

BIG KAISER BALANCING

ACCORDING TO ISO 16084

WHAT DO BALANCING, UNBALANCE AND BALANCE QUALITY MEAN?

BIG KAISER tool holders are designed for high-speed machines. If a rotating tool holder (Fig. 1) is not rotationally symmetrical, imbalance occurs (Fig. 2). As a result, when the rotational speed is increased, non-symmetrical centrifugal forces occur at the tool holder and the cutting tool, causing vibration and premature spindle bearing failure. To correct for the imbalance, the tool is balanced by various methods such as drilling (Fig. 3), milling, or grinding a flat, moving the center of mass as close as possible to the center of the axis of rotation.

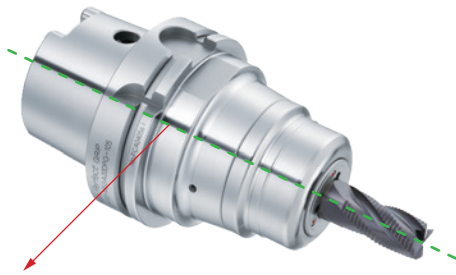


Fig. 1

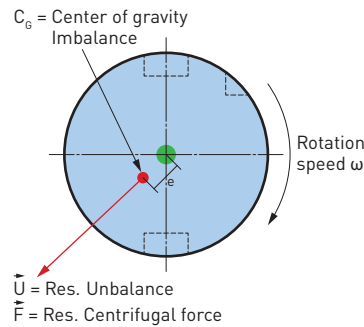


Fig. 2: Unbalanced

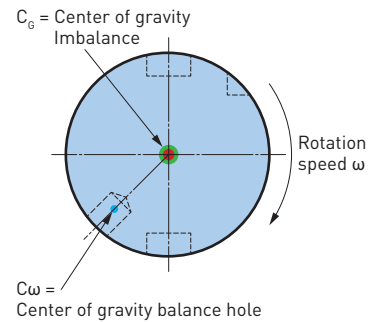


Fig. 3: Balanced

BALANCING REQUIREMENTS IN PRACTICE USING G2.5

The balancing quality G2.5 is widely used in the industry and is described in the ISO 1940-1 standard, issued in 2003. However, this quality class is often overspecified, and, in many cases, not economically or technically feasible, especially when applied to smaller and lighter tools. The standard described above is designed for rigid rotors and is practical in a broader use for balancing. However, it cannot be applied to a complete system of spindles, tool holders and tools adequately and within technical constraints. For example, for a tool to be compliant, it will need to be balanced to less than 1 gmm/kg at a speed of 25,000 rpm, which in turn, corresponds to a mass eccentricity of less than 1 μm . This allowable tolerance is less than the interchange accuracy for even HSK, essentially negating all the cost and time for balancing the tool to such a strict tolerance.

BIG KAISER BALANCING POLICY

For this reason, all BIG KAISER tool holders are balanced according to ISO 16084 (issued in 2017), specifically developed for rotating tool systems. ISO 16084 focuses on the interaction between spindle and tool, factoring in the allowable load on the spindle bearings generated by the tool's imbalance. This load must not exceed 1% of the dynamic load capacity of the spindle bearings. According to ISO 16084, the allowable unbalance tolerance is specified in [gmm], and is not expressed using a special quality grade [G].

In conclusion, BIG KAISER does not indicate any G-values for balancing quality, but rather the maximum rotational speeds of the individual tool holder. The values shown for each item number in our catalog are in compliance with the requirements for standard balance quality according to ISO 16084.

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