



# Surface Finishing of Components for the Aerospace Industry: Walther Trowal Cuts Processing Times for Finishing of Blisks From Several Days to A Few Hours

A new mass finishing system completely eliminates manual operations. For the efficient surface finishing of high value work pieces like blisks for airplane and land-based turbines, Walther Trowal has redesigned its "CM" vibratory system. It ensures that the work pieces receive a uniform, homogeneous high quality finish with absolutely repeatable results. The surface finish of blisks ("Blade Integrated Disks") in airplane and other turbines affects to a large extent the airflow characteristics and,

thus, the overall efficiency, fuel consumption and noise emissions. To date the surface finishing of blisks was done manually with grinding disks and other manually operated tools. Due to the "human factor" the quality of the final finish could greatly vary between work pieces. Frequently, it could even happen that certain surface areas were not finished at all. For the consistent and high quality finishing of circular high value components

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Figure 1: The work bowl of the "CM" rotary vibrator. The shown work piece is a dummy.



Figure 2: In the "CM" rotary vibrator work pieces with a diameter of up to 980 mm can be processed. During the finishing process itself the work bowl is covered with a noise absorbing lid.

Walther Trowal redesigned the rotary vibrator "CM" in close cooperation with leading turbine manufacturers to make it more suitable for treating all kinds of turbine components (Figs 1). The "CM" system allows deburring and general surface improvement of components with diameters of up to 980 mm (Fig. 2). Single work pieces are mounted to the inner dome of the processing bowl. The height of the inner dome itself has

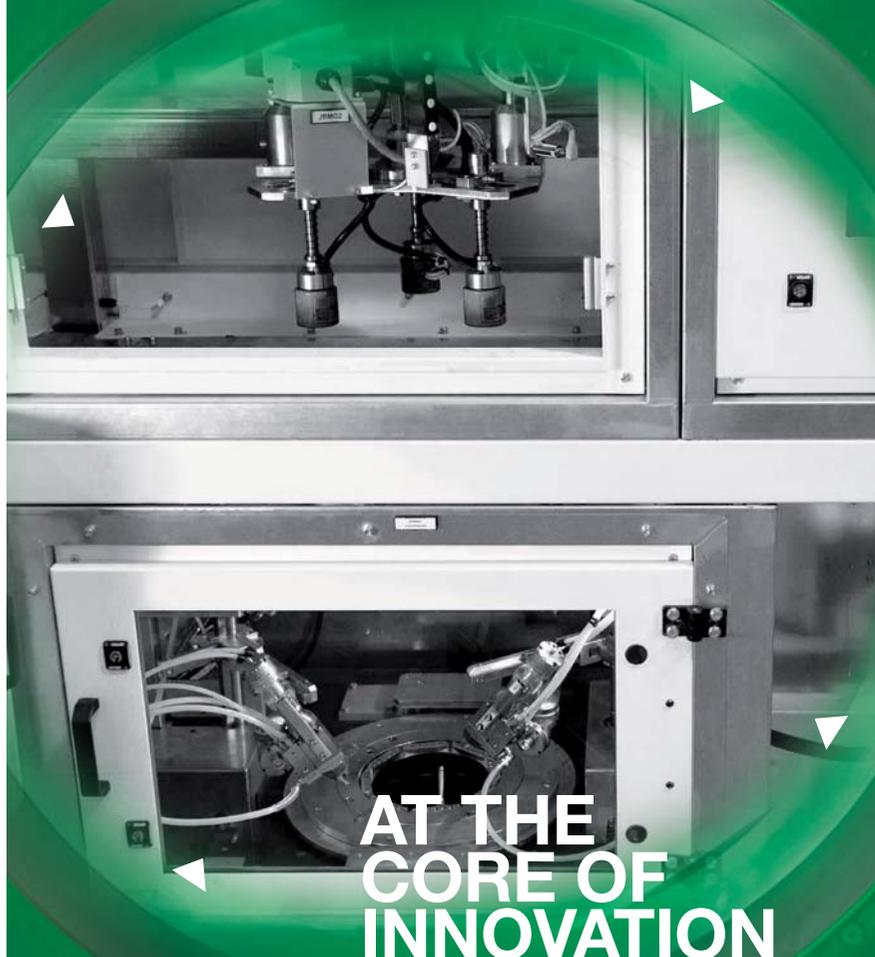
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**Figure 3:** With a diameter of just 1,450 mm the compact rotary vibrator easily fits into any manufacturing environment.

been drastically shortened (**Fig. 3**). After grinding media has been filled into the bowl, a vibratory motor causes the complete work bowl to vibrate. This causes a constant “rubbing” of the media against the fixed work piece. Since the “rubbing” action is highly homogeneous, a uniform, even finish on all surface areas of the disk and blades is achieved. After completion of the process the surface roughness readings amount to  $Ra = 0.2$  to  $0.4 \mu m$ . Starting with an initial surface roughness of  $Ra = 4$  to  $5 \mu m$ , the desired finishing results are achieved within about five to six hours. Compared to this innovative method the manual finishing of blisks can take several days. Christoph Cruse, sales manager at Walther Trowal, is commenting on the special conditions prevailing in the aerospace industry: “Especially for the production of turbine components any manual manufacturing operations must be viewed with great skepticism, because the quality of the work will vary greatly. With our new finishing machine, we have completely eliminated the vagaries of the human factor. And, we can reduce the finishing times for blisks from several days to just a few hours”. For finishing of blisks Walther Trowal is recommending the special finishing media, type V 2030. This media produces very smooth surface finishes on materials and shapes, which are typical for blisks. Of course, the V 2030 media is globally approved for the aerospace industry.

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