



SURFACE VEHICLE STANDARD

J2754™

APR2025

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Superseding J2754 APR2019

Volumetric Rating of Excavator Mounted, Bucket Linkage Operated Grapples

RATIONALE

This revision is to correct an error in Equation 6. Additionally, dates were removed from references, and they were reordered.

SAE J2754 has been reaffirmed to comply with the SAE Five-Year Review policy.

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1. SCOPE AND APPLICATION

This standard specifies a procedure for approximating the volume of materials contained in the grapple of bucket linkage operated grapples mounted to excavators. The volume ratings are based on the inside dimensions of the grapple and representative volumes extending beyond the grapple.

The method employs the technique of dividing the complex shape of the material in the grapple into simple geometric forms to allow volume calculations of different grapple configurations.

The rating method is intended to provide a consistent means of comparing grapple capacities. It is not intended to define actual capacities that might be observed in any specific application.

2. REFERENCES

2.1 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Standard.

2.1.1 ISO Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 7451 Earth moving machinery - Volumetric ratings for hydraulic excavator buckets and backhoe loader buckets

ISO 7546 Earth moving machinery - Loader and front-loading excavator buckets - Volumetric ratings

ISO 9248 Earth-moving machinery - Units for dimensions, performance and capacities, and their measurement accuracies

3. RESTRICTIONS AND LIMITATIONS

The effect on volumes of local discontinuities such as tine teeth, tooth adapters, wear components and gussets shall be ignored.

4. DEFINITIONS, SYMBOLS AND TERMINOLOGY

4.1 GRAPPLE COMPONENTS

(See Figure 1.)

4.1.1 Hinge Pin

The pivot pin that connects the upper and lower jaws.

4.1.2 Inner Sheet

The inside face that composes the inside of the jaw.

4.1.3 Lower Jaw

The half of the grapple not attached to the machine's bucket linkage.

4.1.4 Outer Sheet

The sheet that composes the outside of the jaw.

4.1.5 Stiff Link Bracket

The bracket attached to the machine's arm used for attaching the stiff link.

4.1.6 Stiff Link

The link that positions the lower jaw.

4.1.7 Tine Tip

The end of the tine.

4.1.8 Tine

A finger that is that portion of the jaw that interlocks with the opposing jaw.

4.1.9 Upper Jaw

The half of the grapple that is attached to the machine's bucket linkage.

4.1.10 Wear Plate

Plates that are attached to the inner and outer sheets of a grapple expressly as a sacrificial component to accommodate wear and therefore protect the grapple structure.

4.2 OPEN POSITION

The position of the grapple jaws when the host machine's bucket cylinder is fully retracted, or retracted as much as the grapple allows.

4.3 CLOSED POSITION

The position of the grapple jaws when the host machine's bucket cylinder is fully extended, or extended as much as the grapple allows.

4.4 GRAB POSITION

The position of the grapple tines in which the area A_G is maximized.

4.5 RATED GRAPPLE VOLUME V_R

Maximum grapple capacity in the grab position.