



# SURFACE VEHICLE RECOMMENDED PRACTICE

J400™

AUG2022

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Revised 2022-08

Superseding J400 OCT2012

## Test for Chip Resistance of Surface Coatings

### RATIONALE

SAE J400 is being revised to correct some technical errors and to make the standard easier to follow.

#### 1. SCOPE

This SAE Recommended Practice covers a laboratory procedure for testing and evaluating the resistance of surface coating to chipping by gravel impact. The test is designed to reproduce the effect of gravel or other media striking exposed paint or coated surfaces of an automobile. The specific intent of the test is to evaluate organic surface coatings or systems on flat test panels; however, it may be possible to extend this type of testing to finished parts or other types of materials such as anodized aluminum or plated plastics if the results are interpreted with respect to the limitations and intent implied by the original testing procedures and rating system.

This document may involve hazardous materials, operations, and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this document to consult and establish safety and health practices and determine the applicability of regulatory limitations prior to use.

All dimensions are nominal unless otherwise noted.

#### 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: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE Chipping Rating Standards (part number EA-400)

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## 2.2 Related Publications

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

### 2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

Young, T. and Hays, D., "Measurement of Chipping of Automotive Finishes," SAE Technical Paper 680046, 1968, doi:10.4271/680046.

## 3. SUMMARY OF METHOD

The test consists of projecting standardized road gravel by means of a controlled air blast onto a suitable test panel. The testing apparatus is called a gravelometer, designed to contain road gravel, a test panel holder, and a gravel projecting mechanism. The projecting mechanism, located in front of the test panel, consists of an air nozzle in the base of an inverted pipe tee. The stem of the pipe tee points upward and is located beneath a vibrating hopper into which the gravel is poured. The gravel, falling into the air blast, is projected toward and impacts upon the test panel, which is usually held perpendicular to the impinging gravel. All testing is conducted under controlled temperature conditions, generally room temperature (ambient) or  $-29^{\circ}\text{C} \pm 3^{\circ}\text{C}$  ( $-20^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ). After the gravel impact, tape is applied to remove any loose paint chips remaining on the panel, and the degree of chipping is determined by visual comparison with the SAE Chipping Rating Standards<sup>1</sup>, by counting the number and sizes of all chips, or by other methods deemed suitable between the contractual parties involved.

## 4. EQUIPMENT AND MATERIALS

### 4.1 Gravelometer

A gravel projecting test apparatus which is constructed according to the design specifications shown in Figures 1A and 1B.

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<sup>1</sup>Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001—Identified as EA-400.



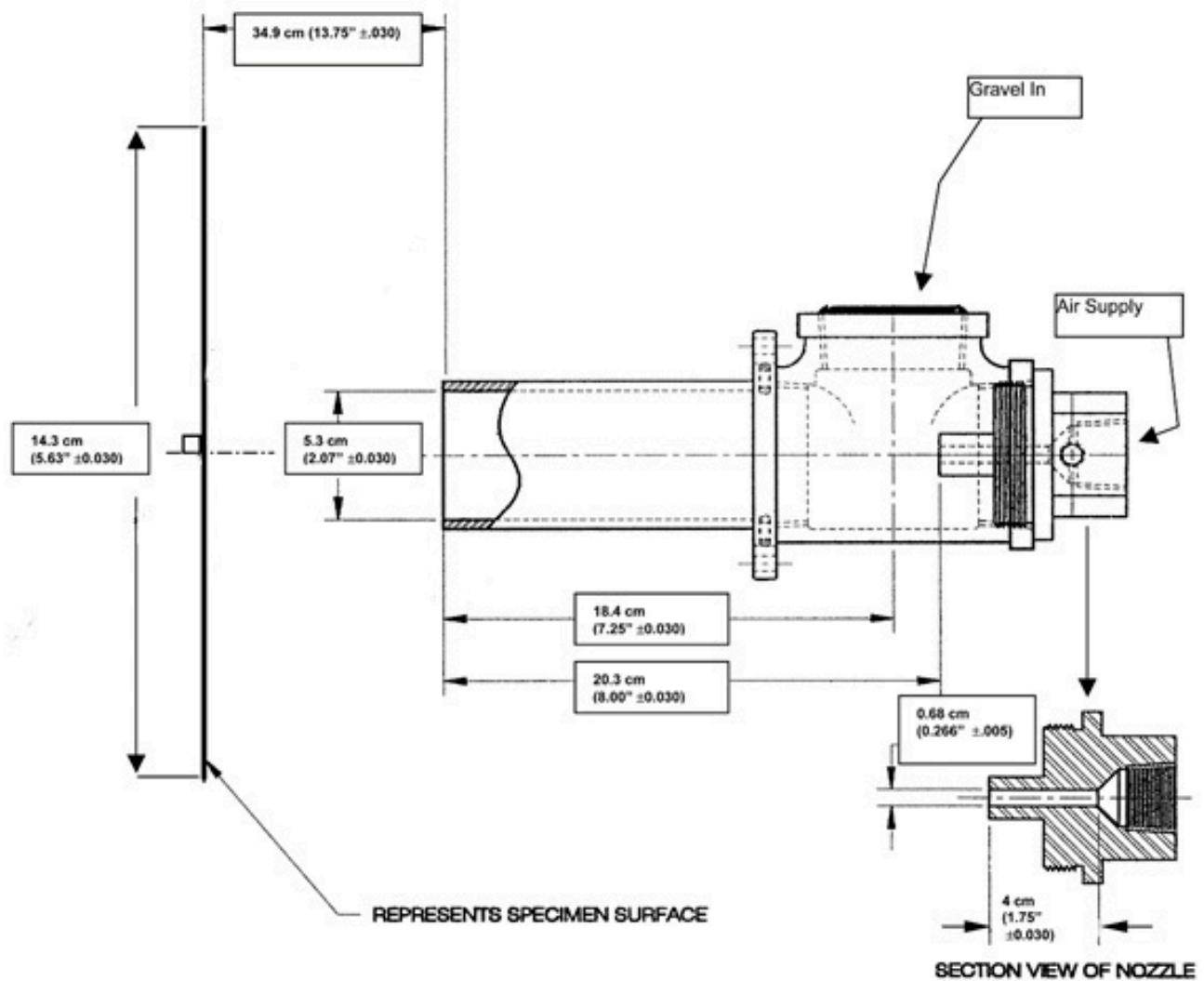


Figure 1A - Test apparatus with 90 degree impingement angle

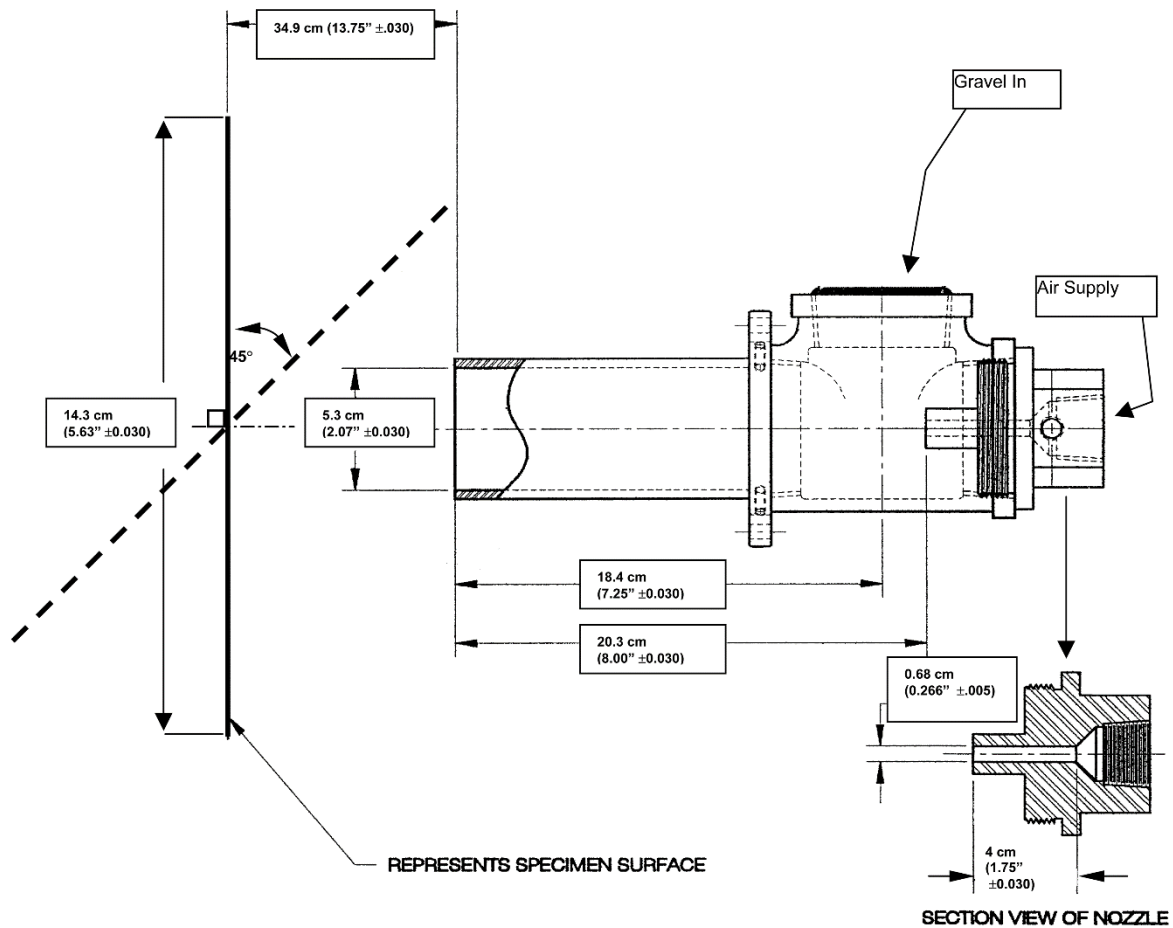


**Figure 1B - Test apparatus showing rotated 45 degree impingement angle**