PR015S
Insert Grade for Machining Hardened Material

- Excellent Thermal Properties Reduce Notch Wear
- Improved Wear Resistance with MEGACOAT HARD Coating
- Stable Machining with Tough Edge GH Chipbreaker

Provides Long Tool Life and Stable Machining in Hardened Material

- MEW
  - 90° Milling Cutter
  - LOMU10/15 Type

- MFPN45
  - 45° Milling Cutter
  - PNMU12 Type

- MFNP66
  - 66° Milling Cutter
  - PNMU09 Type

- MFSN88
  - 88° Milling Cutter
  - SNMU13 Type


## PR015S

**Insert Grade for Machining Hardened Metal**

Provides Long Tool Life and Stable Machining in Hardened Material

Excellent Thermal Properties and Improved Wear Resistance with MEGACOAT HARD Coating

### 1 Improved thermal properties reduce sudden fracturing and decrease notch wear

- **Micro-Grain WC**
- **Coarse-Grain WC**
- **Binder Phase**
- **Heat-Resistant Components**

**PR015S**

**Conventional Substrate A**

- Improved thermal conductivity by optimum distribution of WC coarse grains
- Resists heat concentration at the cutting edge to promote stable machining

### 2 Improved wear resistance with MEGACOAT HARD coating

**MEGACOAT HARD**

- High hardness and high heat-resistant PVD layer

- High aluminum content and multicomponent layer
- High hardness and oxidation resistance

- Multicomponent layer with excellent adhesion

- Carbide substrate

**Coating Film Property (Internal Evaluation)**

<table>
<thead>
<tr>
<th>Hardness (GPa)</th>
<th>Oxidation Onset Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1,400</td>
</tr>
<tr>
<td>35</td>
<td>1,200</td>
</tr>
<tr>
<td>30</td>
<td>1,000</td>
</tr>
<tr>
<td>25</td>
<td>800</td>
</tr>
<tr>
<td>20</td>
<td>600</td>
</tr>
<tr>
<td>15</td>
<td>400</td>
</tr>
</tbody>
</table>

**Oxidation Resistance**

- **Low**
- **High**

**Wear Resistance Comparison (Internal Evaluation)**

**Workpiece: D2 Tool Steel (53HRC)**

- Conventional A (Machining Time: 6 min)
- PR015S (Machining Time: 6 min)

- Cutting Conditions: $V_c = 330$ sfm, $D.O.C. \times a_e = 0.039'' \times 0.394''$, $f_z = 0.002$ ipt, Dry

**Workpiece: D2 Tool Steel (60HRC)**

- Conventional A (Machining Time: 6 min)
- PR015S (Machining Time: 6 min)

- Cutting Conditions: $V_c = 330$ sfm, $D.O.C. \times a_e = 0.039'' \times 0.394''$, $f_z = 0.002$ ipt, Dry
Low Cutting Forces Equivalent to Positive Inserts
Chattering Resistance for Excellent Surface Finish
Economical 4-edge Insert
Improved Toolholder Durability and Insert Installation Accuracy

<table>
<thead>
<tr>
<th>Shape</th>
<th>Part Number</th>
<th>Dimensions (mm)</th>
<th>Grade</th>
<th>Applicable Toolholders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>W1</td>
<td>S</td>
<td>D1</td>
</tr>
<tr>
<td></td>
<td>LOMU 100408ER-GH</td>
<td>6.6</td>
<td>4.0</td>
<td>3.4</td>
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<tr>
<td></td>
<td>LOMU 150508ER-GH</td>
<td>9.2</td>
<td>5.6</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Face Mills: ø32mm~ø80mm, ø1.50”~ø4.00”
End Mills: ø16mm~ø50mm ø0.625”~ø1.50”

Economical Inserts with 10 Cutting Edges
Reduces Chattering with Low Cutting Force Design
Reduces Cutting Costs when Machining Auto Parts and Other General Purpose Machining Applications

<table>
<thead>
<tr>
<th>Shape</th>
<th>Part Number</th>
<th>Dimensions (mm)</th>
<th>Grade</th>
<th>Applicable Toolholders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>INSL</td>
<td>S</td>
<td>D1</td>
</tr>
<tr>
<td></td>
<td>PNMU 0905XNER-GH</td>
<td>14.6</td>
<td>5.56</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Face Mills: ø50mm~ø160mm
End Mills: ø32mm, ø40mm

Reduced Chattering with Low Cutting Force Design
Excellent Fracture Resistance
Economical Inserts with 10 Cutting Edges
Suppresses Fracturing with Dual Angle Edge Design

<table>
<thead>
<tr>
<th>Shape</th>
<th>Part Number</th>
<th>Dimensions (mm)</th>
<th>Grade</th>
<th>Applicable Toolholders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>INSL</td>
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<td>D1</td>
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<td>PNMU 1205ANER-GH</td>
<td>17.98</td>
<td>6.17</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Face Mills: ø63mm~ø315mm ø2.00”~ø10.00”
End Mills: ø50mm, ø63mm, ø80mm ø2.00”~ø2.50”~ø3.00”

For more details on toolholders, see the KYOCERA general product catalog or product brochures
**MFSN88**

**High Efficiency Cutter with a 88° Cutting Edge Angle**

- Economical Inserts with 8 Cutting Edges
- Reduces Chattering with Low Cutting Force Design
- Suitable for Shoulder Roughing
- Cost Reduction in Approximately 90° Corner Cutting

**Recommended Cutting Conditions**

(60HRC or less)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>fz (ipt)</th>
<th>Cutting Speed (Vc : sfm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOMU 100408ER-GH</td>
<td>0.002<del>0.003</del>0.005</td>
<td>260<del>390</del>520</td>
</tr>
<tr>
<td>LOMU 150508ER-GH</td>
<td>0.003<del>0.006</del>0.009</td>
<td>260<del>390</del>520</td>
</tr>
<tr>
<td>PNMU 0905XNER-GH</td>
<td>0.004<del>0.008</del>0.012</td>
<td>260<del>390</del>390</td>
</tr>
<tr>
<td>PNMU 1205ANER-GH</td>
<td>0.004<del>0.010</del>0.014</td>
<td>260<del>390</del>390</td>
</tr>
<tr>
<td>SNMU 130508EN-GH</td>
<td>0.004<del>0.008</del>0.012</td>
<td>260<del>390</del>390</td>
</tr>
<tr>
<td>WNMU 080608EN-GH</td>
<td>0.004<del>0.008</del>0.012</td>
<td>260<del>390</del>390</td>
</tr>
</tbody>
</table>

**MFWMN**

**Double-sided 6-edge Insert, Low Cutting Force 90° Cutter**

- Economical Double-sided 6-edge Insert
- Superior Fracture Resistance due to Thick Edge Design
- Sharp Cutting with Lower Cutting Forces
- Resistant to Chattering and Applicable to Long Overhang

For more details on toolholders, see the KYOCERA general product catalog or product brochures.