# MICRO-FRAISE **Z3** DE FINITION POUR COMPOSANT HORLOGER · **Z3** FINISHING MICRO-END MILL FOR WATCHMAKING COMPONENT · **Z3**-FINISH-MIKROFRÄSER FÜR UHRENKOMPONENTE

**21161T-1** Version 05.11.2026

SWISS MADE

E25 UF
ULTRAFINE GRADE HIGH-END GRADE WITH VERY HIGH HARDNESS AND TOUGHNESS FOR MICRO-MACHINING

λ=32°-38° Y=10°
VARIABLE HELIX ANGLES 32° - 38° AND CUTTING ANGLE 10°

angle vif
SHARP EDGE

SIDE AND CENTER CUT

l1 1.5xD
CUTTING EDGE LENGTH 1.5XD

IRREGULAR TOOTHING

λ2 λ1
VARIABLE HELIX ANGLES

## MATERIAL COMPATIBILITY

●●● Excellent (3/3) ●●○ Good (2/3) ●○○ Possible (1/3) ○○○ Not recommended

Product material compatibility

| CATEGORY | MATERIAL | SPECIFICATION | GRP | 21161T-1 |
|---|---|---|---|---|
| | **Alloyed and non-alloyed steels** Non-alloyed steels | Rm < 450 N/mm² | 1a | ●●● 3/3 |
| | | Rm 450–700 N/mm² | 1b | ●●● 3/3 |
| | | Rm 700–900 N/mm² | 1c | ●●● 3/3 |
| | | Rm > 1200 N/mm² | 1d | ●●● 3/3 |
| | **Stainless steels** Stainless steels | Rm < 650 N/mm² | 2a | ●●● 3/3 |
| | | Rm 650–950 N/mm² | 2b | ●●● 3/3 |
| | | Rm > 950 N/mm² | 2c | ●●● 3/3 |
| | **Hardened steels** Hardened steels | 44–56 HRC | 3a | ●●● 3/3 |
| | | 57–67 HRC | 3b | ●●○ 2/3 |
| | **Exotic materials** Special alloys | < 32 HRC | 4a | ●●● 3/3 |
| | | > 32 HRC | 4b | ●●● 3/3 |
| | **Graphite** Industrial graphite | | 5 | ●●○ 2/3 |
| | **Cast iron** Grey / nodular cast iron | < 32 HRC | 6a | ●●○ 2/3 |
| | | > 32 HRC | 6b | ●●○ 2/3 |
| | **Titanium** Titanium alloys | Rm < 600 N/mm² | 7a | ●●● 3/3 |
| | | 600 < Rm N/mm² | 7b | ●●● 3/3 |
| | **Nickel alloys** Inconel, Hastelloy | Rm < 1000 N/mm² | 8a | ●●● 3/3 |
| | | Rm > 1000 N/mm² | 8b | ●●● 3/3 |
| | **Copper, brass, bronze** Copper-based | Rm < 850 N/mm² | 9a | ●●○ 2/3 |
| | | Rm > 850 N/mm² | 9b | ●●○ 2/3 |
| | **Aluminum** Aluminum alloys | Si < 0.5% | 10a | ●○○ 1/3 |
| | | 0.5% < Si < 5% | 10b | ●○○ 1/3 |
| | | Si > 5% | 10c | ●○○ 1/3 |
| | **Synthetic materials** Engineering plastics | Thermoplastic | 11a | ○○○ 0/3 |
| | | Thermoset | 11b | ○○○ 0/3 |
| | **Composite materials** Reinforced composites | Glass fiber / GFK | 12a | ●●○ 2/3 |
| | | Carbon fiber / KFK | 12b | ●●○ 2/3 |
| | **Precious metals** Gold, platinum, silver | Gold | 13a | ●○○ 1/3 |
| | | Platinum | 13b | ●○○ 1/3 |

## TECHNICAL DRAWING






21161

## DIMENSIONS

| NOMINAL DIMENSIONS | |
|---|---|
| D (0/- 0.01) | 1 mm |
| d (h5) | 3 mm |
| L | 38 mm |
| l1 | 1.5 mm |
| l3 | – |
| d3 | – |
| R | – |
| e | – |
| Z | 3 |
| Chamfer K | - |
| w° collision angle | 10° |

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