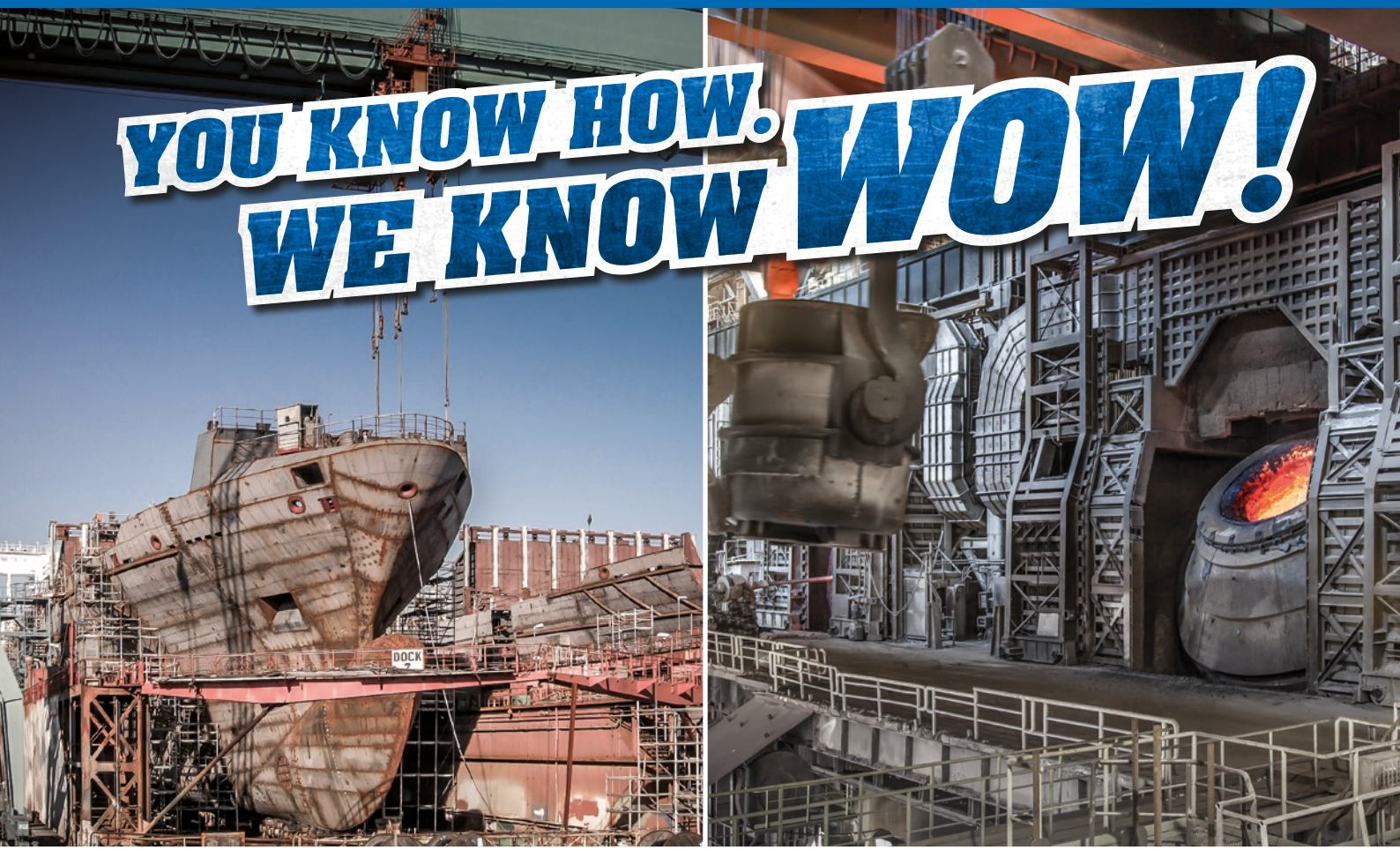
# Tungsten carbide burrs with TOUGH and TOUGH-S cuts

The stock removal experts for tough applications

PFERD





**TRUST BLUE**

- Innovative, very robust high-performance cuts providing exceptional impact resistance
- Minimized damages such as tooth chipping/breakage and splintering
- Also useable in the low rotational speed range

# TC burrs with TOUGH and TOUGH-S cuts
for tough applications

The TOUGH and TOUGH-S cuts have been specially designed for tough operating conditions in dockyards, foundries and steel construction. They are also ideal for use in all manufacturing sectors where, due to the difficult production environment, tooth breakages or other damage to conventional burrs is a frequent occurrence.

## Advantages:

- Innovative, special cuts providing exceptional impact resistance.
- Minimized tooth chipping/breakage, splintering and burr failures due to very robust, high-performance cuts.
- Can also be used at low rotational speeds.
- Due to their extreme impact resistance, they can perfectly be used as long-shank variants.

## Applications:

- High-impact applications when using shank extensions
- Applications with a high angle of surface contact
- Milling of narrow contours
- Applications where high rotational speeds are not available

## Materials that can be worked:

- Cast iron
- Steel
- Cast steel
- The TOUGH and TOUGH-S cuts can be used on materials up to 54 HRC. For harder materials, it is recommended to perform trials beforehand.

## Recommendations for use:

- For the cost-effective use of burrs, work with higher rotational/cutting speeds. Power recommendation for tool drives:
  - Shank diameter of 3 mm: 75 to 300 watts
  - Shank diameter of 6 mm: from 300 watts
- Please observe the rotational speed recommendations.

## Matching tool drives:

- Flexible shaft drive
- Straight grinder

## Sicherheitshinweise:

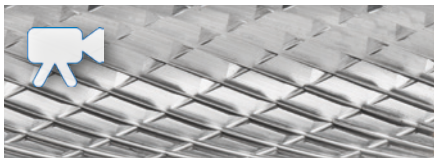
= Wear eye protection!

= Wear hearing protection!

= Wearing protective gloves is recommended. Handle the tool drive with both hands.

= Observe the recommended rotational speed, especially when using burrs with long shanks!

## TOUGH cut



Tungsten carbide burrs with the TOUGH cut are particularly aggressive and are characterized by high stock removal.

## TOUGH-S cut

Tungsten carbide burrs with the TOUGH-S cut are characterized by smooth milling and high stock removal.

## Recommended rotational speed range [RPM]

To determine the recommended cutting speed range [m/min], please proceed as follows:

❶ Select the material group to be machined.
❷ Select the cut.
❸ Establish the cutting speed range.

To determine the recommended rotational speed range [RPM], please proceed as follows:

❹ Select the required burr diameter.
❺ The cutting speed range and the burr diameter determine the recommended rotational speed range.

| ❶ Material group | | | Application | ❷ Cut | ❸ Cutting speed |
|---|---|---|---|---|---|
| Steel, cast steel | Steels up to 1,200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steel, alloyed steels | Coarse stock removal with impact load | TOUGH | 250–600 m/min |
| | | | | TOUGH-S | |
| | Hardened, heat-treated steels over 1,200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steels, cast steel | | TOUGH | 250–350 m/min |
| | | | | TOUGH-S | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL (GG), with nodular graphite/nodular cast iron EN-GJS (GGG), white annealed cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS) | Coarse stock removal with impact load | TOUGH | 250–600 m/min |
| | | | | TOUGH-S | |

**Example:**
TC burr,
TOUGH cut,
burr dia. of 12 mm.
Coarse stock removal with impact load on steels up to 1,200 N/mm².
Cutting speed: 250–600 m/min
**Rotational speed range:**
**7,000–16,000 RPM**

| ❹ Burr dia. [mm] | ❺ Cutting speeds [m/min] | | |
|---|---|---|---|
| | 250 | 350 | 600 |
| | Rotational speeds [RPM] | | |
| 8 | 10,000 | 14,000 | 24,000 |
| 10 | 8,000 | 11,000 | 19,000 |
| 12 | 7,000 | 9,000 | 16,000 |
| 16 | 5,000 | 7,000 | 12,000 |

# TC burrs with TOUGH and TOUGH-S cuts
for tough applications

Tungsten carbide burrs with a long shank are ideal for cost-effectively machining small, hard-to-reach areas on components. Long-shank versions are available with the 3 PLUS, 5, STEEL and TOUGH cuts.

Tungsten carbide burrs with a long shank can be shortened if required.
Tungsten carbide burrs with the designation **GL 75 mm** are made from solid tungsten carbide, which means they can only be shortened using diamond tools.
**GL = total length (solid tungsten carbide)**
**SL = shank length (long steel shank)**

## Safety notes:

Not suitable for robotic or stationary applications. **Risk of bending**. Use only rigid clamping systems/drives.

= Observe the prescribed rotational speed!

## Safety note – maximum rotational speed [RPM] for burrs with long shanks

**When working with long-shank burrs, it is crucial that the burr is in contact with the workpiece (or inserted in the bore or slot to be machined) before the drive system is turned on. As a rule, the tool must remain in contact with the workpiece for as long as the machine is running.** Failure to observe this procedure may result in shank failure (bending) and hence an increased risk of accidents. If continuous contact between the tool and the workpiece is not guaranteed, the ❸ **maximum idling speeds stated in the table must not be exceeded**.

For safety reasons, the maximum application speeds ❷ **with contact with the workpiece** require a reduction in the recommended speed of tungsten carbide burrs with standard shanks. The reduced speeds are stated in the table below.

To determine the recommended rotational speed range [RPM], please proceed as follows:

❶ Select the required burr diameter.
❷ For the maximum application speed [RPM] with contact with the workpiece, please refer to the right-hand side of the table.

**Example:**
TC burr, SL 150 mm,
3 PLUS cut,
burr dia. 12 mm.
Coarse stock removal on steels
up to 1,200 N/mm².
**Maximum application speed with contact with the workpiece: 7,000 RPM**

| ❶ Burr dia. [mm] | ❸ Maximum idling speed [RPM] without contact with the workpiece | | ❷ Maximum application speed [RPM] with contact with the workpiece | |
|---|---|---|---|---|
| | Shank length [mm] | | | |
| | 75 | 150 | 75 | 150 |
| 3 | 10,000 | - | 31,000 | - |
| 6 | 6,000 | 8,000 | 15,000 | 15,000 |
| 8 | - | 6,000 | - | 11,000 |
| 10 | - | 4,000 | - | 9,000 |
| 12 | - | 3,000 | - | 7,000 |

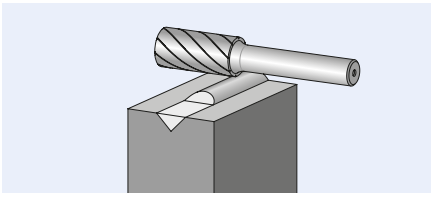
## Extensions for drive spindles

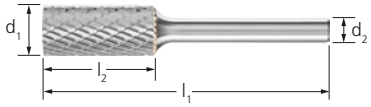
In some applications, drive spindle extensions are an economic alternative to customized burrs with long shanks. For more information please refer to our Tool Manual, catalogue section 9.

# TC burrs with TOUGH and TOUGH-S cuts
for tough applications

## Cylindrical shape ZYA without end cut

Cylindrical burr according to DIN 8032.



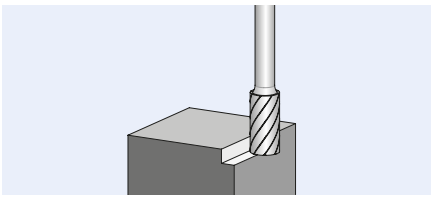


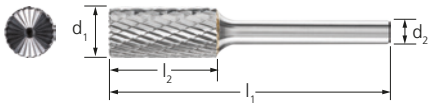

**Ordering notes:**
- Please complete the description with the desired cut.

| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | Cut TOUGH | Cut TOUGH-S | | Description |
|---|---|---|---|---|---|---|---|
| | | | | EAN 4007220 | | | |
| **Shank dia. 6 mm** | | | | | | | |
| 8 | 20 | 6 | 60 | 895504 | - | 1 | ZYA 0820/6 ... |
| 10 | 20 | 6 | 60 | 895658 | - | 1 | ZYA 1020/6 ... |
| 12 | 25 | 6 | 65 | 895665 | 895672 | 1 | ZYA 1225/6 ... |

## Cylindrical shape ZYAS with end cut

Cylindrical burr according to DIN 8032 with circumferential and end cut.






| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | Cut TOUGH | | Description |
|---|---|---|---|---|---|---|
| | | | | EAN 4007220 | | |
| **Shank dia. 6 mm** | | | | | | |
| 8 | 20 | 6 | 60 | 769997 | 1 | ZYAS 0820/6 TOUGH |
| 10 | 20 | 6 | 60 | 770023 | 1 | ZYAS 1020/6 TOUGH |
| 12 | 25 | 6 | 65 | 869109 | 1 | ZYAS 1225/6 TOUGH |
| **Shank dia. 8 mm** | | | | | | |
| 12 | 25 | 8 | 65 | 770054 | 1 | ZYAS 1225/8 TOUGH |

# TC burrs with TOUGH and TOUGH-S cuts
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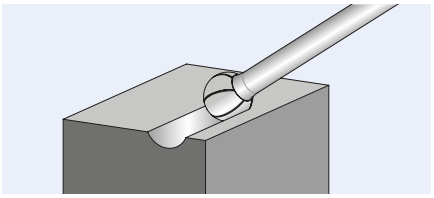
## Ball shape KUD

Ball-shaped burr according to DIN 8032.

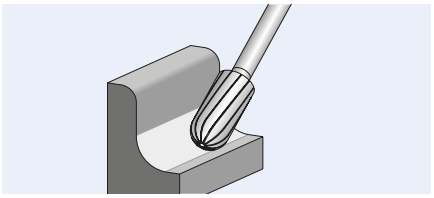



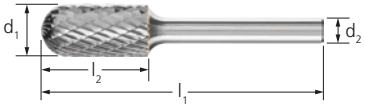
| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | Cut TOUGH EAN 4007220 | | Description |
|---|---|---|---|---|---|---|
| **Shank dia. 6 mm** | | | | | | |
| 8 | 7 | 6 | 47 | 955383 | 1 | KUD 0807/6 TOUGH |
| 12 | 10 | 6 | 51 | 770160 | 1 | KUD 1210/6 TOUGH |

## Cylindrical shape with radius end WRC

Cylindrical burr with radius end according to DIN 8032. Combination of cylindrical and ball-shaped geometries.

SL = shank length (long steel shank)






**Ordering notes:**
- Please complete the description with the desired cut.

**Safety notes:**

= Please observe the reduced rotational speeds for long-shank burrs. They can be found on page 3.

| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | Cut TOUGH | Cut TOUGH-S | | Description |
|---|---|---|---|---|---|---|---|
| | | | | EAN 4007220 | | | |
| **Shank dia. 6 mm** | | | | | | | |
| 8 | 20 | 6 | 60 | 770108 | - | 1 | WRC 0820/6 ... |
| 10 | 20 | 6 | 60 | 770115 | - | 1 | WRC 1020/6 ... |
| 12 | 25 | 6 | 65 | 770122 | 770139 | 1 | WRC 1225/6 ... |
| **Long shank dia. of 6 mm, SL 150 mm** | | | | | | | |
| 12 | 25 | 6 | 175 | 091043 | - | 1 | WRC 1225/6 ... SL 150 |
| **Shank dia. 8 mm** | | | | | | | |
| 12 | 25 | 8 | 65 | 769881 | - | 1 | WRC 1225/8 ... |

# TC burrs with TOUGH and TOUGH-S cuts
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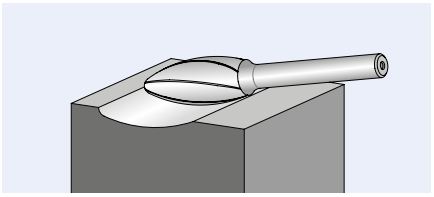
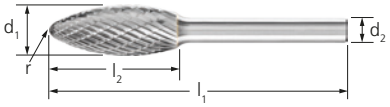
## Flame shape B

Flame-shaped burr according to ISO 7755/8.



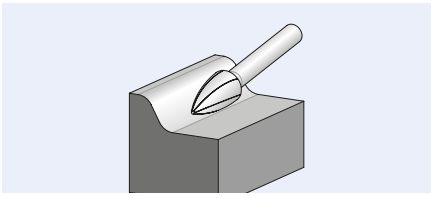


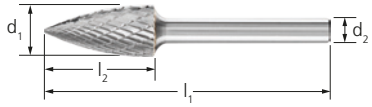

| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | r [mm] | Cut TOUGH EAN 4007220 | | Description |
|---|---|---|---|---|---|---|---|
| **Shank dia. 6 mm** | | | | | | | |
| 8 | 20 | 6 | 60 | 1.5 | 770061 | 1 | B 0820/6 TOUGH |
| 12 | 30 | 6 | 70 | 2.1 | 770085 | 1 | B 1230/6 TOUGH |
| **Shank dia. 8 mm** | | | | | | | |
| 12 | 30 | 8 | 70 | 2.1 | 770092 | 1 | B 1230/8 TOUGH |

## Pointed tree shape SPG

Pointed tree-shaped burr according to DIN 8032, flattened tip.

SL = shank length (long steel shank)






**Ordering notes:**
- Please complete the description with the desired cut.

**Safety notes:**

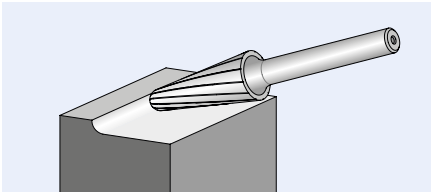
= Please observe the reduced rotational speeds for long-shank burrs. They can be found on page 3.

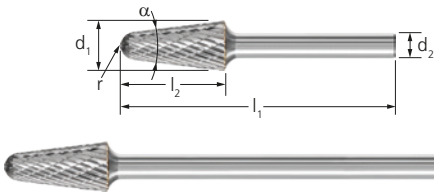
| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | Cut TOUGH | Cut TOUGH-S | | Description |
|---|---|---|---|---|---|---|---|
| | | | | EAN 4007220 | | | |
| **Shank dia. 6 mm** | | | | | | | |
| 10 | 20 | 6 | 60 | 770252 | 770269 | 1 | SPG 1020/6 ... |
| 12 | 25 | 6 | 65 | 770276 | - | 1 | SPG 1225/6 ... |
| **Long shank dia. of 6 mm, SL 150 mm** | | | | | | | |
| 12 | 25 | 6 | 175 | 090930 | - | 1 | SPG 1225/6 ... SL 150 |
| **Shank dia. 8 mm** | | | | | | | |
| 12 | 25 | 8 | 65 | 770283 | - | 1 | SPG 1225/8 ... |

## Conical shape with radius end KEL

Conical burr with radius end according to DIN 8032.

SL = shank length (long steel shank)






**Safety notes:**

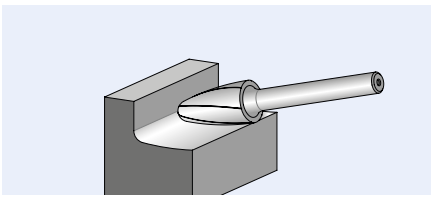
= Please observe the reduced rotational speeds for long-shank burrs. They can be found on page 3.

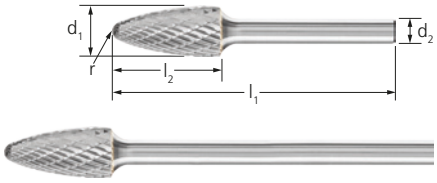
| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | α | r [mm] | Cut TOUGH  EAN 4007220 | | Description |
|---|---|---|---|---|---|---|---|---|
| **Shank dia. 6 mm** | | | | | | | | |
| 12 | 25 | 6 | 65 | 14° | 3.3 | 770320 | 1 | KEL 1225/6 TOUGH |
| **Long shank dia. of 6 mm, SL 150 mm** | | | | | | | | |
| 12 | 25 | 6 | 175 | 14° | 3.3 | 091166 | 1 | KEL 1225/6 TOUGH SL 150 |
| **Shank dia. 8 mm** | | | | | | | | |
| 12 | 25 | 8 | 65 | 14° | 3.3 | 770337 | 1 | KEL 1225/8 TOUGH |

## Tree shape with radius end RBF

Tree-shaped burr with radius end according to DIN 8032.

SL = shank length (long steel shank)






**Ordering notes:**

- Please complete the description with the desired cut.

**Safety notes:**

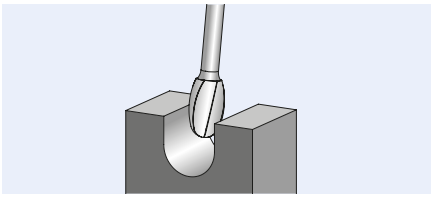
= Please observe the reduced rotational speeds for long-shank burrs. They can be found on page 3.

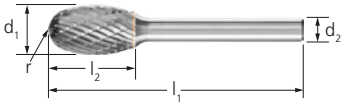
| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | r [mm] | Cut TOUGH  | TOUGH-S  EAN 4007220 | | Description |
|---|---|---|---|---|---|---|---|---|
| **Shank dia. 6 mm** | | | | | | | | |
| 8 | 20 | 6 | 60 | 1.2 | 770191 | - | 1 | RBF 0820/6 ... |
| 10 | 20 | 6 | 60 | 2.5 | 770207 | - | 1 | RBF 1020/6 ... |
| 12 | 25 | 6 | 65 | 2.5 | 770214 | 770238 | 1 | RBF 1225/6 ... |
| 16 | 25 | 6 | 65 | 4.9 | 869116 | - | 1 | RBF 1625/6 ... |
| **Long shank dia. of 6 mm, SL 150 mm** | | | | | | | | |
| 12 | 25 | 6 | 175 | 2.5 | 090947 | - | 1 | RBF 1225/6 ... SL 150 |
| **Shank dia. 8 mm** | | | | | | | | |
| 12 | 25 | 8 | 65 | 2.5 | 770221 | 770245 | 1 | RBF 1225/8 ... |

# TC burrs with TOUGH and TOUGH-S cuts
for tough applications

## Oval shape TRE

Oval burr according to DIN 8032.






| $d_1$ [mm] | $l_2$ [mm] | $d_2$ [mm] | $l_1$ [mm] | r [mm] | Cut TOUGH  EAN 4007220 | | Description |
|---|---|---|---|---|---|---|---|
| **Shank dia. 6 mm** | | | | | | | |
| 10 | 16 | 6 | 56 | 4.0 | 770344 | 1 | TRE 1016/6 TOUGH |
| 12 | 20 | 6 | 60 | 5.0 | 770351 | 1 | TRE 1220/6 TOUGH |

## Set 1712 TOUGH

Set 1712 TOUGH contains five tungsten carbide burrs for tough applications in the most common shapes and dimensions. The sturdy plastic box protects the tools from dirt and damage. The burrs are secured at the shanks, facilitating the selection and withdrawal of the tools. Five further unused slots are available for other burrs.

**Contents:**
5 tungsten carbide burrs,
shank diameter of 6 mm, TOUGH cut
1 piece each:
- WRC 1225/6 TOUGH
- SPG 1225/6 TOUGH
- RBF 1225/6 TOUGH
- KEL 1225/6 TOUGH
- TRE 1220/6 TOUGH


| Cut TOUGH  EAN 4007220 | | Description |
|---|---|---|
| **Shank dia. 6 mm** | | |
| 955635 | 1 | 1712 TOUGH |