HPS Beyond™ Drills for Aluminum Machining with MQL

Primary Application

B284/B285_HPS Series Solid Carbide Drills offer the highest metal removal rates and longest tool life in aluminum and other non-ferrous materials when MQL is applied. These drills can also be used with standard through coolant.

By combining the HP-Point Geometry and the new KN15™ Beyond grade with the new Kennametal polishing technology and unique flute design into one tool, the B28*HPS is the ultimate production tool for aluminum workpiece applications — even when compared to PCD solutions. This drill family is a differentiated high-end and high-performance alternative to commoditized conventional carbide or PCD straight-fluted drills.

Features and Benefits

HPS Drill-Point Design
- Sharp cutting edge enables high tool life in aluminum and other non-ferrous materials.
- Low cutting forces and less built-up edge.
- HP-Point enables high feed rates by progressive rake angle and excellent centering capabilities.

Enlarged Flute Design
- Enables fast chip evacuation and high metal removal rates.

NEW KN15™ Beyond™ Grade
- The highly polished surface ensures superior chip evacuation, even when MQL coolant is applied.
- Specified, uncoated 9% Co fine-grain carbide.

“D” Shank Optimised for MQL Applications
- Enlarged chamfer on back end according to DIN 69090-3 (round cylindrical for MQL) to ensure optimum coolant flow without leakage.

Customization
- Intermediate diameters available as semi-standards.
- Length variations and step drills available as custom solutions.
- Using Kennametal MQL chucks together with standard B28_HPS is recommended.
- Optional coatings available for applications in aluminum with Si > 9%, based on TiB₂ and DLC.
Solid Carbide Drills
HPS Beyond™ Drills • Aluminum • Through Coolant

For information on L, L3, and L4 max, see the Solid Carbide Drill foldout dimension table between pages G4 and G5 in the Kennametal Innovations Master Catalog Cutting Tools 2013.

<table>
<thead>
<tr>
<th>D1 diameter (mm)</th>
<th>D1 diameter (in)</th>
<th>D1 diameter (fraction)</th>
<th>wire size</th>
<th>L5</th>
<th>LS</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,000</td>
<td>.1181</td>
<td>–</td>
<td>–</td>
<td>0.6</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>3,175</td>
<td>.1250</td>
<td>1/8</td>
<td>–</td>
<td>0.6</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>3,200</td>
<td>.1260</td>
<td>–</td>
<td>–</td>
<td>0.6</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>3,300</td>
<td>.1299</td>
<td>–</td>
<td>–</td>
<td>0.6</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>3,500</td>
<td>.1378</td>
<td>–</td>
<td>–</td>
<td>0.6</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>3,571</td>
<td>.1406</td>
<td>9/64</td>
<td>–</td>
<td>0.7</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>3,970</td>
<td>.1563</td>
<td>5/32</td>
<td>–</td>
<td>0.7</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,000</td>
<td>.1575</td>
<td>–</td>
<td>–</td>
<td>0.7</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,200</td>
<td>.1654</td>
<td>–</td>
<td>–</td>
<td>0.8</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,366</td>
<td>.1719</td>
<td>11/64</td>
<td>–</td>
<td>0.8</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,500</td>
<td>.1772</td>
<td>–</td>
<td>–</td>
<td>0.8</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,763</td>
<td>.1875</td>
<td>3/16</td>
<td>–</td>
<td>0.9</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,800</td>
<td>.1890</td>
<td>–</td>
<td>12</td>
<td>0.9</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>4,900</td>
<td>.1929</td>
<td>–</td>
<td>–</td>
<td>0.9</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,000</td>
<td>.1969</td>
<td>–</td>
<td>–</td>
<td>0.9</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,100</td>
<td>.2008</td>
<td>–</td>
<td>–</td>
<td>0.9</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,159</td>
<td>.2031</td>
<td>13/64</td>
<td>–</td>
<td>1.0</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,200</td>
<td>.2047</td>
<td>–</td>
<td>–</td>
<td>1.0</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,500</td>
<td>.2165</td>
<td>–</td>
<td>–</td>
<td>1.0</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,558</td>
<td>.2188</td>
<td>7/32</td>
<td>–</td>
<td>1.0</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,600</td>
<td>.2205</td>
<td>–</td>
<td>–</td>
<td>1.0</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,800</td>
<td>.2283</td>
<td>–</td>
<td>–</td>
<td>1.1</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>5,954</td>
<td>.2344</td>
<td>15/64</td>
<td>–</td>
<td>1.1</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>6,000</td>
<td>.2362</td>
<td>–</td>
<td>–</td>
<td>1.1</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>6,300</td>
<td>.2480</td>
<td>–</td>
<td>–</td>
<td>1.2</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>6,400</td>
<td>.2520</td>
<td>–</td>
<td>–</td>
<td>1.2</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>6,500</td>
<td>.2559</td>
<td>–</td>
<td>–</td>
<td>1.2</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>6,600</td>
<td>.2598</td>
<td>–</td>
<td>–</td>
<td>1.2</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>6,700</td>
<td>.2638</td>
<td>–</td>
<td>–</td>
<td>1.2</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>6,746</td>
<td>.2656</td>
<td>17/64</td>
<td>–</td>
<td>1.2</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>6,800</td>
<td>.2677</td>
<td>–</td>
<td>–</td>
<td>1.3</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>7,000</td>
<td>.2756</td>
<td>–</td>
<td>–</td>
<td>1.3</td>
<td>36</td>
<td>8</td>
</tr>
</tbody>
</table>

(continued)
### D1 Diameter

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tolerance</th>
<th>Wire Size</th>
<th>LS</th>
<th>LS</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>B284D07145HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D07145HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D07400HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D07400HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D07500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D07500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D07541HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D07541HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D07938HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D07938HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D08000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D08000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D08334HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D08334HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D08500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D08500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D08733HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D08733HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D09000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D09000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D09129HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D09129HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D09300HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D09300HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D09500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D09500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D09525HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D09525HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D10000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D10000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D10200HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D10200HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D10500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D10500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D10716HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D10716HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D11113HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D11113HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D11908HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D11908HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D12000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D12000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D12500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D12500HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D12700HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D12700HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D14000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D14000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D14286HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D14286HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D15875HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D15875HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D19050HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B285D19050HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B284D20000HPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Tolerance Metric

<table>
<thead>
<tr>
<th>Nominal Size Range</th>
<th>D1 Tolerance m7</th>
<th>D Tolerance h6</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;3–6</td>
<td>0.004/0.016</td>
<td>0.000–0.006</td>
</tr>
<tr>
<td>&gt;6–10</td>
<td>0.006/0.021</td>
<td>0.000–0.009</td>
</tr>
<tr>
<td>&gt;10–18</td>
<td>0.008/0.029</td>
<td>0.000–0.013</td>
</tr>
</tbody>
</table>

### Tolerance Inch

<table>
<thead>
<tr>
<th>Nominal Size Range</th>
<th>D1 Tolerance m7</th>
<th>D Tolerance h6</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;118–2362</td>
<td>0.002/0.003</td>
<td>0.000–0.003</td>
</tr>
<tr>
<td>&gt;2382–3807</td>
<td>0.002/0.003</td>
<td>0.000–0.003</td>
</tr>
<tr>
<td>&gt;3893–7667</td>
<td>0.003/0.010</td>
<td>0.000–0.004</td>
</tr>
<tr>
<td>&gt;7687–14,000</td>
<td>0.003/0.011</td>
<td>0.000–0.005</td>
</tr>
</tbody>
</table>

www.kennametal.com
### HP Drills • B28_HPS Series • Grade KN15™ • MQL and Through Coolant

**Cutting Speed — vc**

<table>
<thead>
<tr>
<th>Material Group</th>
<th>Starting Value</th>
<th>mm/r</th>
<th>3,0</th>
<th>4,0</th>
<th>6,0</th>
<th>8,0</th>
<th>10,0</th>
<th>12,0</th>
<th>16,0</th>
<th>20,0</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>120</td>
<td>450</td>
<td>0.13–0.25</td>
<td>0.14–0.29</td>
<td>0.17–0.35</td>
<td>0.21–0.42</td>
<td>0.27–0.50</td>
<td>0.33–0.57</td>
<td>0.37–0.69</td>
<td>0.43–0.82</td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td>350</td>
<td>0.14–0.23</td>
<td>0.15–0.28</td>
<td>0.17–0.34</td>
<td>0.22–0.39</td>
<td>0.29–0.46</td>
<td>0.34–0.54</td>
<td>0.39–0.67</td>
<td>0.45–0.80</td>
</tr>
<tr>
<td>N</td>
<td>100</td>
<td>400</td>
<td>0.13–0.18</td>
<td>0.14–0.19</td>
<td>0.16–0.25</td>
<td>0.20–0.30</td>
<td>0.28–0.37</td>
<td>0.33–0.42</td>
<td>0.38–0.56</td>
<td>0.44–0.68</td>
</tr>
<tr>
<td>N</td>
<td>100</td>
<td>300</td>
<td>0.10–0.16</td>
<td>0.12–0.18</td>
<td>0.14–0.24</td>
<td>0.16–0.28</td>
<td>0.20–0.36</td>
<td>0.24–0.40</td>
<td>0.28–0.44</td>
<td></td>
</tr>
</tbody>
</table>

**Cutting Speed — vc**

<table>
<thead>
<tr>
<th>Material Group</th>
<th>Starting Value</th>
<th>mm/r</th>
<th>1/8</th>
<th>3/16</th>
<th>1/4</th>
<th>5/16</th>
<th>3/8</th>
<th>5/8</th>
<th>3/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>390</td>
<td>1480</td>
<td>.005–.010</td>
<td>.006–.011</td>
<td>.007–.014</td>
<td>.008–.017</td>
<td>.011–.020</td>
<td>.013–.022</td>
<td>.015–.027</td>
</tr>
<tr>
<td>N</td>
<td>390</td>
<td>1150</td>
<td>.006–.009</td>
<td>.006–.011</td>
<td>.007–.013</td>
<td>.009–.015</td>
<td>.011–.018</td>
<td>.013–.021</td>
<td>.015–.026</td>
</tr>
<tr>
<td>N</td>
<td>330</td>
<td>1310</td>
<td>.005–.007</td>
<td>.006–.007</td>
<td>.006–.010</td>
<td>.008–.012</td>
<td>.011–.015</td>
<td>.013–.017</td>
<td>.015–.022</td>
</tr>
<tr>
<td>N</td>
<td>330</td>
<td>980</td>
<td>.004–.006</td>
<td>.005–.007</td>
<td>.006–.009</td>
<td>.006–.011</td>
<td>.007–.013</td>
<td>.008–.014</td>
<td>.009–.016</td>
</tr>
</tbody>
</table>