

BULLETIN NO. 103

JAN-AIR BALANCING PRACTICES

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ISO Standards

Jan-Air, Inc. follows ISO 1940-1 International Standard for calculating balancing grades for centrifugal fans. The total permissible residual unbalance can be calculated by the following simplified equation:

$$U_{per} = \frac{6.015 \cdot G \cdot W}{N}$$

where 6.015 is a constant, G is the ISO balancing Grade, W is the fan's weight in pounds, and N is the maximum intended operating speed in revolutions per minute. U_{per} is used as the upper limit entirely for single plane corrections, and U_{per} is divided equally to both correction planes for dynamic (two-plane) balancing.

Selection of Balance Grade

An ISO 6.3 Grade will be the most common grade for centrifugal fans, and Jan-Air will commonly use this grade unless a precision balance is specifically requested. In most cases, Jan-Air can offer an ISO 5.0 Grade as a precision balance, and in some instances, levels down to an ISO 2.5 Grade may be possible for select parts. All grades requested below an ISO 6.3 Grade will require special considerations and quotes.

Equipment Used

Jan-Air has three horizontal overhung balancing machines from Hines Industries. A 10-lb, 50-lb, and 100-lb machine provide a large range of options for varying part geometries and weights. Jan-Air uses expanding arbors with 0.0005" T.I.R. repeatability for 1/2" bores and larger, while bores smaller than 1/2" use precision-ground straight shaft arbors with tolerances of +0.0000/-0.0005".

Balancing Clips Used on Forward-Curved Impellers

Jan-Air sources balancing clip weights in both 1050 carbon steel and 410 stainless steel. Carbon steel balancing clips are supplied in both zinc-plated and black-phosphate finishes. Forward-curved (FC) impellers will use clips for balancing corrections. Aluminum FC products will use zinc-plated steel clips unless specified for spark resistance applications or specially requested. Steel FC impellers will normally use zinc-plated carbon steel clips and black-phosphate carbon steel clips will be used on applications that require the clips to be welded in-place after balancing. Aluminum and steel products will normally NOT have welded clips, whereas stainless steel parts WILL normally have welded clips. Special requests can be made as desired by the client to have clips welded or not welded. A weight removal process may be required for fine balancing limits when ultra-light clips are not available.

Balancing Corrections Used on Other Product Categories

Other impeller styles will use "slug" or "washer" style weights on the outside of the front ring and back disk. Weights are resistance-welded in place for steels and stainless steels; weights are riveted in place for aluminum products. Resistance-welded weights can additionally be TIG-welded in place by special request only. Some specialty applications may use self-drilling machine screws as balance correction weights, while other products such as our material handling impellers may use a weight removal process for corrections. Small, fast, and light-weight parts may also require a weight removal process that would be secondary to the weight addition process.