

Milling tools **AX-RV**

NEW



High-performance milling of aluminium with the new AX-RV tools

AX-RV sets new benchmarks in matters of high-performance milling of aluminium structural components. The product line **AX-RV** was developed by FRAISA in close cooperation with our industry partners.

Thanks to the technological innovations of **AX-RV**, superior results with regard to productivity, cost reduction, quality and process safety can be achieved. Thanks to the comprehensive selection of length, diameter and corner radius designs, already the basic range offers excellent possibilities for an optimisation.

The advantages:

- **Greatest productivity** and minimal machining costs per workpiece
- **Higher process safety:** thanks to less vibrations and a smooth operation
- **Minimal set-up costs and set-up times:** thanks to already balanced tools
- **High level of optimisation:** reduced control checks and longer tool life
- **Improved component quality:** thanks to a process-secure operation and better transitions at infeed depths
- **Clearly structured and easy-to-use range of corner radius end mills**

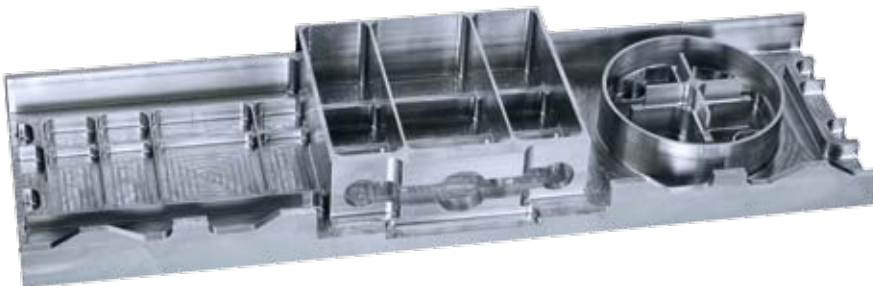


Fig. 1: FRAISA ToolSchool component made from aerospace aluminium 3.4364 (7075)
AX-RV3 3 x d Ø 10; r=1.0 mm / 15583.450

Application data: n=19735 rpm; vf=7400 mm / min; ap up to 8.5 mm; Q up to 370 cm³ / min

AX-RV3 5 x d Ø 10; r=1.0 mm / 15583.450

Application data: n=19735 rpm; vf=5900 mm / min; ap up to 5 mm; Q up to 300 cm³ / min

Machine: Mikron HPM800U; Emulsion, external

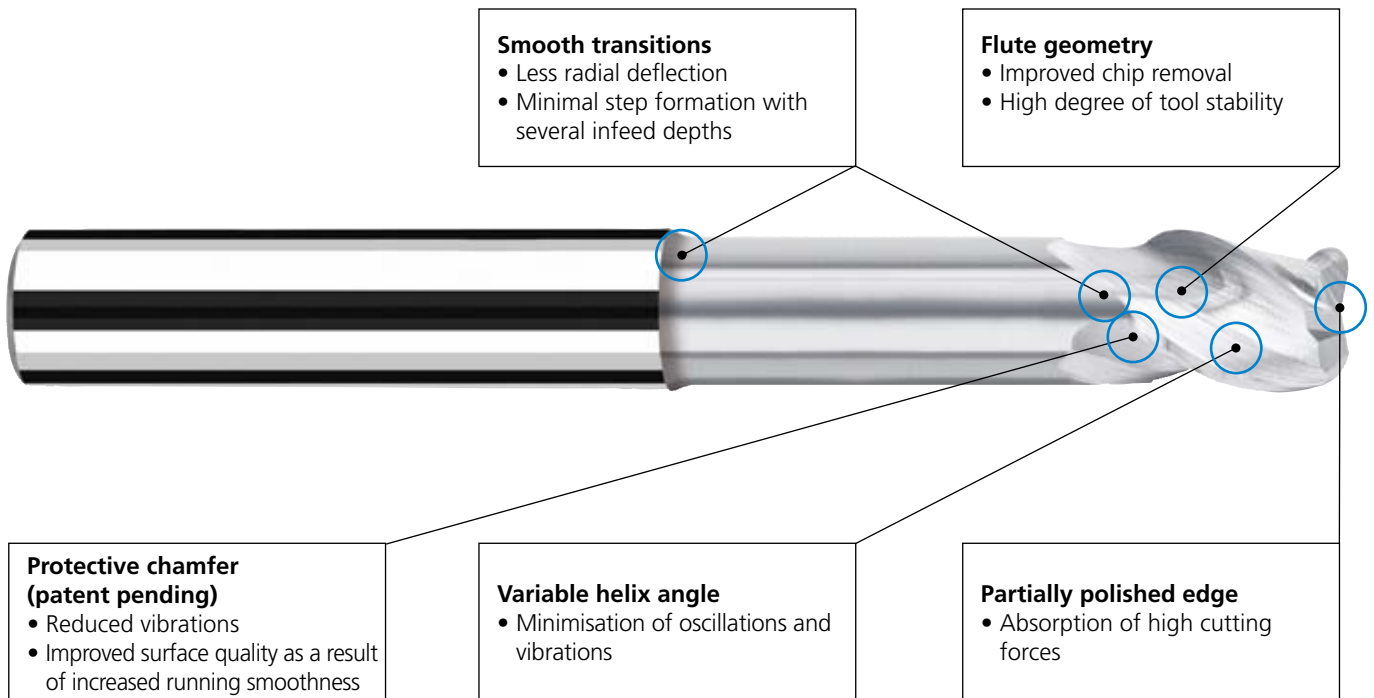


Fig. 2: Technology features of AX-RV

Greatest productivity and minimal machining costs per workpiece

The high capacity of the new **AX-RV** is a result of the above-mentioned technological elements, which are all aligned with one another. As a result, the removal capacity can be at least doubled in a suitable machine environment compared to current standard tools. Thus, machining costs are reduced and the output capacity can be significantly increased.

Higher process safety

The technological elements not only increase the productivity but also the process safety.

Thanks to the stable tool design with vibration-reducing features, the tool is less prone to unfavourable influences during the machining process.

Minimal set-up costs and set-up times

The balancing of fast-rotating aluminium tools is necessary to comply with the quality of balancing required by the spindle manufacturer and to not damage the spindle.

Additionally, non-balanced systems have a negative influence on the surface quality and the process performance.

FRAISA produces all new **AX-RV** series tools in a finely balanced condition with a quality of balancing of G2.5 at n=20,000 rpm or an admissible residual unbalance Uadm <1gmm. The process of balancing for **AX-RV** tools is thus no longer required. As a result, set-up costs are considerably reduced, the handling, safety and reproducibility are distinctively increased, a better surface quality is achieved thanks to an increased running smoothness and the service life of the machine spindle is extended.

Productivity [cm³/min]

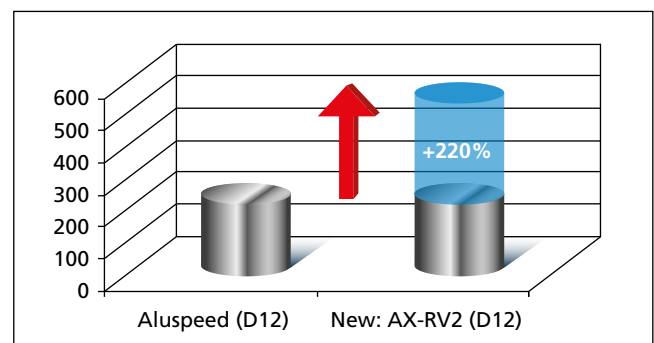


Fig. 3: The cutting performance during the machining of aluminium 7075 for structural components from the field of aviation. Tool diameter of 12 mm, pocket machining.

Reduction in terms of time and costs

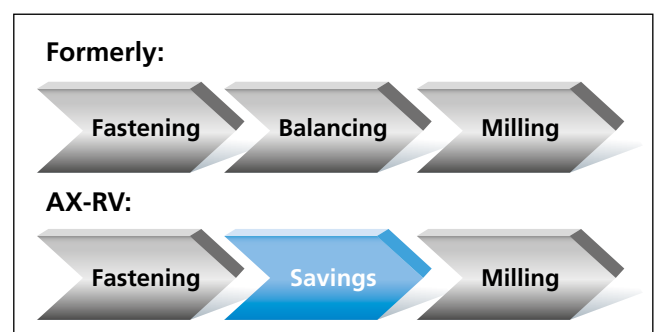


Fig. 4: Savings in terms of costs and time thanks to the fact that the balancing of the tools is no longer required with AX-RV.

Improved component quality

Due to the cutting edge design and the smooth transitions, the new **AX-RV** achieves a better surface quality at a higher performance level. Moreover, the cutting edge end design enables a reduced step formation with several infeed depths.

Example: component quality



Abb. 5: Test workpiece made from aerospace aluminium 7075
 l_3/d_1 ratio up to $5d_1$
 Step formation between two machining levels <0.006 mm
 Surface quality $R_a <0.25$ μm

Clearly structured and easy-to-use range of corner radius end mills:

The **AX-RV** users are offered an extensive standard range with over 270 items in a coated or uncoated version. By means of a clear and simple structure of the l_3/d_1 ratio and the assigned corner radii, it is possible for the customer to effortlessly select the tool.

Diameter to neck length design

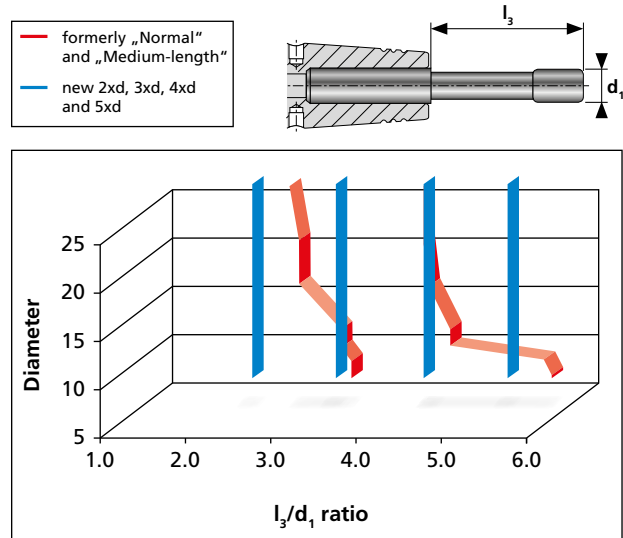


Fig. 6: Constant L/D ratios with AX-RV.

Field of application of AX-RV




The **AX-RV** range is particularly suitable for the manufacture of aluminium structural components for the sector of aviation. Furthermore, all wrought aluminium alloys, but also copper alloys and thermoplastics, can be machined by using **AX-RV**.

| Material desig. EN AW | Material no. EN AW | Aviation Mat. no. | Tensile strength Rm in [N/mm ²] | Yield point Rp0.2 in [N/mm ²] | Elongation A ₅ in [%] |
|-----------------------|--------------------|-------------------|---|---|----------------------------------|
| AlMg1SiCu | 6061 | 3.3214 | 195-315 | 100-255 | 6-18 |
| AlCu4MgSi | 2017 | 3.1324 | 375-410 | 215-275 | 8-14 |
| Al Cu4Mg1(Zr) | 2024/2124 | 3.1354 | 430-490 | 290-360 | 6-12 |
| AlCu2Mg1,5Ni | 2618 | 3.1924 | 390-430 | 305-375 | 3-8 |
| AlZn5,5MgCu | 7075/7175 | 3.4364 | 420-530 | 355-460 | 5-8 |
| AlZn6CuMgZr | 7050/7150 | 3.4144 | 430-500 | 360-440 | 3-9 |

Table 1: Examples for types of aluminium that can be machined perfectly by using AX-RV.

AX-RV range

AX-RV smooth-edged, with corner radius, number of teeth = 2

| | | | | | |
|----------------------------|---|--|-----------------------|------------|-----|
| N°15573 New! |  | Diameter: 6 to 25 mm Radii: 1.0, 2.5, 4.0 | X-Generation X | HM MG10 | 3xd |
| N°15574 New! |  | Diameter: 6 to 25 mm Radii: 1.0, 2.5, 4.0 | X-Generation X | HM MG10 | 4xd |
| N°15575 New! |  | Diameter: 6 to 25 mm Radii: 1.0, 2.5, 4.0 | X-Generation X | HM MG10 | 5xd |

AX-RV smooth-edged, with corner radius, number of teeth = 3

| | | | | | |
|----------------------------|---|---|-----------------------|------------|-----|
| N°15582 New! |  | Diameter: 10 to 25 mm Radii: 2.5, 4.0 | X-Generation X | HM MG10 | 2xd |
| N°15583 New! |  | Diameter: 10 to 25 mm Radii: 1.0, 2.5, 4.0 | X-Generation X | HM MG10 | 3xd |
| N°15584 New! |  | Diameter: 10 to 25 mm Radii: 1.0, 2.5, 4.0 | X-Generation X | HM MG10 | 4xd |
| N°15585 New! |  | Diameter: 10 to 25 mm Radii: 1.0, 2.5, 4.0 | X-Generation X | HM MG10 | 5xd |

FRAISA recommends:

We recommend using different length versions during the component manufacture in order to achieve the most productive cutting process.

This way, the performance of a tool from length group 5 x d₁ can be doubled compared to a tool from length group 3 x d₁.

The number of the cutting edges selected is primarily subject to the machining strategy. High radial and axial infeeds argue in favour of the application of double-edged tools.

Strategies with high feed rates at a low or medium radial and axial infeed argue in favour of three-edged tools. The economically optimal strategy must be determined in accordance with the machine capability, the cooling lubricant supply and optimal chip evacuation.

For detailed application recommendations, please refer to the complete catalogue and our cutting data software ToolExpert.



Where is it possible to ask questions concerning the product?

If you have any question, please send an email to mail.ch@fraisa.com. You may also directly contact our local customer consultant.

The FRAISA application engineers will be happy to advise you.

For further information, please refer to www.fraisa.com

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