

**Dimensions and Tolerances for Coolant System Hoses**

1. **Scope**—The purpose of this SAE Recommended Practice is to provide dimensions for both standard and thin-wall hoses and to provide commercial and precision tolerances for SAE 20R3 and SAE 20R4 coolant system hoses.

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

SAE J20—Coolant System Hoses

SAE J2605—Non-Contact Hose Measurement Study 1

3. **Dimensions and Tolerances for SAE 20R3**—Target dimensions and tolerances are shown in Tables 1A through 4B. Contact or non-contact measurement method must be agreed upon by manufacturer and customer. Since expanded ends may cause wall gages to change, O.D.'s and tolerances for the expanded ends must also be agreed upon by the manufacturer and customer. Dimensions and tolerances other than those listed in Tables 1A to 4B must be agreed upon by manufacturer and customer.

**TABLE 1A—STANDARD WALL DIMENSIONS AND COMMERCIAL TOLERANCES FOR SAE 20R3  
Tolerances and Method for Contact Measurement**

| ID<br>mm     | ID<br>Tolerance<br>mm | Target<br>OD <sup>(1)</sup><br>mm | OD<br>Tolerance<br>mm | Reference<br>Wall<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|--------------|-----------------------|-----------------------------------|-----------------------|-------------------------|--|
| 5.0 to <9.0  | ±0.8                  | Maximum ID<br>Plus 7 mm           | ±0.8                  | 3.5                     | 1.0  |
| 9.0 to <25.4 | ±0.8                  | Maximum ID<br>Plus 8 mm           | ±0.8                  | 4.0                     | 1.0  |
| 25.4         | ±0.8                  | 34                                | ±1.2                  | 4.3                     | 1.0  |
| >25.4        | ±0.8                  | Maximum ID<br>Plus 9.9 mm         | ±1.6                  | 4.95                    | 1.0  |

1. The target OD should be measured over a plug gauge equal to the specified maximum ID.

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**TABLE 1B—STANDARD DIMENSIONS AND COMMERCIAL TOLERANCES FOR SAE 20R3**  
Tolerances for Non-Contact Measurement (see SAE J2605)

| ID<br>mm     | ID<br>Tolerance<br>mm | Target<br>Wall Thickness<br>mm | Wall Thickness<br>Tolerance<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|--------------|-----------------------|--------------------------------|-----------------------------------|--|
| 5.0 to <9.0  | ±0.8                  | 3.5                            | ±0.4                              | 1.0  |
| 9.0 to <25.4 | ±0.8                  | 4.0                            | ±0.4                              | 1.0  |
| 25.4         | ±0.8                  | 4.3                            | ±0.6                              | 1.0  |
| >25.4        | ±0.8                  | 4.95                           | ±0.8                              | 1.0  |

**TABLE 2A—STANDARD WALL DIMENSIONS AND PRECISION TOLERANCES FOR SAE 20R3**  
(GENERALLY APPLIED TO WRAPPED MANDREL-BUILT HOSES ONLY)

| ID<br>mm       | ID<br>Tolerance<br>mm | Target<br>OD <sup>(1)</sup><br>mm | OD<br>Tolerance<br>mm | Reference<br>Wall<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|----------------|-----------------------|-----------------------------------|-----------------------|-------------------------|--|
| 5.0 to <9.0    | ±0.5                  | Maximum ID<br>Plus 7 mm           | ±0.5                  | 3.5                     | 1.0  |
| 9.0 and larger | ±0.5                  | Maximum ID<br>Plus 8 mm           | ±0.5                  | 4.0                     | 1.0  |

1. The target OD should be measured over a plug gauge equal to the specified maximum ID.

**TABLE 2B—STANDARD WALL DIMENSIONS AND PRECISION TOLERANCES FOR SAE 20R3**  
(GENERALLY APPLIED TO WRAPPED MANDREL-BUILT HOSES ONLY)  
Tolerances for Non-Contact Measurement (see SAE J2605)

| ID<br>mm       | ID<br>Tolerance<br>mm | Target<br>Wall Thickness<br>mm | OD<br>Tolerance<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|----------------|-----------------------|--------------------------------|-----------------------|--|
| 5.0 to <9.0    | ±0.8                  | 3.5                            | ±0.5                  | 1.0  |
| 9.0 and larger | ±0.8                  | 4.0                            | ±0.5                  | 1.0  |

**TABLE 3A—THIN WALL DIMENSIONS AND COMMERCIAL TOLERANCES FOR SAE 20R3**  
Tolerances and Method for Contact Measurement

| ID<br>mm     | ID<br>Tolerance<br>mm | Target<br>OD <sup>(1)</sup><br>mm | OD<br>Tolerance<br>mm | Reference<br>Wall<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|--------------|-----------------------|-----------------------------------|-----------------------|-------------------------|--|
| 5.0 to <9.0  | ±0.8                  | Maximum ID<br>Plus 6 mm           | ±0.8                  | 3.0                     | 1.0  |
| 9.0 to <25.4 | ±0.8                  | Maximum ID<br>Plus 7 mm           | ±0.8                  | 3.5                     | 1.0  |
| 25.4         | ±0.8                  | 32.4                              | ±1.2                  | 3.5                     | 1.0  |
| >25.4        | ±0.8                  | Maximum ID<br>Plus 7 mm           | ±1.2                  | 3.5                     | 1.0  |

1. The target OD should be measured over a plug gauge equal to the specified maximum ID.

**TABLE 3B—THIN WALL DIMENSIONS AND COMMERCIAL TOLERANCES FOR SAE 20R3**  
Tolerances for Non-Contact Measurement (see SAE J2605)

| ID<br>mm     | ID<br>Tolerance<br>mm | Target<br>Wall Thickness<br>mm | Wall Thickness<br>Tolerance<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|--------------|-----------------------|--------------------------------|-----------------------------------|--|
| 5.0 to <9.0  | ±0.8                  | 3.0                            | ±0.4                              | 1.0  |
| 9.0 to <25.4 | ±0.8                  | 3.5                            | ±0.4                              | 1.0  |
| 25.4         | ±0.8                  | 3.5                            | ±0.6                              | 1.0  |
| >25.4        | ±0.8                  | 3.5                            | ±0.6                              | 1.0  |

**TABLE 4A—THIN WALL DIMENSIONS AND PRECISION TOLERANCES FOR SAE 20R3**  
(GENERALLY APPLIED TO WRAPPED MANDREL-BUILT HOSES ONLY)

| ID<br>mm       | ID<br>Tolerance<br>mm | Target<br>OD <sup>(1)</sup><br>mm | OD<br>Tolerance<br>mm | Reference<br>Wall<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|----------------|-----------------------|-----------------------------------|-----------------------|-------------------------|--|
| 5.0 to <9.0    | ±0.5                  | Maximum ID<br>Plus 6 mm           | ±0.5                  | 3.0                     | 1.0  |
| 9.0 and larger | ±0.5                  | Maximum ID<br>Plus 7 mm           | ±0.5                  | 3.5                     | 1.0  |

1. The target OD should be measured over a plug gauge equal to the specified maximum ID.

**TABLE 4B—THIN WALL DIMENSIONS AND PRECISION TOLERANCES FOR SAE 20R3**  
(GENERALLY APPLIED TO WRAPPED MANDREL-BUILT HOSES ONLY)  
Tolerances for Non-Contact Measurement (see SAE J2605)

| ID<br>mm       | ID<br>Tolerance<br>mm | Target<br>Wall Thickness<br>mm | OD<br>Tolerance<br>mm | Maximum<br>Wall Thickness<br>Variation<br>mm |
|----------------|-----------------------|--------------------------------|-----------------------|--|
| 5.0 to <9.0    | ±0.8                  | 3.0                            | ±0.5                  | 1.0  |
| 9.0 and larger | ±0.8                  | 3.5                            | ±0.5                  | 1.0  |

- 4. Dimensions and Tolerances for SAE 20R4**—Target dimensions and tolerances are shown in 4.1 through 4.4. Measurement method must be agreed upon by manufacturer and customer. Since expanded ends may cause wall gages to change, O.D.'s and tolerances for the expanded ends must also be agreed upon by the manufacturer and customer. Dimensions and tolerances other than those listed in the following paragraph must be agreed upon by manufacturer and customer. Since the wall gage may change due to bends near the end of hoses, the wall gage reported will be the average of 4 readings taken 90 degrees apart.
- 4.1 Standard Wall Dimensions and Commercial Tolerances for SAE 20R4**—The I.D. tolerance is ±0.8 mm for hose sizes smaller than 70 mm and ±1.6 mm for hose sizes 70 mm and larger. The wall gage and tolerance is 4.95 mm ± 0.65 mm (4.3 mm to 5.6 mm) for hose sizes smaller than 50.8 mm and 5.35 mm ± 1.05 mm (4.3 mm to 6.4 mm) for hose sizes 50.8 mm and larger.
- 4.2 Standard Wall Dimensions and Precision Tolerances for SAE 20R4**—The I.D. tolerance is ±0.5 mm for hose sizes smaller than 70 mm and ±1.0 mm for hose sizes 70 mm and larger. The wall gage and tolerance is 4.95 mm ± 0.65 mm (4.45 mm to 5.45 mm) for hose sizes smaller than 50.8 mm and 5.35 mm ± 0.8 mm (4.55mm to 6.15 mm) for hose sizes 50.8 mm and larger.

**4.3 Thin-Wall Dimensions and Commercial Tolerances for SAE 20R4**—The I.D. tolerance is  $\pm 0.8$  mm for hose sizes smaller than 38 mm. The wall gage and tolerance is  $4.0 \text{ mm} \pm 0.6 \text{ mm}$  (3.4 mm to 4.6 mm) for hose sizes smaller than 38 mm. For hose larger than 38 mm, the dimensions and tolerances should be agreed upon between the customer and hose manufacturer.

**4.4 Thin-Wall Dimensions and Precision Tolerances for SAE 20R4**—The I.D. tolerance is  $\pm 0.5$  mm for hose sizes smaller than 38 mm. The wall gage and tolerance is  $4.0 \text{ mm} \pm 0.5 \text{ mm}$  (3.5 mm to 4.5 mm) for hose sizes smaller than 38 mm. For hose larger than 38 mm, the dimensions and tolerances should be agreed upon between the customer and hose manufacturer.

**5. Notes**

**5.1 Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE NON-HYDRAULIC HOSE COMMITTEE

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