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# SURFACE VEHICLE DRAFT TECHNICAL REPORT

An American National Standard

SAE J1642

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Committee Draft

## MEDIUM- AND HEAVY-DUTY TRUCK CONVERTER/MUFFLER CONFIGURATION

***Foreword*—**This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

Several factors combined to produce the need for this report. First was the adoption of lower particulate emissions standards beginning in 1994. Second was the identification of catalytic converter technology for particulate reduction. Third is the extreme diversity in the design and manufacturing of catalyst and converters. Fourth is the extreme diversity in the design and manufacturing of vehicle engines, chassis, and exhaust systems.

***1.*** ***Scope*—**This SAE Draft Technical Report is intended to document the technical consensus of the current design state of converter/mufflers for heavy-duty emission classification diesel vehicle applications. This will maximize standardization and promote interchangeability of parts from different manufacturers.

**1.1** **Purpose—**The purpose of this SAE Draft Technical Report is to give the technical community the opportunity to review, comment on, and use the Draft Technical Report prior to its final approval by SAE.

***2.*** ***References***

**2.1** **Applicable Publications—**The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE JXXXX—Diesel Catalytic Converter Nomenclature and Terminology

2.1.2 OTHER PUBLICATION

Federal Register; Title 40; Sec. 86.082-2; Definitions

***3.*** ***Technical Requirements***

**3.1** **Design**

3.1.1 DIMENSIONAL UNITS—The outline dimensions of the unit shall be in SI (metric) units. However, the actual values shall be direct conversion of the existing English dimensions for mufflers. Tooling and gaging will not be changed for metric purposes. This is otherwise known as "soft" Metric.





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3.1.2 DESIGN ENVELOPE—The principle is that the converter/muffler will be identical with the muffler currently used in the application—except for overall length. If another size is necessary, an existing one will be used. This will allow a greater degree of commonization and the use of existing mating hardware for pipes and mounting. Table 1 is a matrix of current muffler characteristics. For additional muffler information, see Appendix A, Table A1, for medium-duty weight class vehicles.

**TABLE 1—NOMINAL MUFFLER DIMENSIONS**

| Cross Section | Nominal Inlet Inside Diameter 89 mm (3.5 in) | Nominal Inlet Inside Diameter 102 mm (4.0 in) | Nominal Inlet Inside Diameter 127 mm (5.0 in) |
|---|---|---|---|
| Oval | | | |
| 210 x 290 mm (8.2 in x 11.5 in) MD | | X | |
| 255 x 380 mm (10 in x 15 in) | | X | X |
| Round | | | |
| 230 mm (9 in) | | X | X |
| 255 mm (10 in) | | X | HD |
| 280 mm (11 in) | | MD | X |
| X - currently used | | | |
| MD - high-volume medium-duty designs | | | |
| HD - high-volume heavy-duty design | | | |

3.1.3 CURRENT MARKET PREFERENCES—At this time, a standard size cannot be established — given packaging, emissions, restriction, and noise requirements. However, Table 1 identifies the current high volume design for medium- and heavy-duty weight class vehicles.

## 3.2 Application Guidelines

3.2.1 MOUNTING—The outline drawing shall identify areas of the converter/muffler that can be used for vehicle mounting. An option is the identification of areas not suitable as a mounting location. Recommended location(s) is desired.

3.2.2 VIBRATION—The converter/muffler will have been designed/tested to a maximum vibration level — generally in the longitudinal axis of the part. This maximum ("g" — long) shall be specified on the outline drawing to allow intelligent application on the truck chassis.

3.2.3 INSTALLATION—The range of pipe length from the turbocharger/manifold outlet to the converter/muffler inlet shall be specified by the engine manufacturer. This will allow proper application in the vehicle chassis. For reference, the current ranges are:

a. MD—0.45 m to 4.1 m
b. HD—1.6 m to 6.5 m

Additional information for specific applications is available in Appendices A and B, Tables A1 and B1.

## *4. Notes*

**4.1 Key Words—**Medium-duty truck, heavy-duty truck, converter/muffler, catalytic converter, particulate, design, dimensions, outline, application, mounting, vibration, installation.

**4.2** This SAE Draft Technical Report represents the current thinking of the sponsoring Technical Committee. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringements arising therefrom, is the sole responsibility of the user.

**4.3** Comments on this Draft are welcome and should be submitted in writing to the Secretary, Technical Standards Board, SAE Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

**4.4** This document shall have a life span of no more than three years from approval which may not be renewed.

PREPARED BY THE SAE ENGINE AFTERTREATMENT STANDARDS COMMITTEE

## APPENDIX A

## 1992 MUFFLER DIMENSIONS AND CONFIGURATIONS FOR MEDIUM-DUTY TRUCKS

### TABLE A1—1992 MUFFLER DIMENSIONS AND CONFIGURATIONS FOR MEDIUM-DUTY TRUCKS

**(ALL DIMENSIONS ARE NOMINAL) (A IS INLET DIAMETER; A AND B ARE ID UNLESS NOTED)**
**(ALL DIMENSIONS ARE BASED IN INCHES BUT ARE EXPRESSED IN MILLIMETERS)**

| Type | A | B | C | D | E | F | G | H | Body |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 102 | 102 | 254 | 1143 | 1295 | | | 76 | ROUND |
| 1 | 102 | 127 | 254 | 1143 | 1295 | | | 76 | ROUND |
| 1 | 102 | 102 | 279 | 914 | 1067 | | | 76 | ROUND |
| 2 | 89 | 102 | 210x292 | 813 | 889 | 64 | 64 | 74 | OVAL |
| 2 | 102 | 102 | 254 | 864 | 1016 | 91 | 62 | 76 | ROUND |
| 2 | 102 | 102 | 279 | 914 | 1067 | 64 | 64 | 74 | ROUND |
| 2 | 102 | 102 | 279 | 914 | 1067 | 64 | 64 | 76 | ROUND |
| 3 | 102 | 102 | 279 | 914 | 1073 | 64 | 64 | 160 | ROUND |
| 3 | 102 | 127 | 254x381 | 1118 | 1194 | 76 | 76 | 76 | OVAL |
| 5 | 102 | 102 | 229 | 1067 | 1143 | 959 | 0 | 76 | ROUND |
| 5 | 102 | 102 | 279 | 914 | 997 | 806 | 64 | 76 | ROUND |
| 7 | 89 | 89 | 254 | 914 | 1000 | 0 | 813 | 79 | ROUND |
| 7 | 102 | 102 | 279 | 762 | 813 | 61 | 630 | 51 | ROUND |
| 7 | 102 | 102 | 279 | 914 | 965 | 64 | 610 | 76 | ROUND |
| 7 | 102 | 102 | 279 | 914 | 991 | 64 | 470 | 76 | ROUND |
| 7 | 102 | 102 | 279 | 914 | 991 | 38 | 191 | 76 | ROUND |
| 7 | 102 | 102 | 279 | 914 | 997 | 64 | 99 | 83 | ROUND |
| 7 | 102 | 102 | 279 | 914 | 1073 | 64 | 813 | 318 | ROUND |
| 7 | 102 | 102 | 210x292 | 737 | 787 | 64 | 602 | 70 | OVAL |
| 8 | 102 | 102 | 229 | 1067 | I = 464 | 108 | 213 | 76 | ROUND |
| 8 | 102 | 102 | 279 | 927 | I = 464 | 108 | 241 | 76 | ROUND |
| 8 | 102 | 102 | 279 | 927 | I = 635 | 108 | 241 | 76 | ROUND |