# The tangential milling system

# Type B29

## ...made by JONGEN!

## THE TOOL

➢ The new tangential step and face milling system with $a_p$ max = 8mm convinces by a quiet and smooth running of machine, maximum productivity and long tool lives.

## CHARACTERISTICS

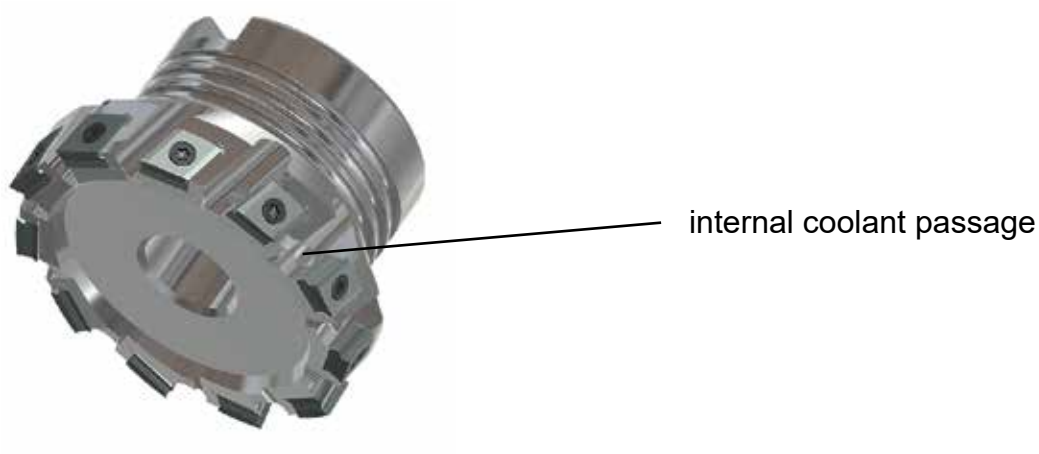
Step and face milling

➢ The positive rake angle and axial angle of inclination enable soft and smooth running of the machine.
➢ The integrated trailing chamfer produces excellent surface quality.

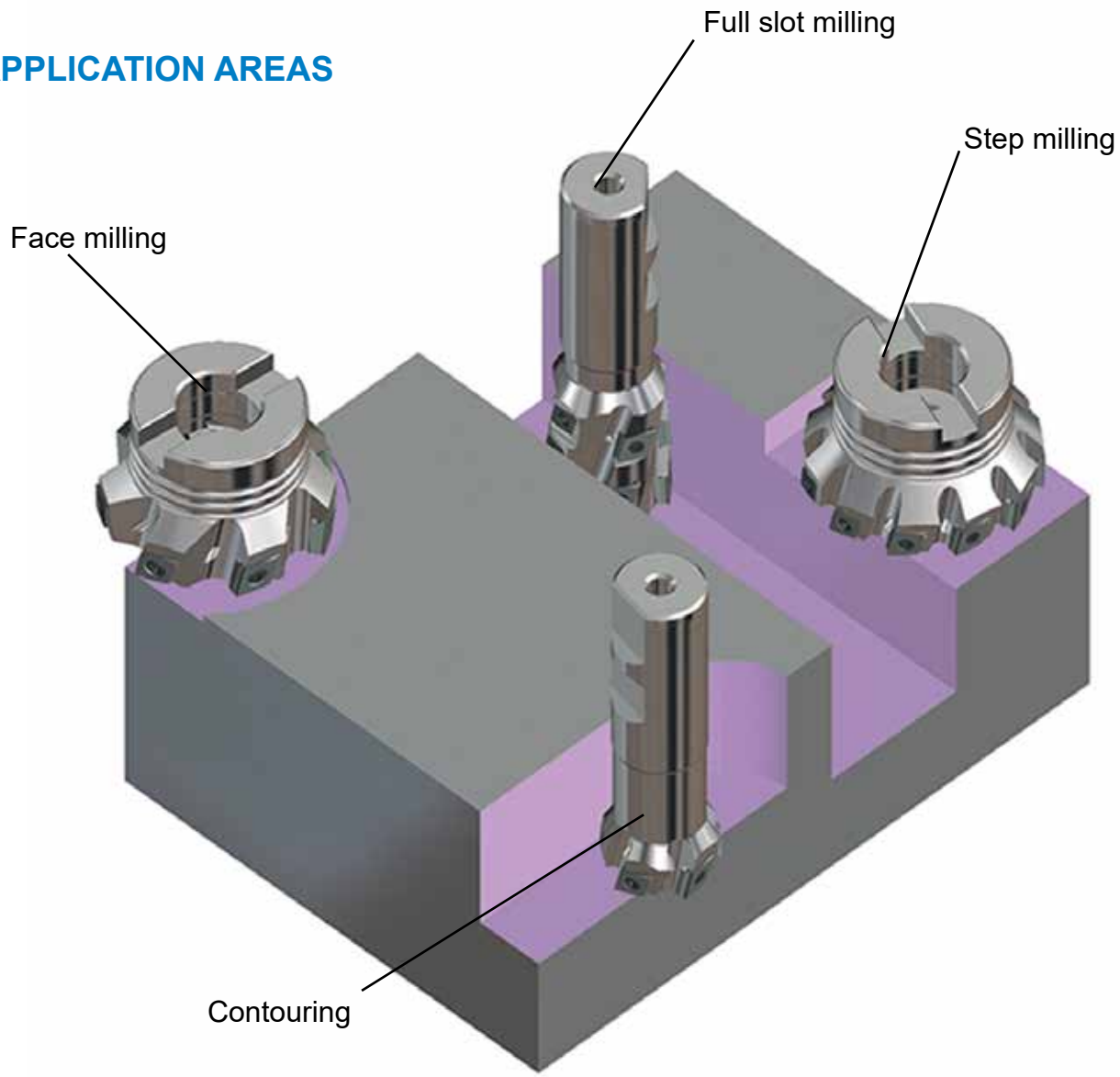
Available types:

- Step-shell type milling cutters made to DIN 8030-A in regular and close pitch, within diameter ranges of 32-80mm
- Shank type milling cutters made to DIN1835-B in regular pitch, within diameter ranges of 25-40mm
- Multi-tooth milling cutter made to DIN1835-B in regular pitch, within diameter ranges of 25-40mm

➢ All tools include internal coolant passages

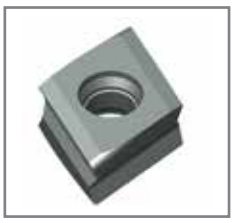



## APPLICATION AREAS



## THE INSERTS

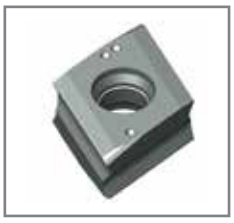
### JMB29-T08GR06



Completely precision ground insert with 4 effective cutting edges. The insert is provided with a positive chip groove and reinforced cutting edge depending on the application type. A stable wedge angle is enabled through additionally applied free-formed surface. The cutting edge is provided with a radius of R0,6 mm and a trailing chamfer.

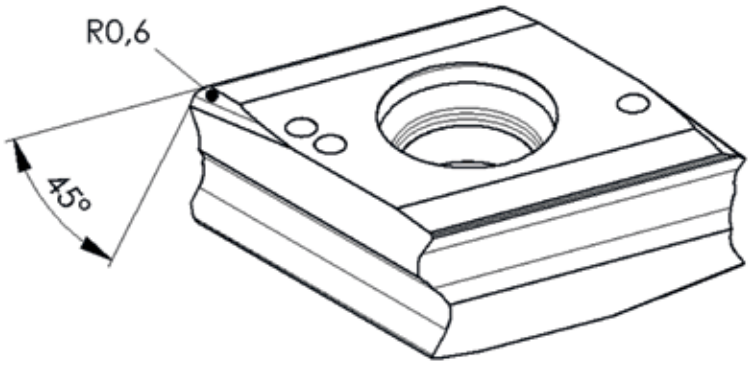
Areas of application: roughing and finishing
all common materials
$a_p$ = max. 8mm

### JMB29-T08PR06



Precision sintered insert, supporting surface ground with 4-effective cutting edges. The insert is provided with a positive chip groove and reinforced cutting edge depending on the application type. A stable wedge angle is enabled through additionally applied free-formed surface. The cutting edge is provided, due to the process-related properties, with a radii-segment and outlet bevel. (see drawing)

Areas of application: roughing
all common materials
$a_p$ = max. 8mm



## Following carbide types are available:

**HC45**

**Code 41, Iso-Classification P30-P35**

Very tough fine grain quality with a thick power nitride coating for middle - high cutting speeds and high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing of almost all steels such as structural steel, tool steel, heat-treatable steel as well as unalloyed, low alloyed and high alloyed steel, and also cast-qualities such as grey cast iron, globular graphite cast iron etc.

**HT32**

**Code 33, Iso-Classification M20-M30**

Hard wearing and tough finest grain carbide with a AlTiN- Nanocomposit-coating for middle – high cutting speeds and middle feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing high grade materials, tool steel and stainless steel.

**HC35**

**Code 50, Iso-Classification M20-M30**

Wear resistant and tough finest grain hard metal quality with power nitride coating for middle cutting speed rates and feed rates. This quality is preferably to be adopted with cooling. Application areas are roughing and finishing of stainless steels and high alloyed materials.

**XC35**

**Code 46, Iso-Classification M20-M30**

Wear resistant and tough finest grain hard metal quality with power nitride coating. This quality is preferably to be adopted for wet machining, however the dry processing is also possible. XC35 has been especially developed for processing stainless steel, duplex steel and high alloyed materials, but also for titanium etc..

**HC20**

**Code 32, Iso-Classification K15-K20**

Very hard wearing fine grain carbide with a AlTiN- Nanocomposit-coating for middle – high cutting speeds with high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing of cast iron materials, e.g. grey-, tempered-, vermicular-, graphite- and globular graphite cast iron.

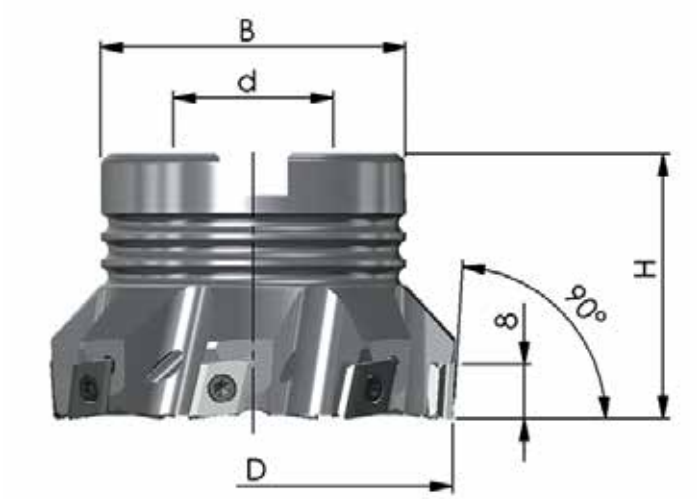
**K15M**

**Code 8, Iso-Classification K10**

Very hard wearing fi ne grain carbide, for high cutting speeds with high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and fi nishing nonferrous metals and aluminium up to a Si-component of approx. 8%.

## TECHNICAL DATA - 90° STEP MILLS

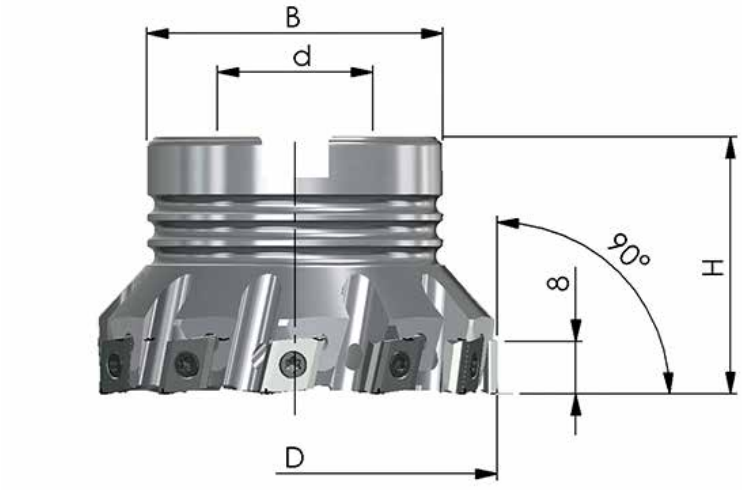
## SHELL TYPE MILLING CUTTERS (DIN 8030-A)




| Order-No. | D | H | d H6 | B | Z | MS |
|---|---|---|---|---|---|---|
| 90PP-032-B29-4 | 32 | 40 | 16 | 30 | 4 | MS-8x25-912 |
| 90PP-040-B29-5 | 40 | 40 | 16 | 38 | 5 | MS-8x25-912 |
| 90PP-050-B29-6 | 50 | 40 | 22 | 46 | 6 | MS-10x25-912 |
| 90PP-063-B29-8 | 63 | 40 | 22 | 46 | 8 | MS-10x25-912 |
| 90PP-080-B29-10 | 80 | 50 | 27 | 58 | 10 | MS-12x35-912 |

**MS= Central Screw**

## SHELL TYPE MILLING CUTTERS (DIN 8030-A) - CLOSE PITCH

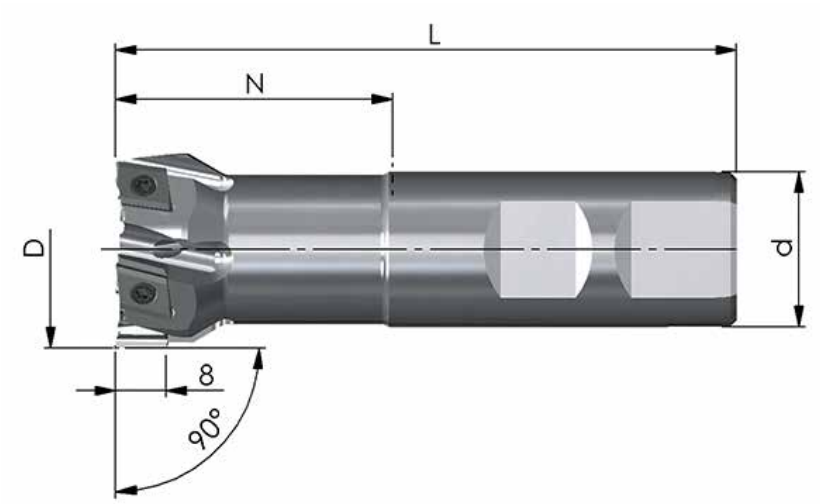



| Order-No. | D | H | d H6 | B | Z | MS |
|---|---|---|---|---|---|---|
| 90PP-032-B29-5 | 32 | 40 | 16 | 30 | 5 | MS-8x25-912 |
| 90PP-040-B29-6 | 40 | 40 | 16 | 38 | 6 | MS-8x25-912 |
| 90PP-050-B29-8 | 50 | 40 | 22 | 46 | 8 | MS-10x25-912 |
| 90PP-063-B29-11 | 63 | 40 | 22 | 46 | 11 | MS-10x25-912 |
| 90PP-080-B29-13 | 80 | 50 | 27 | 58 | 13 | MS-12x35-912 |

**MS= Central Screw**

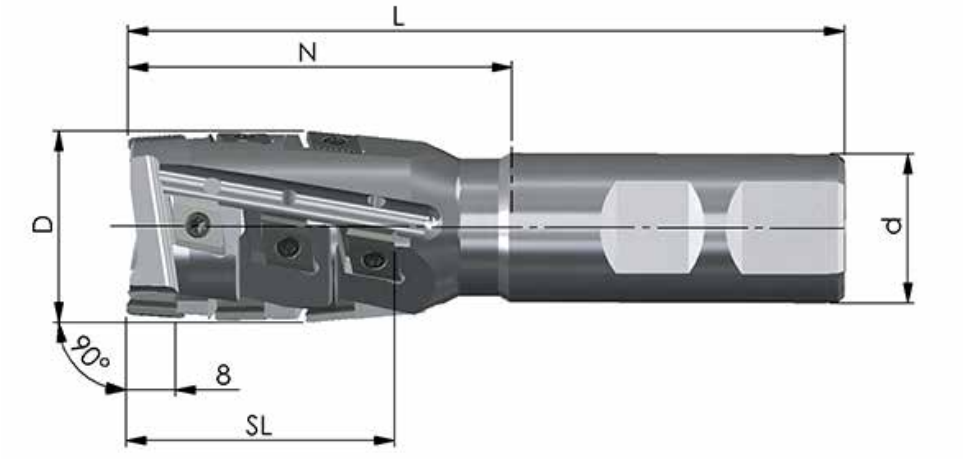
## TECHNICAL DATA - 90° STEP MILLS

## SHANK TYPE MILLING CUTTERS (DIN1835-B / WELDON)




| Order-No. | D | L | N | d h6 | Z |
|---|---|---|---|---|---|
| 90PP-25-44-25-B29-3 | 25 | 100 | 43 | 25 | 3 |
| 90PP-32-44-25-B29-4 | 32 | 100 | 43 | 25 | 4 |
| 90PP-32-44-32-B29-4 | 32 | 104 | 43 | 32 | 4 |
| 90PP-40-44-32-B29-5 | 40 | 104 | 43 | 32 | 5 |

## MULTI-TOOTH MILLING CUTTERS (DIN1835-B / WELDON)




| Order-No. | D | SL | N | L | d h6 | $Z_{eff.}$ | ZZ |
|---|---|---|---|---|---|---|---|
| VZF-25-44-25-B29-2 | 25 | 45 | 63 | 120 | 25 | 2 | 12 |
| VZF-28-44-25-B29-2 | 28 | 45 | 63 | 120 | 25 | 2 | 12 |
| VZF-32-44-25-B29-2 | 32 | 45 | 63 | 120 | 25 | 2 | 12 |
| VZF-32-44-32-B29-2 | 32 | 45 | 59 | 120 | 32 | 2 | 12 |
| VZF-40-44-32-B29-3 | 40 | 45 | 59 | 120 | 32 | 3 | 18 |

## THE INSERTS

| | | | HC45 (code 41) | HC30 (code 52) | HC35 (code 50) | XC35 (code 46) | HC20 (code 53) | K15M (code 8) | |
|---|---|---|---|---|---|---|---|---|---|
|  | **JMB29-T08PR06**<br>IK 8,0x4,0 R0,6 + chamfer | |  |  | | |  | | |
| | | $f_z$ [mm] | 0,15 (0,05-0,25) | 0,15 (0,05-0,25) | | | 0,15 (0,05-0,25) | | |
|  | **JMB29-T08GR06**<br>IK 8,0x4,0 R0,6 | |  | |  |  |  | | |
| | | $f_z$ [mm] | 0,15 (0,05-0,25) | | 0,15 (0,05-0,25) | 0,15 (0,05-0,25) | 0,15 (0,05-0,25) | | |
|  | **JMB29-T08GR02**<br>IK 8,0x4,0 R0,2 | | | | | | |  | |
| | | $f_z$ [mm] | | | | | | 0,20 (0,15-0,25) | |
| | |  | 20 | 20 | 20 | 20 | 20 | 20 | |

**P** Areas of application: roughing

**G** Areas of application: roughing and finishing

## SPARE PARTS

**SS 3,0-2**
(M = 1,7-1,8 Nm)

**T 09**


**100g**

# FURTHER TECHNICAL INFORMATION

## Calculation of rotation number of main spindle:

$$n = \frac{1000 \cdot v_c \ [min^{-1}]}{D \cdot \pi}$$

*n = Rotation number (min-1)*
*Vc = Cutting speed (m/min)*
*D = Diameter of a tool (mm)*

## Feed rate:

$$v_f = f_z \cdot Z \cdot n \ [mm/min]$$

*$V_f$ = Total feed (mm/min)*
*$f_z$ = Feed rate per tooth (mm)*
*Z = Number of teeth*
*n = Rotation number (min-1)*

## Average chip thickness

$$h_m \approx f_z \sqrt{\frac{a_e}{D}} \ [mm] \rightarrow f_z \approx h_m \sqrt{\frac{D}{a_e}} \ [mm]$$

$h_m$ = *Average chip thickness [mm]*
*$f_z$ = Feed rate per tooth (mm)*
*$a_e$ = Radial depth of cut [mm]*
*D = Diameter of a tool (mm)*

## PARAMETERS STEP MILLING + FACE MILLING

| Material | | Hardness | Quality | Depth of cut |
|---|---|---|---|---|
| | | | | $a_e$ [mm] |
| P | Structural steel, Unalloyed steel | <180 HB | HC45 | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| | Tool steel, Heat-treatable steel, Alloyed steel | 180-350 HB | HC45 | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| M | Stainless-steel, High grade steel, High alloyed steel, | <270 HB | HC35 XC35 (HT32) | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| S | Heat-resistant super alloys Titan alloys | | XC35 (HC35) (HT32) | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| H | Tempered steel | 40-55 HRC | HC20 | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| K | Grey cast iron | <800 N/mm² | HC20 | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| | Globular graphite cast iron | <350 N/mm² | HC20 (HC45) | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |
| N | Aluminium Non-ferrous metals | up to 12% Si | K15M | -0,25D |
| | | | | -0,5D |
| | | | | -0,75D |
| | | | | >0,75D-1D |

The above mentioned data are standard values.
Up and down corrections are possible depending on the machine type, tool and holding fixture.

| Cutting speed $v_c$ [m/min.] | Feed rate per tooth $f_z$ [mm] | | |
|---|---|---|---|
| | ø25-32 | ø40+50 | ø63+80 |
| 220 (200-350) | 0,24 (0,09-0,29) | 0,24 (0,09-0,29) | 0,24 (0,09-0,29) |
| | 0,17 (0,12-0,29) | 0,17 (0,05-0,22) | 0,17 (0,02-0,22) |
| | 0,14 (0,04-0,19) | 0,14 (0,04-0,19) | 0,14 (0,04-0,19) |
| | 0,12 (0,04-0,17) | 0,12 (0,04-0,17) | 0,12 (0,02-0,17) |
| 200 (160-280) | 0,20 (0,09-0,29) | 0,20 (0,05-0,25) | 0,20 (0,05-0,25) |
| | 0,14 (0,02-0,19) | 0,14 (0,02-0,19) | 0,14 (0,02-0,19) |
| | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) |
| | 0,10 (0,02-0,15) | 0,10 (0,02-0,15) | 0,10 (0,02-0,15) |
| 160 (100-300) | 0,20 (0,05-0,25) | 0,20 (0,05-0,25) | 0,20 (0,05-0,25) |
| | 0,14 (0,02-0,19) | 0,14 (0,02-0,19) | 0,14 (0,04-0,19) |
| | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) |
| | 0,10 (0,02-0,15) | 0,10 (0,02-0,15) | 0,10 (0,05-0,15) |
| 60 (40-200) | 0,20 (0,05-0,25) | 0,20 (0,05-0,25) | 0,20 (0,10-0,25) |
| | 0,14 (0,02-0,19) | 0,14 (0,02-0,19) | 0,14 (0,04-0,19) |
| | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) |
| | 0,10 (0,02-0,15) | 0,10 (0,02-0,15) | 0,10 (0,00-0,15) |
| 80 (50-120) | 0,10 (0,08-0,15) | 0,10 (0,08-0,15) | 0,10 (0,08-0,15) |
| | 0,07 (0,05-0,12) | 0,07 (0,05-0,12) | 0,07 (0,05-0,12) |
| | 0,06 (0,04-0,11) | 0,06 (0,04-0,11) | 0,06 (0,04-0,11) |
| | 0,05 (0,03-0,10) | 0,05 (0,03-0,10) | 0,05 (0,03-0,10) |
| 250 (180-350) | 0,30 (0,15-0,35) | 0,30 (0,15-0,35) | 0,30 (0,22-0,35) |
| | 0,21 (0,09-0,26) | 0,21 (0,09-0,26) | 0,21 (0,13-0,26) |
| | 0,17 (0,07-0,22) | 0,17 (0,07-0,22) | 0,17 (0,09-0,22) |
| | 0,15 (0,07-0,20) | 0,15 (0,07-0,20) | 0,15 (0,07-0,20) |
| 200 (130-280) | 0,20 (0,05-0,25) | 0,20 (0,05-0,25) | 0,20 (0,05-0,25) |
| | 0,14 (0,02-0,19) | 0,14 (0,02-0,19) | 0,14 (0,06-0,19) |
| | 0,12 (0,02-0,17) | 0,12 (0,02-0,17) | 0,12 (0,04-0,17) |
| | 0,10 (0,02-0,15) | 0,10 (0,02-0,15) | 0,10 (0,02-0,15) |
| 500 (500-1000) | 0,30 (0,15-0,35) | 0,30 (0,15-0,35) | 0,30 (0,15-0,35) |
| | 0,21 (0,09-0,26) | 0,21 (0,09-0,26) | 0,21 (0,06-0,26) |
| | 0,17 (0,07-0,22) | 0,17 (0,07-0,22) | 0,17 (0,02-0,22) |
| | 0,15 (0,07-0,20) | 0,15 (0,07-0,20) | 0,15 (0,00-0,20) |

## NOTES

09/18

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