

MillLine



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Tungaloy Report No. 380S1-US

**New grades lineup** for a wide range of materials



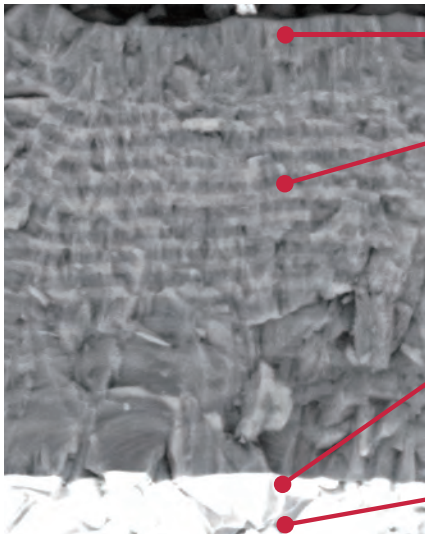
**INDUSTRY 4.0**  
*FEED the SPEED!*



# Grades with long tool life for a wide range of materials

**New AH3225** **P M**  
**PREMIUMTEC**

- Nano multi-layer coating technology with three major properties for optimal cutting edge integrity
- Increased resistance to wear, fracture, oxidation, built-up edge and delamination



### Technology 1 - Resistance to built-up edge

The coating surface prevents built-up edge

### Technology 2 - Resistance to wear, oxidation, and fracture

Multi-layered coating is designed to resist wear and oxidation, while preventing micro-cracks from propagating in the coating layer for improved resistance to edge chipping

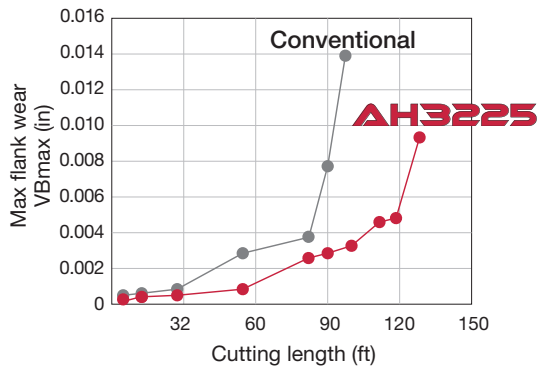
### Technology 3 - Strong coating/substrate adhesion

Coating is optimized for strong adhesion property with substrate to maintain strong cutting edge integrity

### Carbide substrate

High resistance to fracture

## Tool life comparison of AH3225



|          |                    |                                     |
|----------|--------------------|-------------------------------------|
| <b>P</b> | Cutter             | : EPS11100RSBU ( $\phi 1"$ , z = 4) |
|          | Insert             | : ASMT11T308PDPR-MJ AH3225          |
|          | Workpiece material | : 1055                              |
|          | Cutting speed      | : $V_c = 660$ sfm                   |
|          | Feed per tooth     | : $f_z = 0.004$ ipt                 |
|          | Depth of cut       | : $a_p = 0.118"$                    |
|          | Cutting width      | : $a_e = 0.8"$                      |
|          | Coolant            | : Dry                               |
|          | Machine            | : Vertical M/C, HSK63               |

## Updated grade selection lineup

It's possible to select the optimal grade for each workpiece material.

| ISO      | Workpiece material    | First choice                  | Fracture resistance         | Wear resistance            | Surface quality |
|----------|-----------------------|-------------------------------|-----------------------------|----------------------------|-----------------|
| <b>P</b> | Steel                 | <b>New</b><br><b>AH3225</b>   |                             | <b>New</b><br><b>T3225</b> | <b>NS740</b>    |
| <b>M</b> | Stainless             | <b>New</b><br><b>AH3225</b>   |                             | <b>AH130</b>               |                 |
| <b>K</b> | Grey cast irons       | <b>AH120</b>                  |                             | <b>New</b><br><b>T1215</b> |                 |
|          | Ductile cast irons    | <b>AH120</b>                  | <b>New</b><br><b>AH3225</b> | <b>New</b><br><b>T1215</b> |                 |
| <b>N</b> | Non-ferrous           | <b>DS1100</b><br><b>KS05F</b> |                             |                            |                 |
| <b>S</b> | Titanium alloys       | <b>AH130</b>                  | <b>New</b><br><b>AH3225</b> |                            |                 |
|          | Heat resisting alloys | <b>AH725</b>                  |                             |                            |                 |
| <b>H</b> | Hard materials        | <b>AH725</b>                  |                             |                            |                 |

**AH3225**  
PREMIUMTEC



- PVD grade for high fracture resistance
- Most suitable for steel and stainless steel in general cutting parameters

**New**  
**T3225**  
PREMIUMTEC



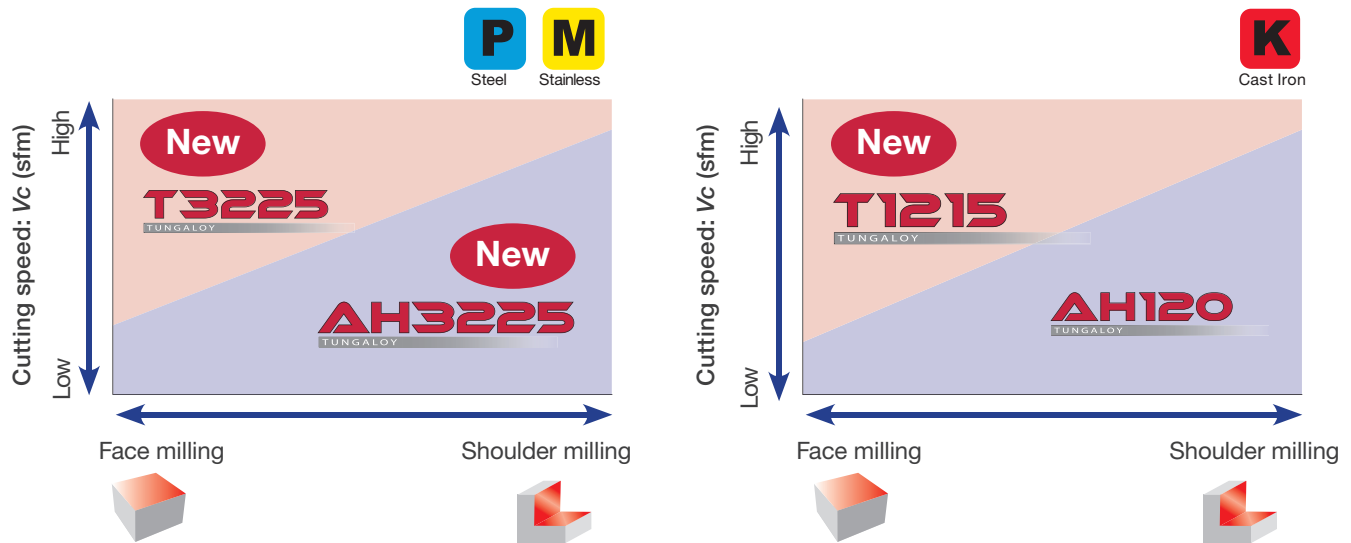
- CVD grade with superior resistance to chipping and fracture
- Ideal for high speed machining of steel and stainless steel

**New**  
**T1215**  
PREMIUMTEC



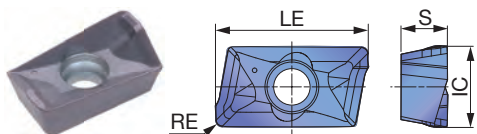
- CVD grade with superior resistance to wear and chipping
- Ideal for high speed machining of cast iron

## Application area

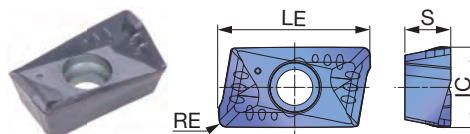


## INSERT

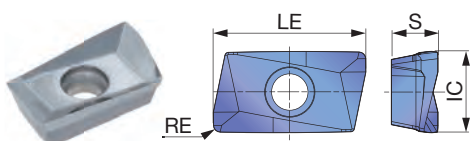
### ASMT11-MJ



### ASMT11-MS



### ASGT11-AJ



|   |                |   |   |   |   |   |   |   |   |   |  |  |  |  |  |
|---|----------------|---|---|---|---|---|---|---|---|---|--|--|--|--|--|
| P | Steel          | ☆ |   |   | ☆ | ★ | ☆ |   |   | ★ |  |  |  |  |  |
| M | Stainless      |   | ☆ | ☆ | ☆ | ★ | ☆ |   |   |   |  |  |  |  |  |
| K | Cast iron      | ★ |   |   | ☆ | ☆ |   | ☆ |   |   |  |  |  |  |  |
| N | Non-ferrous    |   |   |   |   |   |   |   | ★ |   |  |  |  |  |  |
| S | Superalloys    |   | ★ |   | ★ | ☆ |   |   |   |   |  |  |  |  |  |
| H | Hard materials |   |   |   | ★ |   |   |   |   |   |  |  |  |  |  |

★ : First choice  
☆ : Second choice

| Designation       | RE    | APMX  | Coated |       |       |       |        |       |       | Cermets | Uncoated | LE | IC | S     |        |       |
|-------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|---------|----------|----|----|-------|--------|-------|
|                   |       |       | AH120  | AH130 | AH140 | AH725 | AH3225 | T3225 | T1215 |         |          |    |    |       | DS1100 |       |
| ASMT11T304PDPR-MJ | 0.016 | 0.417 | ●      | ●     |       | ●     | ●      | ●     | ●     | ●       |          |    |    | 0.457 | 0.264  | 0.146 |
| ASMT11T308PDPR-MJ | 0.031 | 0.417 | ●      | ●     |       | ●     | ●      | ●     | ●     | ●       |          |    |    | 0.457 | 0.264  | 0.146 |
| ASMT11T312PDPR-MJ | 0.047 | 0.417 | ●      | ●     |       | ●     | ●      | ●     | ●     | ●       |          |    |    | 0.457 | 0.264  | 0.146 |
| ASMT11T316PDPR-MJ | 0.063 | 0.417 | ●      | ●     |       | ●     | ●      | ●     | ●     | ●       |          |    |    | 0.457 | 0.264  | 0.146 |
| ASMT11T320PDPR-MJ | 0.079 | 0.417 | ●      |       |       | ●     | ●      | ●     | ●     | ●       |          |    |    | 0.457 | 0.264  | 0.146 |
| ASMT11T330PDPR-MJ | 0.118 | 0.417 | ●      | ●     |       | ●     | ●      | ●     | ●     | ●       |          |    |    | 0.457 | 0.264  | 0.146 |
| ASMT11T304PDPR-MS | 0.016 | 0.417 |        | ●     | ●     |       | ●      |       |       |         |          |    |    | 0.457 | 0.264  | 0.146 |
| ASGT11T304PDPR-AJ | 0.016 | 0.417 |        |       |       |       |        |       | ●     |         | ●        |    |    | 0.457 | 0.264  | 0.146 |
| ASGT11T308PDPR-AJ | 0.031 | 0.417 |        |       |       |       |        |       | ●     |         | ●        |    |    | 0.457 | 0.264  | 0.146 |

Caution : The contour radius when using the tool is smaller than the RE value.  
If RE is 0.047" or more, it will be about 10% smaller than RE.

● : New  
● : Line up

## STANDARD CUTTING CONDITIONS

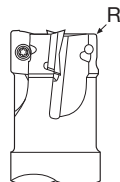
TPO11 / EPO11 / HPO11 type

| ISO                     | Workpiece material                                    | Hardness HB         | Priority                | Grade        | Cutting speed Vc (sfm) | Feed per tooth: fz (ipt) |               |               |
|-------------------------|---|---------------------|-------------------------|--------------|------------------------|--------------------------|---------------|---------------|
|                         |   |                     |                         |              |                        | MJ                       | MS            | AJ            |
| P                       | Low carbon steel<br>1018, 1020, 1026, etc.            | < 200               | First choice            | AH3225       | 330 - 820              | 0.004 - 0.008            | -             | -             |
|                         |   | < 200               | For wear resistance     | T3225        | 330 - 820              | 0.004 - 0.008            | -             | -             |
|                         |   | < 200               | Surface quality         | NS740        | 330 - 820              | 0.002 - 0.006            | -             | -             |
|                         | High carbon steel and alloy steel<br>1045, 4140, etc. | 200 - 300           | First choice            | AH3225       | 330 - 660              | 0.004 - 0.006            | -             | -             |
|                         |   | 200 - 300           | For wear resistance     | T3225        | 330 - 660              | 0.004 - 0.006            | -             | -             |
|                         |   | 200 - 300           | Surface quality         | NS740        | 330 - 660              | 0.002 - 0.005            | -             | -             |
| Tool steel<br>H13, etc. | 150 - 300   | First choice        | AH3225                  | 330 - 500    | 0.004 - 0.006          | -                        | -             |               |
|                         | 150 - 300   | For wear resistance | T3225                   | 330 - 500    | 0.004 - 0.006          | -                        | -             |               |
| M                       | Stainless steel<br>304SS, 316SS, 17-4 PH, etc.        | -                   | First choice            | AH3225       | 260 - 660              | -                        | 0.003 - 0.008 | -             |
|                         |   | -                   | For wear resistance     | AH130        | 260 - 660              | -                        | 0.003 - 0.008 | -             |
| K                       | Gray cast iron<br>Class 25, Class 30, etc.            | 150 - 250           | First choice            | AH120        | 330 - 820              | 0.005 - 0.008            | -             | -             |
|                         |   | 150 - 250           | For wear resistance     | T1215        | 330 - 820              | 0.005 - 0.008            | -             | -             |
|                         | Ductile cast iron<br>60-40-18, 60-55-06, etc.         | 150 - 250           | First choice            | AH120        | 260 - 660              | 0.005 - 0.008            | -             | -             |
|                         |   | 150 - 250           | For wear resistance     | T1215        | 260 - 660              | 0.005 - 0.008            | -             | -             |
| N                       | Aluminum alloys<br>Si < 13%                           | -                   | First choice            | DS1100       | 1000 - 3300            | -                        | -             | 0.002 - 0.008 |
|                         | Aluminum alloys<br>Si ≥ 13%                           | -                   | First choice            | DS1100       | 330 - 660              | -                        | -             | 0.002 - 0.008 |
|                         | Copper alloys   | -                   | First choice            | KS05F        | 660 - 1650             | -                        | -             | 0.002 - 0.008 |
| S                       | Titanium alloys<br>Ti-6Al-4V, etc.                    | -                   | First choice            | AH130        | 60 - 200               | 0.003 - 0.005            | -             | -             |
|                         |   | -                   | For fracture resistance | AH3225       | 60 - 200               | 0.003 - 0.005            | -             | -             |
|                         | Superalloys<br>Inconel718, etc.                       | -                   | First choice            | AH725        | 60 - 130               | 0.003 - 0.005            | -             | -             |
|                         |   | -                   | For fracture resistance | AH130        | 60 - 130               | 0.003 - 0.005            | -             | -             |
|                         |   | -                   | For wear resistance     | AH120        | 60 - 130               | 0.003 - 0.005            | -             | -             |
| H                       | Hardened steel  | H13, etc.           | 40 - 50 HRC             | First choice | AH725                  | 150 - 230                | 0.002 - 0.003 | -             |
|                         |   | D2, etc.            | 50 - 60 HRC             | First choice | AH725                  | 130 - 220                | 0.002 - 0.002 | -             |

### CAUTIONARY POINT IN MODIFYING CUTTER BODIES

When using inserts with corner radius RE ≥ 0.079" (2 mm), standard cutter bodies have to be modified "R". (Only for TPO11, EPO11, TLS11, ELS11, HPO11)

About roughing type TLS11, ELS11  
From 2nd row onwards, please use insert with RE = 0.016" or 0.031"



| Corner radius RE (in) | The dimension of modifying (in) |
|-----------------------|---------------------------------|
| 0.016 - 0.063         | Unnecessary                     |
| 0.079 - 0.126         | 0.080                           |

## Roughing type TLS11 / ELS11

| ISO      | Workpiece material                                       | Hardness<br>HB | Priority                | Grade  | Cutting speed<br>Vc (sfm) | Feed per tooth: fz (ipt) |               |               |
|----------|--|----------------|-------------------------|--------|---------------------------|--------------------------|---------------|---------------|
|          |  |                |                         |        |                           | MJ                       | MS            | AJ            |
| <b>P</b> | Low carbon steel<br>1018, 1020, 1026, etc.               | < 200          | First choice            | AH3225 | 330 - 820                 | 0.004 - 0.007            | -             | -             |
|          |  | < 200          | For wear resistance     | T3225  | 330 - 820                 | 0.004 - 0.007            | -             | -             |
|          | High carbon steel and<br>alloy steel<br>1045, 4140, etc. | 200 - 300      | First choice            | AH3225 | 330 - 660                 | 0.003 - 0.006            | -             | -             |
|          |  | 200 - 300      | For wear resistance     | T3225  | 330 - 660                 | 0.003 - 0.006            | -             | -             |
|          | Tool steel<br>H13, etc.                                  | 150 - 300      | First choice            | AH3225 | 330 - 660                 | 0.003 - 0.006            | -             | -             |
|          |  | 150 - 300      | For wear resistance     | T3225  | 330 - 660                 | 0.003 - 0.006            | -             | -             |
| <b>M</b> | Stainless steel<br>304SS, 316SS, 17-4 PH, etc.           | -              | First choice            | AH3225 | 330 - 500                 | -                        | 0.003 - 0.006 | -             |
|          |  | -              | For wear resistance     | AH130  | 330 - 500                 | -                        | 0.003 - 0.006 | -             |
| <b>K</b> | Gray cast iron<br>Class 25, Class 30, etc.               | 150 - 250      | First choice            | AH120  | 330 - 820                 | 0.004 - 0.007            | -             | -             |
|          |  | 150 - 250      | For wear resistance     | T1215  | 330 - 820                 | 0.004 - 0.007            | -             | -             |
|          | Ductile cast iron<br>60-40-18, 60-55-06, etc.            | 150 - 250      | First choice            | AH120  | 260 - 660                 | 0.004 - 0.007            | -             | -             |
|          |  | 150 - 250      | For wear resistance     | T1215  | 260 - 650                 | 0.004 - 0.007            | -             | -             |
| <b>N</b> | Aluminum alloys<br>Si < 13%                              | -              | First choice            | DS1100 | 660 - 1640                | -                        | -             | 0.002 - 0.007 |
|          | Aluminum alloys<br>Si ≥ 13%                              | -              | First choice            | DS1100 | 330 - 660                 | -                        | -             | 0.002 - 0.007 |
| <b>S</b> | Titanium alloys<br>Ti-6Al-4V, etc.                       | -              | First choice            | AH130  | 66 - 200                  | -                        | 0.003 - 0.006 | -             |
|          |  | -              | For fracture resistance | AH3225 | 66 - 200                  | -                        | 0.003 - 0.006 | -             |
|          | Superalloys<br>Inconel718, etc.                          | -              | First choice            | AH725  | 66 - 130                  | 0.002 - 0.005            | -             | -             |
|          |  | -              | For wear resistance     | AH130  | 66 - 130                  | 0.002 - 0.005            | -             | -             |
|          |  | -              | For wear resistance     | AH3225 | 66 - 130                  | 0.002 - 0.005            | -             | -             |
|          |  | -              | For wear resistance     | AH3225 | 66 - 130                  | 0.002 - 0.005            | -             | -             |

- To remove excessive chip accumulation use an air blast.
- To avoid built up edge on the cutting edges (aluminum machining), use a water soluble coolant.
- When cutting an interrupted surface or a casted skin, the feed per tooth (fz) should be reduced to the lower recommended value shown in the above table.
- Cutting conditions are limited by machine power, workpiece rigidity and spindle output. When the cutting width, depth or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

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