



SURFACE VEHICLE RECOMMENDED PRACTICE

J1986™

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Balance Weight and Rim Flange Design Specifications,
Test Procedures, and Performance Recommendations

RATIONALE

This document is being revised to update types of balance weights found in the market, clarify the test procedures found in 8.4 through Section 9, and identify a minimum for adhesive weight failure mode.

1. SCOPE

This SAE Recommended Practice is intended to serve as a guide for standardization of features, dimensions, and configurations of balance weights for aluminum and steel wheels intended for use on passenger cars, light trucks, and multipurpose vehicles to assure good installation and retention of the balance weight. This document also provides test procedures and minimum performance requirements for testing balance weight retention.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

SAE J393 Nomenclature - Wheels, Hubs, and Rims for Commercial Vehicles

2.1.2 Tire and Rim Association Publications

Available from Tire and Rim Association, Inc., 4000 Embassy Parkway, Suite 390, Akron, OH 44333, www.us-tra.org.

Tire and Rim Association Yearbook

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2.1.3 Other Publications

GMW15851 Adhesively Attached Exterior Trim Component

Reference document for GM 15851 adhesive wet-out can be purchased from Accuris at <https://store.accuristech.com/>.

3. DEFINITIONS

3.1 BALANCE WEIGHT ASSEMBLY

An assembly of the weight and the clip which is intended for mounting on the rim flange to balance the tire/wheel assembly about its axis of rotation and thus minimize vibrations due to the rotation of the tire/wheel assembly.

3.1.1 ADHESIVE WEIGHT

These weights are used to correct imbalance as in 3.1 and are placed on the inner rim diameter behind the spokes and on the inner diameter at a specified location on the inboard surface.

3.1.2 WEIGHT

A specified mass with contours to conform to the surface of the rim flange for clip-on weights. Adhesive weights are a dense mass that can be formed to fit the inner rim diameter.

3.1.3 CLIP

Specially formed metal affixed to the weight to mount the balance weight on the rim flange.

3.1.4 SPUR

An optional part of a clip protruding from its surface interfacing with the rim flange that can enhance retention.

3.1.5 BALANCE WEIGHT COATING

Noncorrosive material coating to prevent corrosion.

3.1.6 BALANCE WEIGHT KEY DIMENSIONS

Dimensions that are essential for fitting the clip-on balance weight on the rim flange.

3.1.7 BALANCE WEIGHT SIZE

The balance weight size is determined by the magnitude of the balance weight mass and is expressed in grams (or ounces).

3.1.8 BALANCE WEIGHT RETENTION FORCE

A static force required to remove the balance weight from the rim flange as set forth in Section 8. A shear force is required to test retention of the adhesive weight at its designated location on the inner rim diameter. To achieve proper retention for the adhesive weight, a "wet-out" of 85% is required as defined in GM Standard GMW15851.

3.1.9 BALANCE WEIGHT RETENTION

The ability of the balance weight to maintain its secure position on the rim flange and at an adhesive weight location during various service conditions on the road as well as in the laboratory.

3.1.10 INTERFERENCE

The measure of clip-on balance weight press fit computed as the difference between the flange thickness and the weight gap. This does not apply to adhesive weights.

3.1.11 For further definitions and descriptions of nomenclature of clip-on balance weights, see Figure 2.

3.1.12 RIM FLANGE

That part of the rim where the clip-on balance weight is mounted.

3.1.12.1 RIM FLANGE KEY DIMENSIONS

Dimensions that are essential for fitting the clip-on balance weight on the rim flange.

3.1.12.2 For further definitions and descriptions of nomenclature of rim flange features, see Figures 3 and 4.

4. BALANCE WEIGHT ASSEMBLY TYPES

Clip-on balance weight types are identified and marked by letter codes (see Table 1). Six different types of clip-on balance weights have been evaluated and recommended for use in the industry: P, C, T, MC, FN, and IAW (see Figure 5). Adhesive weights are not considered to be part of “assembly types.” See Figure 1 for an example of adhesive weights.

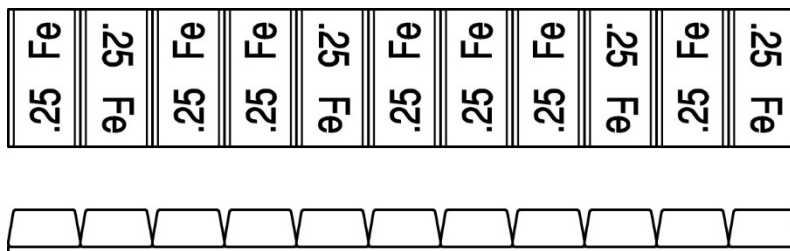


Figure 1 - Adhesive weight example

Table 1 - Typical application chart clip-on balance weight selection

Wheel Rim Type	Weight Type	Weight Gap	Spur Depth	Flange Lip Thickness	Flange Offset
See Figure 8 Steel Rolled Flange and Light Alloy Rolled Flange	C	1.6-2.0	NA	2.0-2.7	10 ± 1.2
	P	2.0-2.4	NA	2.7-3.3	10 ± 1.2
	T	2.7-3.1	NA	3.4-4.6	10 ± 1.2
	MC	4.1-4.5	0.7-1.1	5.0-6.0	10 ± 1.2
See Figure 7 Full Face Light Alloy, Steel, Clad	T	2.7-3.1	NA	3.4-4.6	10 ± 1.2
See Figure 6 Light Alloy Machined	MC	4.1-4.5	0.7-1.1	5.0-6.0	7.6 ± 0.5
	FN	6.5-6.9	NA	6.4-7.5	7 ± 0.5
	IAW	4.8-5.3	NA	5.5-6.5	7 ± 0.5

NOTE: Wheels with flange lip thickness or tolerances outside of the typical ranges may require different flange offsets to meet retention force targets.

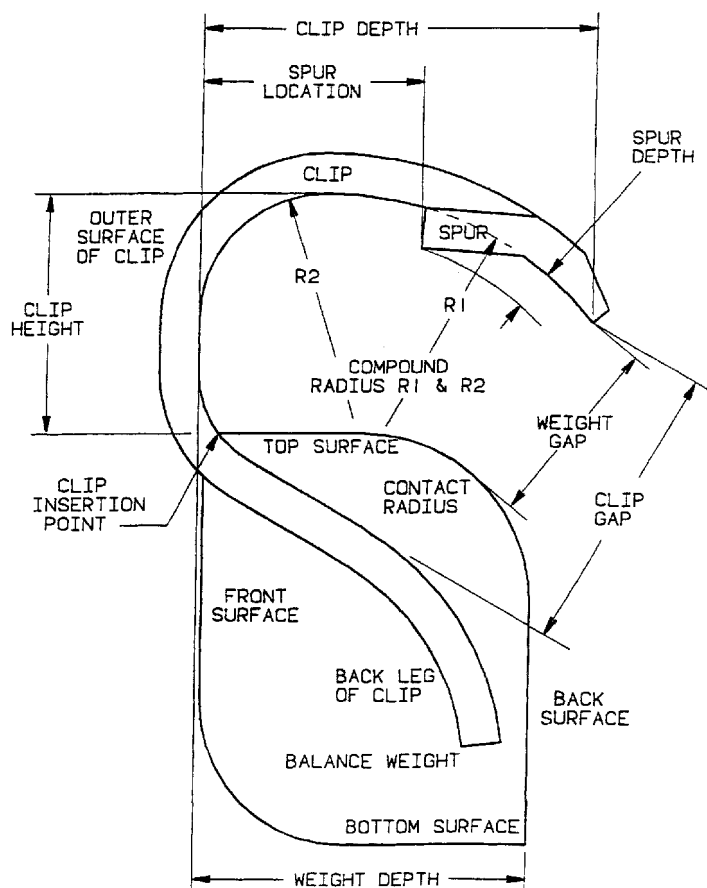
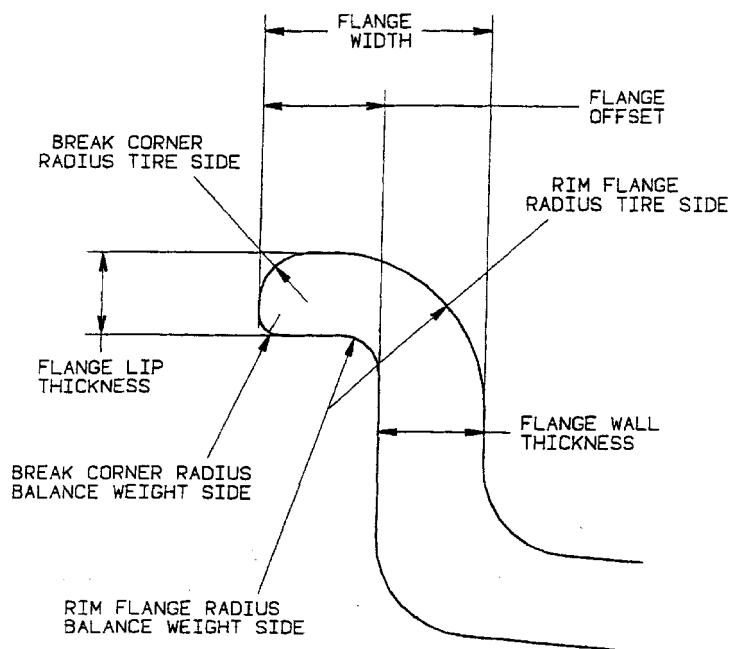


Figure 2 - Balance weight assembly terminology



NOTE:
TERMINOLOGY IS TYPICAL FOR
INBOARD AND OUTBOARD RIM FLANGES

Figure 3 - Machined aluminum wheel rim flange terminology (Type MC)

Documents



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