

| coating                                                         | properties and application                                                                                                                                                                                                                                                                                                                                | precautions                                                                                                                                          |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Titanium Nitride (TiN)</b>                                   | Proprietary TiN coating (hardness 2300 Vickers) offers significantly improved wear life and thread finish, often at higher tapping speeds, in a broad range of materials, especially steels, irons, and plastics.<br>Golden colour.                                                                                                                       | Use with caution in non-ferrous materials such as aluminium because of tendency to gall.                                                             |
| <b>Titanium Carbonitride (TiCN)</b>                             | Proprietary TiCN coating (hardness 3000 Vickers) is harder, tougher, and more wear resistant than TiN under conditions of moderate cutting temperatures. Like TiN, TiCN may be used at higher cutting speeds in a broad range of materials, especially steels and irons.<br>Blue-grey colour.                                                             | Use with caution in non-ferrous materials such as aluminium because of tendency to gall. TiAlN is a better choice when used at extreme temperatures. |
| <b>Titanium Nitride + Chromium Carbide Carbon (TiN + CrC/C)</b> | Proprietary coating (hardness 2300 Vickers) that combines the wear resistance of smooth TiN coating with a lubricous top layer of chromium carbide carbon. Effective in stainless steel and non-ferrous materials including aluminium and titanium. Ideal choice for 300 series stainless steels, wrought, and die cast aluminiums.<br>Black/grey colour. | Effective in both ferrous and non-ferrous materials.                                                                                                 |
| <b>Titanium Aluminium Nitride (TiAlN)</b>                       | Nanolayer TiAlN coating (hardness 3300 Vickers) offers improved wear life and thread finish, especially in conditions where high temperatures can be generated. Use for PH stainless steels and nickel-based alloys like INCONEL®.<br>Violet/grey colour.                                                                                                 | Use with caution in non-ferrous materials because of tendency to gall.                                                                               |
| <b>Chromium Nitride (CrN)</b>                                   | CrN is medium hard (hardness 1800 Vickers) and has a lower wear resistance than TiN, TiCN, and TiAlN. However, unlike these coatings, CrN does not gall when used in some non-ferrous work materials. Use for brass, bronze, zinc alloys, and magnesium alloys.<br>Silver colour.                                                                         | Ineffective in ferrous materials.                                                                                                                    |
| <b>Nitride (MAXI #1)</b>                                        | Hardened case extends wear life in abrasive materials. Use for aluminium and other non-ferrous materials.                                                                                                                                                                                                                                                 | Avoid on taper pipe, fast spiral, and small diameter (<#6) or fine pitch taps due to tendency for thread chipping.                                   |
| <b>Oxide (SH-50)</b>                                            | Helps prevent galling in ferrous (iron-based) materials. For free machining steel. Use for steels, stainless steels, and irons.                                                                                                                                                                                                                           | Has a tendency to cause galling in non-ferrous materials such as aluminium.                                                                          |
| <b>Nitride and Oxide (SH-47)</b>                                | Combines the benefits of nitride and oxide surface treatments. For steels, stainless steels, and nickel alloys.                                                                                                                                                                                                                                           | See precautions for nitride and oxide surface treatments.                                                                                            |