RS PRO

# Special

E81-5/2011-GBE-

# HDS-Endmills

HARDAL$^{SUPRA}$

\+ Black Panther DN 630$^{+}$

= Increased productivity with low tool cost by means of newly developed cutting material!


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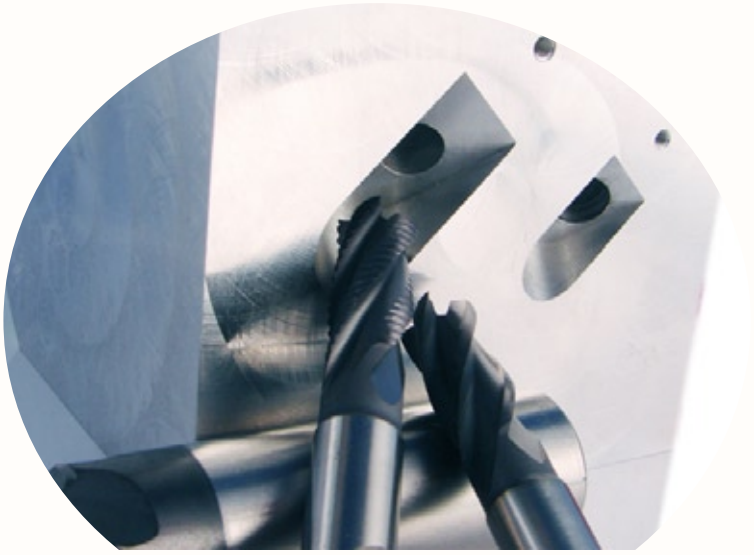
## HDS-Endmills

**These tools are manufactured from a newly developed cutting material HARDAL SUPRA. When used in conjunction with the TiALN based coating DN630+ they are the new high performance alternative to conventional HSS and carbide endmills.**
**The high speed alloy with a hardness of up to 70HRc guarantees an extremely stable cutting edge, the Black Panther coating DN630+ takes care of the necessary heat and oxidation resistance. This combination allows the HDS endmills to show excellent results even when run dry!**



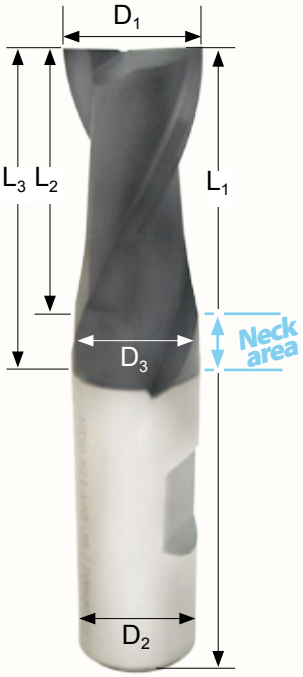
## Features

- *High tensile strength*
- *Extreme oxidation resistance*
- *Very good wear-resistance*
- *Low cost*
- *Suitable for dry cutting*
- *Neck area*
- *Increased feeds*
- *Upper cutting speeds*
- *Heat resistant*
- *Black Panther coating DN 630+*
- *Optimal stability of cutting edges*

# HDS 821 GS Type N

2 flute | 30° | DIN 1835 HB | Type N | DIN 327

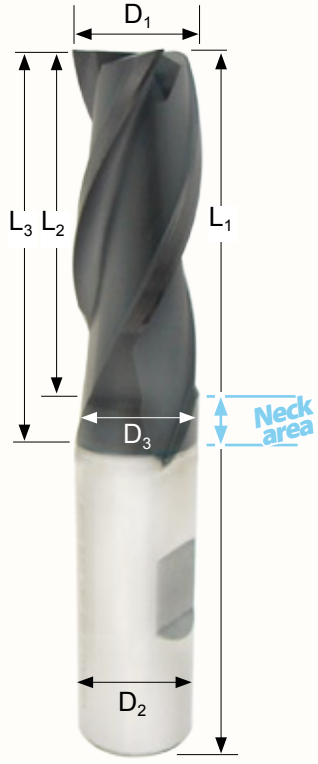
| Part Number | Dimensions ( mm ) | | | | | | |
|---|---|---|---|---|---|---|---|
| | $D_1 e_8$ | $D_2$ | $D_3$ | $L_1$ | $L_2$ | $L_3$ | f |
| HDS 821 030 GS DN 630+ | 3 | 6 | | 49 | 5 | | 2 |
| HDS 821 040 GS DN 630+ | 4 | 6 | | 51 | 7 | | 2 |
| HDS 821 050 GS DN 630+ | 5 | 6 | | 52 | 8 | | 2 |
| HDS 821 060 GS DN 630+ | 6 | 6 | 5,5 | 52 | 8 | 16 | 2 |
| HDS 821 080 GS DN 630+ | 8 | 8 | 7,5 | 55 | 11 | 19 | 2 |
| HDS 821 100 GS DN 630+ | 10 | 10 | 9,0 | 63 | 13 | 23 | 2 |
| HDS 821 120 GS DN 630+ | 12 | 12 | 11,0 | 73 | 16 | 28 | 2 |
| HDS 821 140 GS DN 630+ | 14 | 12 | | 73 | 16 | 28 | 2 |
| HDS 821 160 GS DN 630+ | 16 | 16 | 15,0 | 79 | 19 | 31 | 2 |
| HDS 821 180 GS DN 630+ | 18 | 16 | | 79 | 19 | 31 | 2 |
| HDS 821 200 GS DN 630+ | 20 | 20 | 19,0 | 88 | 22 | 38 | 2 |




# HDS 832 GS Type N

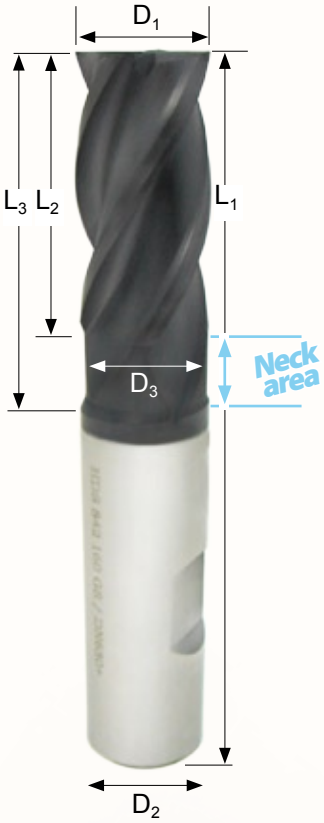
3 flute | 30° | DIN 1835 HB | Type N | DIN 844

| Part Number | Dimensions ( mm ) | | | | | | |
|---|---|---|---|---|---|---|---|
| | $D_1 h_{10}$ | $D_2$ | $D_3$ | $L_1$ | $L_2$ | $L_3$ | f |
| HDS 832 030 GS DN 630+ | 3 | 6 | | 52 | 8 | | 3 |
| HDS 832 040 GS DN 630+ | 4 | 6 | | 55 | 11 | | 3 |
| HDS 832 050 GS DN 630+ | 5 | 6 | | 57 | 13 | | 3 |
| HDS 832 060 GS DN 630+ | 6 | 6 | 5,5 | 57 | 13 | 21 | 3 |
| HDS 832 080 GS DN 630+ | 8 | 8 | 7,5 | 69 | 19 | 33 | 3 |
| HDS 832 100 GS DN 630+ | 10 | 10 | 9,0 | 72 | 22 | 32 | 3 |
| HDS 832 120 GS DN 630+ | 12 | 12 | 11,0 | 83 | 26 | 38 | 3 |
| HDS 832 160 GS DN 630+ | 16 | 16 | 15,0 | 92 | 32 | 44 | 3 |
| HDS 832 200 GS DN 630+ | 20 | 20 | 19,0 | 104 | 38 | 54 | 3 |
| HDS 832 250 GS DN 630+ | 25 | 25 | 24,0 | 121 | 45 | 65 | 3 |



# HDS 842/852 Type N

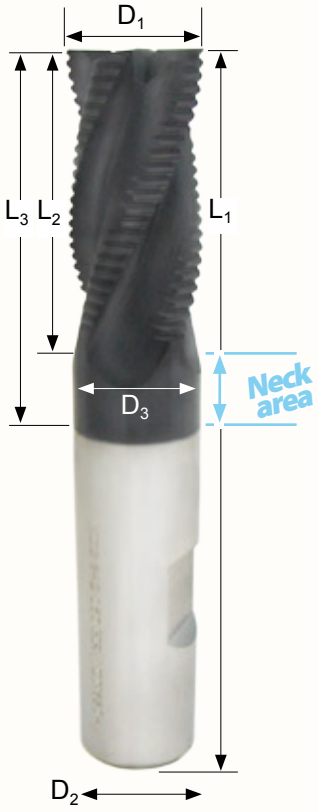
4/5 flute | 30° | DIN 1835 HB | Type N | DIN 844




| Part Number | Dimensions ( mm ) | | | | | | |
|---|---|---|---|---|---|---|---|
| | $D_1 h_{10}$ | $D_2$ | $D_3$ | $L_1$ | $L_2$ | $L_3$ | f |
| HDS 842 030 GS DN 630+ | 3 | 6 | | 52 | 8 | | 4 |
| HDS 842 040 GS DN 630+ | 4 | 6 | | 55 | 11 | | 4 |
| HDS 842 050 GS DN 630+ | 5 | 6 | | 57 | 13 | | 4 |
| HDS 842 060 GS DN 630+ | 6 | 6 | 5,5 | 57 | 13 | 21 | 4 |
| HDS 842 080 GS DN 630+ | 8 | 8 | 7,5 | 69 | 19 | 33 | 4 |
| HDS 842 100 GS DN 630+ | 10 | 10 | 9,0 | 72 | 22 | 32 | 4 |
| HDS 842 120 GS DN 630+ | 12 | 12 | 11,0 | 83 | 26 | 38 | 4 |
| HDS 842 160 GS DN 630+ | 16 | 16 | 15,0 | 92 | 32 | 44 | 4 |
| HDS 842 200 GS DN 630+ | 20 | 20 | 19,0 | 104 | 38 | 54 | 4 |
| HDS 852 250 GS DN 630+ | 25 | 25 | 24,0 | 121 | 45 | 65 | 5 |

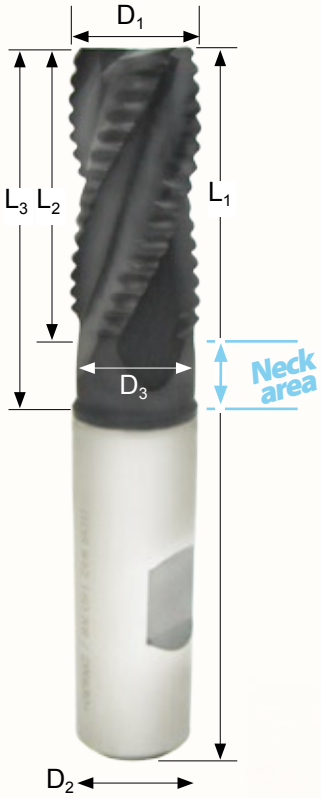
# HDS 842/852 Type HR Fine tooth


| Part Number | Dimensions ( mm ) | | | | | | |
|---|---|---|---|---|---|---|---|
| | $D_1 h_{10}$ | $D_2$ | $D_3$ | $L_1$ | $L_2$ | $L_3$ | f |
| HDS 842 060 HR DN 630+ | 6 | 6 | 5,5 | 57 | 13 | 21 | 4 |
| HDS 842 080 HR DN 630+ | 8 | 8 | 7,5 | 69 | 19 | 33 | 4 |
| HDS 842 100 HR DN 630+ | 10 | 10 | 9,0 | 72 | 22 | 32 | 4 |
| HDS 842 120 HR DN 630+ | 12 | 12 | 11,0 | 83 | 26 | 38 | 4 |
| HDS 842 160 HR DN 630+ | 16 | 16 | 15,0 | 92 | 32 | 44 | 4 |
| HDS 842 200 HR DN 630+ | 20 | 20 | 19,0 | 104 | 38 | 54 | 4 |
| HDS 852 250 HR DN 630+ | 25 | 25 | 24,0 | 221 | 45 | 65 | 5 |



# HDS 842/852 Type NR Coarse tooth

4/5 flute | 30° | DIN 1835 HB | Type NR | DIN 844




| Part Number | Dimensions ( mm ) | | | | | | |
|---|---|---|---|---|---|---|---|
| | $D_1 h_{10}$ | $D_2$ | $D_3$ | $L_1$ | $L_2$ | $L_3$ | f |
| HDS 842 060 NR DN 630+ | 6 | 6 | 5,5 | 57 | 13 | 21 | 4 |
| HDS 842 080 NR DN 630+ | 8 | 8 | 7,5 | 69 | 19 | 33 | 4 |
| HDS 842 100 NR DN 630+ | 10 | 10 | 9,0 | 72 | 22 | 32 | 4 |
| HDS 842 120 NR DN 630+ | 12 | 12 | 11,0 | 83 | 26 | 38 | 4 |
| HDS 842 160 NR DN 630+ | 16 | 16 | 15,0 | 92 | 32 | 44 | 4 |
| HDS 842 200 NR DN 630+ | 20 | 20 | 19,0 | 104 | 38 | 54 | 4 |
| HDS 852 250 NR DN 630+ | 25 | 25 | 24,0 | 121 | 45 | 65 | 5 |

## Cutting Recommendations Type NR, HR

| Material | | Tensile Strength N/mm² | Cutting Speed $v_c$ m/min | Feed $f_z$ *[mm/t]* Diameter [mm] 2 - 3 | 4 - 6 | 8 - 12 | 16 - 25 |
|---|---|---|---|---|---|---|---|
| | Mild Steel, Hardening Steel, Free Cutting Steel | 400 - 700<br>700 - 850<br>< 1000 | 50 - 65<br>45 - 60<br>40 - 55 | 0,002 - 0,004<br>0,002 - 0,003<br>0,001 - 0,002 | 0,01 - 0,013<br>0,006 - 0,01<br>0,004 - 0,008 | 0,02 - 0,03<br>0,015 - 0,025<br>0,01 - 0,018 | 0,035 - 0,05<br>0,03 - 0,04<br>0,02 - 0,03 |
| | Highly Alloyed Steel | < 1200 | 35 - 45 | 0,001 - 0,002 | 0,004 - 0,007 | 0,009 - 0,015 | 0,018 - 0,028 |
| | Stainless Steel | < 850 | 30 - 45 | 0,001 - 0,003 | 0,004 - 0,009 | 0,012 - 0,018 | 0,023 - 0,033 |
| | Cast Iron | < 240 HB<br>< 300 HB | 40 - 55<br>30 - 45 | 0,002 - 0,003<br>0,001 - 0,003 | 0,007 - 0,01<br>0,004 - 0,008 | 0,015 - 0,026<br>0,01 - 0,018 | 0,03 - 0,04<br>0,02 - 0,03 |
| | Titanium Ti-Alloys | < 900<br>< 1200 | 15 - 25<br>10 - 15 | 0,001 - 0,002 | 0,004 - 0,008 | 0,01 - 0,015 | 0,02 - 0,028 |
| | HRSA | 30 - 60 $HR_C$ | | | | | |

$a_e$ = 1,0 X D

## Cutting Recommendations Type N

| Material | | Tensile Strength N/mm² | Cutting Speed $v_c$ m/min | Feed $f_z$ *[mm/t]* Diameter [mm] 2 - 3 | 4 - 6 | 8 - 12 | 16 - 25 |
|---|---|---|---|---|---|---|---|
| | Mild Steel, Hardening Steel, Free Cutting Steel | 400 - 700<br>700 - 850<br>< 1000 | 50 - 65<br>50 - 60<br>40 - 55 | 0,004 - 0,008<br>0,003 - 0,004<br>0,002 - 0,003 | 0,01 - 0,018<br>0,007 - 0,013<br>0,005 - 0,01 | 0,035 - 0,045<br>0,02 - 0,03<br>0,015 - 0,025 | 0,05 - 0,06<br>0,035 - 0,05<br>0,03 - 0,04 |
| | Highly Alloyed Steel | < 1200 | 35 - 40 | 0,001 - 0,003 | 0,005 - 0,009 | 0,014 - 0,021 | 0,025 - 0,035 |
| | Stainless Steel | < 850 | 35 - 45 | 0,003 - 0,004 | 0,006 - 0,013 | 0,015 - 0,025 | 0,03 - 0,04 |
| | Cast Iron | < 240 HB<br>< 300 HB | 40 - 55<br>30 - 50 | 0,002 - 0,005<br>0,002 - 0,003 | 0,008 - 0,012<br>0,007 - 0,01 | 0,02 - 0,03<br>0,015 - 0,026 | 0,03 - 0,05<br>0,03 - 0,04 |
| | Aluminium and -alloys | < 450 | 200 - 250 | 0,005 - 0,01 | 0,013 - 0,025 | 0,03 - 0,04 | 0,05 - 0,07 |
| | Aluminium and -alloys ( > 12% Si) | < 600 | 100 - 150 | 0,003 - 0,007 | 0,01 - 0,015 | 0,025 - 0,035 | 0,05 - 0,06 |
| | Aluminium and -alloys ( > 12% Si) | > 600 | 90 - 120 | 0,006 - 0,01 | 0,015 - 0,025 | 0,03 - 0,045 | 0,04 - 0,05 |
| | Copper, Brass, Bronze | < 850 | 85 - 110 | | | | |
| | Titanium Ti-alloys | < 900<br>< 1200 | 20 - 30<br>10 - 15 | 0,001 - 0,002<br>0,001 - 0,002 | 0,004 - 0,008<br>0,004 - 0,007 | 0,015 - 0,02<br>0,013 - 0,016 | 0,025 - 0,03<br>0,022 - 0,025 |
| | HRSA | 30 - 60 $HR_C$ | 5 - 10 | 0,001 - 0,002 | 0,003 - 0,005 | 0,01 - 0,012 | 0,015 - 0,022 |

$a_e$ = 1,0 X D