

# SURFACE VEHICLE DRAFT TECHNICAL REPORT

Submitted for recognition as an American National Standard

**SAE** J2440

ISSUED  
FEB1998

Issued 1998-02

## Domestic Performance Torque Converter Manufacturing

**Foreword**—The purpose of this Draft Technical Report is to give the technical community the opportunity to review, comment on, and use its content prior to final approval by SAE. Comments on this draft are welcome and should be submitted in writing to Secretary, Technical Standards Board, SAE, 400 Commonwealth Dr., Warrendale, PA 15096-0001.

1. **Scope**—The scope of this SAE Draft Technical Report is to establish dimensional standards for high-performance domestic torque converter manufacturers. Many torque converter manufacturers build converters to their own standards. Some of these standards may be outside of the specifications that define a quality performance torque converter.

1.1 **Purpose**—The purpose of this SAE Draft Technical Report is to establish dimensional standards for the high-performance torque converter aftermarket.

### 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 J641—Hydrodynamic Drives Terminology

SAE J643—Hydrodynamic Drive Test Code

SAE J1087—One-Way Clutches—Nomenclature and Terminology

### 3. Definitions

3.1 **Torque Converter**—A hydrodynamic drive which transmits power with ability to change torque.

3.2 **Impeller**—Designates the power input member. May also be known as the pump.

3.3 **Turbine**—Designates the output member.

3.4 **Reactor**—Designates the reaction member. May also be known as the stator.

3.5 **One-Way Clutch**—See SAE J1087.

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- 3.6 **Lock-Up Torque Converter**—A hydrodynamic torque converter using a clutch to provide a direct mechanical drive.
- 3.7 **Clutch Piston**—A friction element device which mechanically couples the impeller and turbine.
- 3.8 **Damper**—A device that reduces the amplitude of torsional vibration to the output.
- 3.9 **Blade**—Within an element, designates the means of directing fluid. Sometimes referred to as fins.
- 3.10 **Torus Section**—Designates the confines of a flow circuit in a radial plane of a torque converter or fluid coupling.
- 3.11 **Shell**—Designates the outside wall of the torus section in any member.
- 3.12 **Torque Converter Size**—In general terms, designates the maximum diameter of the flow path.
- 3.13 **Hub**—The tubular appendage on the impeller side of the converter. The hub typically drives the transmission pump.
- 3.14 **Hub Slot**—The portion of the hub that drives the transmission pump.
- 3.15 **Pilot**—Designates the part of the converter that locates the converter to the crankshaft centerline.
- 3.16 **Non-Lockup Torque Converter**—A conventional torque converter which does not contain a lockup clutch. Abbreviated as NLU.

4. **Dimensions and Material Standards**

- 4.1 **External Dimensional Standards**—The critical external dimensions are illustrated in Figure 1.

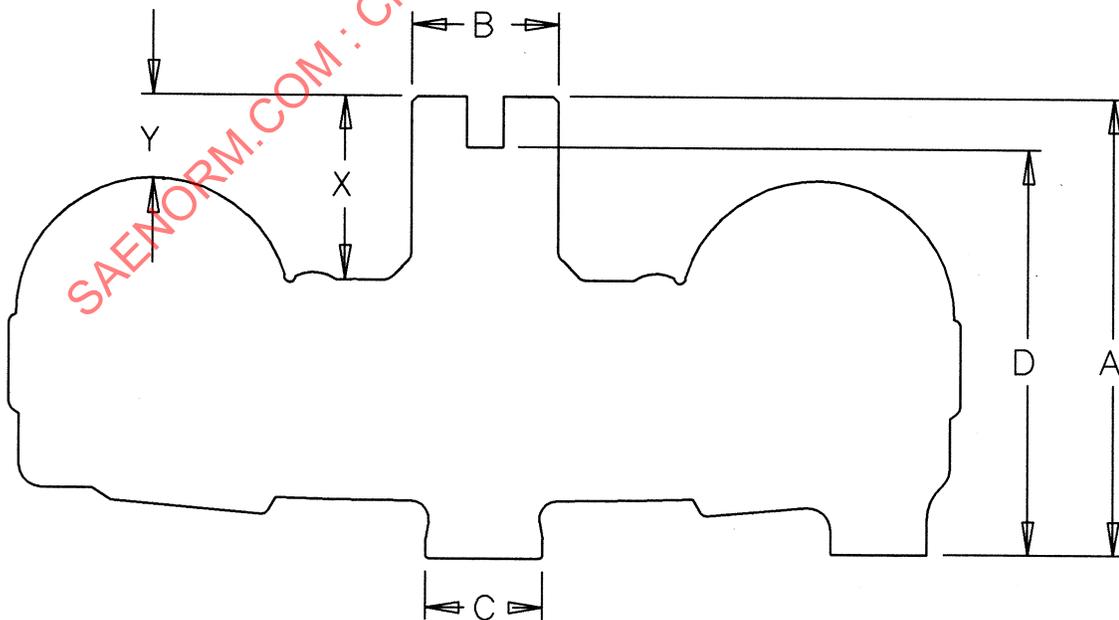


FIGURE 1—TORQUE CONVERTER DIMENSIONS

4.1.1 HUB DIMENSIONS—Hub diameters (designated as B in Figure 1) are given in Table 1.

**TABLE 1—TORQUE CONVERTER HUB DIMENSIONS**

Converter	Lower Limit, cm (in)	Upper Limit, cm (in)
P.G., TH 350, TH 400,727	4.755 (1.872)	4.763 (1.875)
TH2004R, TH700R4	4.432 (1.745)	4.440 (1.748)
Ford Lower Hub	5.060 (1.992)	5.070 (1.996)
Ford Upper Hub	5.034 (1.982)	5.044 (1.986)
904	3.797 (1.495)	3.805 (1.498)

4.1.2 PILOT DIMENSIONS—Pilot diameters, dimension C in Figure 1, are indicated in Table 2.

**TABLE 2—TORQUE CONVERTER PILOT DIMENSIONS**

Torque Converter Type	C, Lower Limit, cm (in)	C, Upper Limit, cm (in)
P.G., TH350, TH400	4.318 (1.700)	4.326 (1.703)
TH2004R, TH700R4	4.318 (1.700)	4.326 (1.703)
Ford Big Block	4.691 (1.847)	4.699 (1.850)
Ford Small Block	3.485 (1.372)	3.493 (1.375)
727, 904	4.590 (1.807)	4.597 (1.810)
904 Early Model	3.929 (1.547)	3.937 (1.550)

4.1.3 OVERALL HEIGHT—Overall converter height, dimension A in Figure 1, are shown in Table 3.

**TABLE 3—TORQUE CONVERTER OVERALL HEIGHT DIMENSIONS**

Converter Type	A, Lower Limit cm (in)	A, Upper Limit, cm (in)
P.G., Turbo	15.54 (6.120)	15.62 (6.150)
2004R, 700R4	14.84 (5.844)	14.92 (5.874)
Pan Fill C-4, C-6, FMX, AOD	14.97 (5.895)	15.05 (5.925)
CF C-4	14.27 (5.620)	14.35 (5.650)
727 NLU	13.72 (5.400)	13.91 (5.475)
904 NLU	13.58 (5.345)	13.65 (5.375)

4.1.4 HUB SLOT WIDTHS AND DEPTHS—Hub slot widths and depths are shown in Table 4.

**TABLE 4—TORQUE CONVERTER HUB SLOT DIMENSIONS**

Application	Width, cm (in) $\pm 0.018$ (0.007)	Depth, cm (in) $\pm 0.038$ (0.015)
Turbo 350, 400, P.G., 700R4 and 2004R Hub	1.021 (0.402)	1.273 (0.501)
TF 727 and 904 Hub	1.016 (0.400)	1.588 (0.625)

- 4.1.5 HUB SLOT DEPTH—On Torqueflite converters, the D dimension as shown in Figure 1 should also be considered. This dimensions is given in Table 5.

**TABLE 5—TORQUEFLITE HUB SLOT DEPTH**

Torque Converter type	D Dimensions Lower Limit, cm (in)	D Dimension Upper Limit, cm (in)
904.727	12.22 (4.810)	12.29 (4.840)

- 4.1.6 HUB LENGTH—Dimension X as shown in Table 6.

**TABLE 6—TORQUE CONVERTER HUB LENGTH**

Converter Type	Hub length, mm (in) ±0.079(0.031)
THUPPR4 10 in S-10	5.72 (2.250)
TH2004R lock-up 11 in P.G.	5.08 (2.000)
All Fords with F-30 hub	5.40 (2.125)
	5.87 (2.313)

- 4.1.7 DIMENSION Y—This hub to converter top dimension should be considered on all Torqueflite converters, to insure that no interference is encountered with the pump. This Dimension is given in Table 7.

**TABLE 7—TORQUE CONVERTER**

Converter type	Dimension Y, cm (in)
11 in Torqueflite 727	25.4 (1.000)
12 in Torqueflite 727	20.6 (0.813)
11 in Torqueflite 904	23.8 (0.938)
10 in Torqueflite 904	25.4 (1.000)
10 in Torqueflite 727	28.6 (1.125)

- 4.1.8 BOLT CIRCLES—See Table 8.

**TABLE 8—TORQUE CONVERTER BOLT CIRCLE**

Converter type	Bolt Circle, cm (in) ±0.040(0.016)
Chrysler	25.40 (10.000)
GM Small	27.31 (10.750)
GM Large	29.21 (11.500)
Ford Mustang II	23.81 (9.375)
Ford Small	26.67 (10.500)
Ford Large	29.05 (11.438)

- 4.1.9 RUNOUT—Runout should be less than 0.025 cm (0.010 in).

## 4.2 Internal Dimensional Standards

4.2.1 FIT OF PILOT BUSHING—0.010 cm to 0.020 cm (0.004 in to 0.008 in) typical.

4.2.2 TURBINE CLEARANCE SPECIFICATIONS—See Table 9.

**TABLE 9—TORQUE CONVERTER TURBINE CLEARANCE**

Torque Converter Nominal Size cm (in)	Turbine Clearance, cm (in)
17.8 (7.0)	0.203 to 0.229 (0.080 to 0.090)
20.3 (8.0)	0.121 to 0.216 (0.075 to 0.085)
22.9 (9.0)	0.229 to 0.254 (0.090 to 0.100)
25.4 to 30.5 (10.0 to 12.0)	0.254 to 0.318 (0.100 to 0.125)

4.2.3 SPLINE LOCATIONS—See Table 10.

**TABLE 10—TORQUE CONVERTER SPLINE LOCATIONS**

Converter Type	Hub to Stator distance, cm (in)	Hub to Turbine Spline, cm (in)
G.M. Powerglide	7.620 (3.000)	11.430 (4.500)
G.M. Turbo 350 and 400	7.747 (3.050)	11.560 (4.550)
G.M. Turbo 200-4R	6.058 (2.375)	9.271 (3.650)
G.M. Turbo 700-R4	6.058 (2.375)	8.636 (3.400)
FORD C-4	8.098 (3.188)	12.065 (4.750)
FORD C-6	8.098 (3.188)	12.065 (4.750)
FORD AOD	8.255 (3.250)	11.557 (4.550)
CHRYLSER 727	7.112 (2.800)	10.287 (4.050)
CHRYLSER 904	7.112 (2.800)	10.668 (4.200)

4.3 Material Standards—See Table 11.

**TABLE 11—TORQUE CONVERTER MATERIALS**

Parts	Material (minimum standards)
Hub	1018 Steel
Turbine Spline	1018 Steel
Inner Race	52100 or 8620 Steel <sup>(1)</sup>
Outer Race	8620 Steel <sup>(1)</sup>
Pilot	1018 Steel <sup>(2)</sup>

1. Requires heat treating
2. Some require heat treating