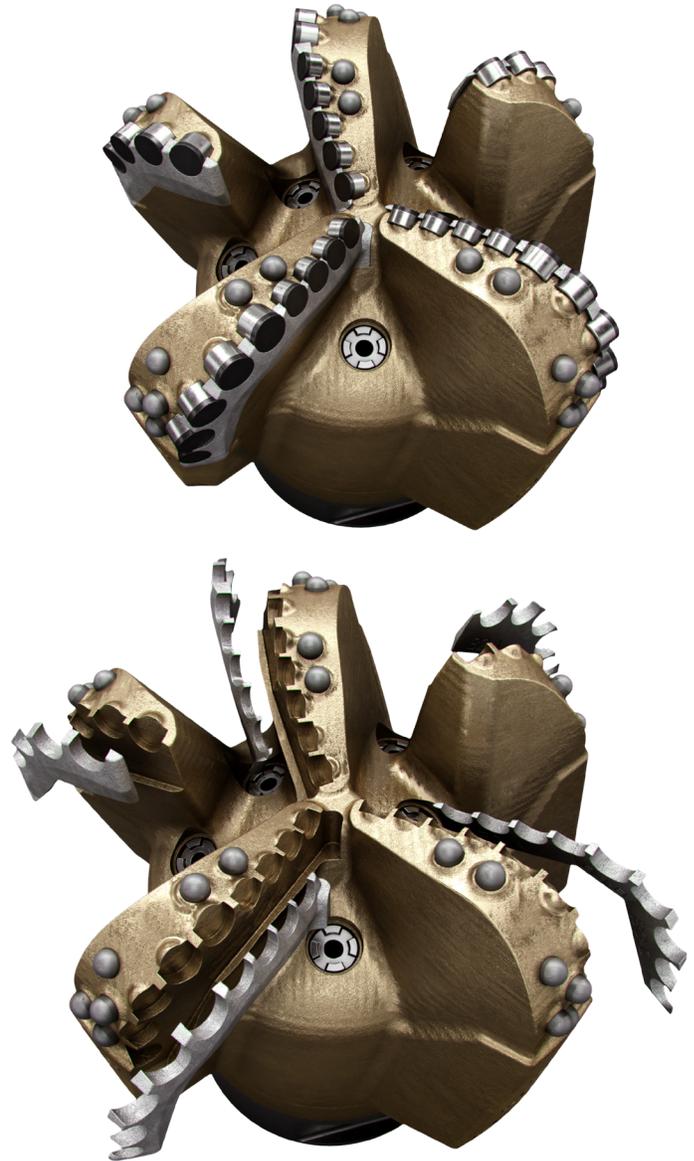
## How it works

Aegis cladding is an erosion-resistant tungsten carbide strip for steel-bodied PDC bits. Strips are made using electron beam melting (EBM)—akin to a laser forge. The EBM heats and bonds the ingredients to yield a proprietary material 400% more erosion resistant and 40% stronger than matrix bit materials.

## What it replaces

Aegis cladding replaces the conventional, manually applied welded-on hardfacing used on the bit-blade fronts and around the PDC cutters. Conventional hardfacing offers inconsistent performance due to the casting technique that results in a nonuniform particle size and distribution, often containing voids that reduce overall strength. Material erodes away faster, reducing the reliability of steel-bodied PDC bit performance. This industry-wide problem limits usage of steel-bodied PDC bits to about 20% of new bit builds.

By contrast, electronic beam additive manufacturing produces a proprietary tungsten carbide matrix material with a highly uniform distribution of spherical carbide particles that eliminate the presence of voids. This, in turn, results in a substantively more erosion-resistant and stronger bit shielding—the Aegis armor cladding.



*Aegis armor cladding is applied directly to the bit blade, delivering increased erosion resistance compared with hardfacing and improved cutter protection.*