SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J226 | REV. JUN95

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Submitted for recognition as an American National Standard

(R) ENGINE PREHEATERS

1. ***Scope—***This SAE Standard describes electric immersion engine preheaters for use in the coolant jacket of heavy-duty and intermediate size diesel engines. This document gives the dimensional information on the four basic styles of engine preheaters. The tables for each style will list the wattage commonly used.

Small engines that typically require less than 600 W of preheat for cold weather starting are not covered by this document. These types of engines generally have very little space available to accommodate an immersion heater of the styles presented in this document.

No related ISO standards were found.

1.1 **Purpose—**The purpose of this document is to establish commonality of engine preheater designs. The user of this document can use these current styles and wattages early on in their designing. This will give the user of this document a good engine preheater design.

2. ***References—***There are no referenced publications specified herein.

3. ***Electric Immersion Heater Types***

3.1 **Straight Adapter Type—**This type is designed for installation through castings, plates, or core plugs. The assembly is held in place in the casting, plate, or core plug by way of a hex nut and suitable gaskets. The grounded type power supply cord is secured to the heater assembly in a manner acceptable with current electrical standard practices. See Figure 1 and Table 1.

3.2 **Threaded Bushing Type—**This type is designed to fit and seal in an existing threaded opening within the coolant jacket of the engine. See Figure 2 and Table 2. The threaded bushing can be of any thread design as long as it is large enough to accommodate the loop dimension of the heating element. Typical are bushings with pipe threads or straight threads with O-ring seals. Where the threaded bushing is screwed into a removable flange, the heating element may be shaped as shown in Figure 1.

3.3 **Core Plug Type—**This type is designed to fit an existing core plug opening in the engine coolant system. There are two types of these heaters. One type is held in place and seals using a press fit into the core plug opening. The second type is held in place using a locking mechanism that tightens up to the inside walls or core plug opening of the engine block coolant chamber, adjacent to the core plug opening. Sealing is accomplished with an O-ring on the side walls of the core plug opening.

See Figure 3. Table 1 applies to heating element design and cordset attachment.

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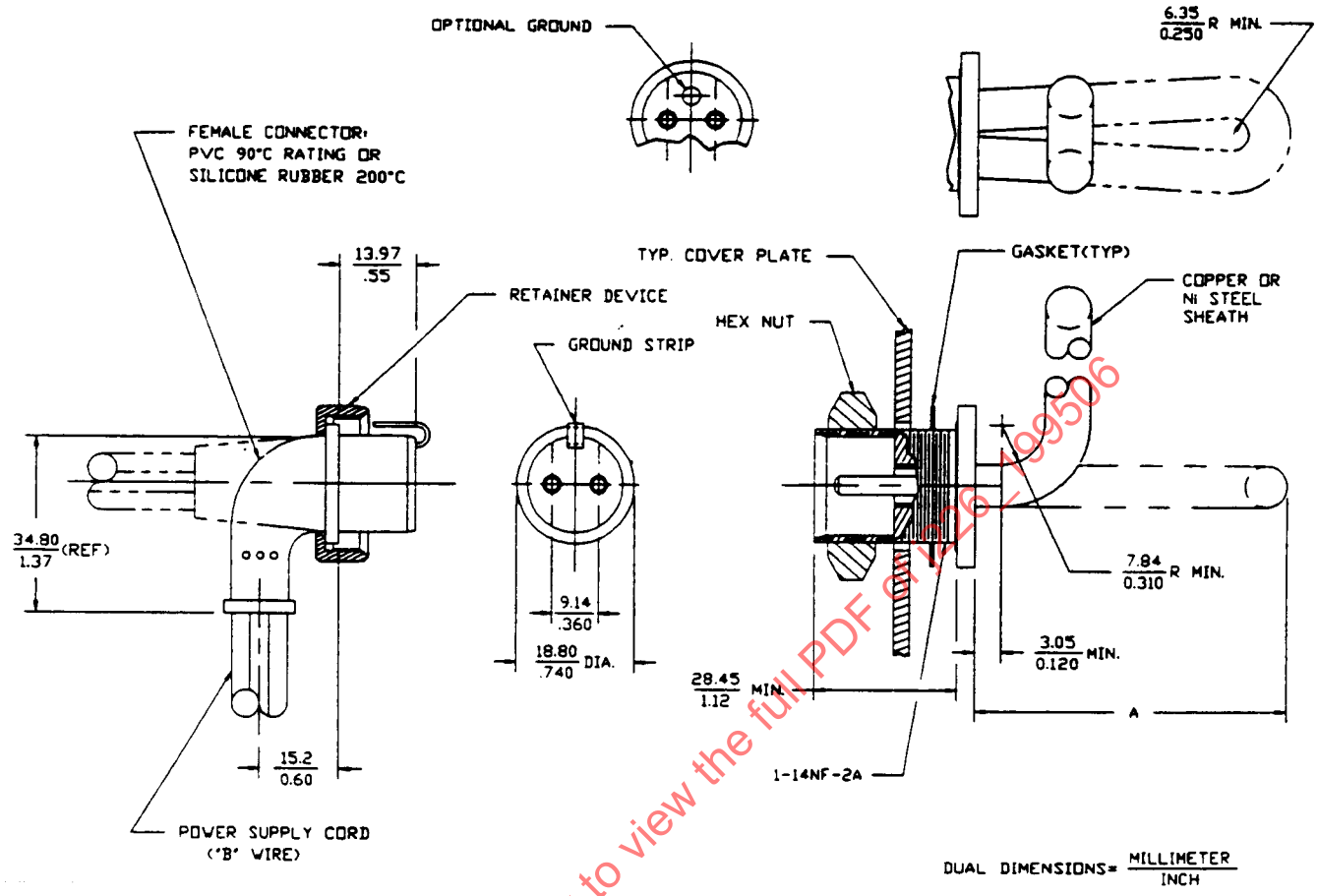

FIGURE 1—STRAIGHT ADAPTER DESIGN

TABLE 1—STRAIGHT ADAPTER DESIGN

SAE Type	Wattage Rating	Volts	Dim. A mm	B Wire (HPN or SJ Series)
2A	1000	120	120	16-3
2B	1000	240	120	16-3
3A	1500	120	160	16-3
3B	1500	240	160	16-3
4A (1)	2000	120	200	14-3
4B	2000	240	200	16-3

Dimension "A" may be reduced in certain applications—consult manufacturer.

Other wattages available, consult manufacturers.

1. Requires 20 amp power source and 20 amp NEMA configuration male cap.

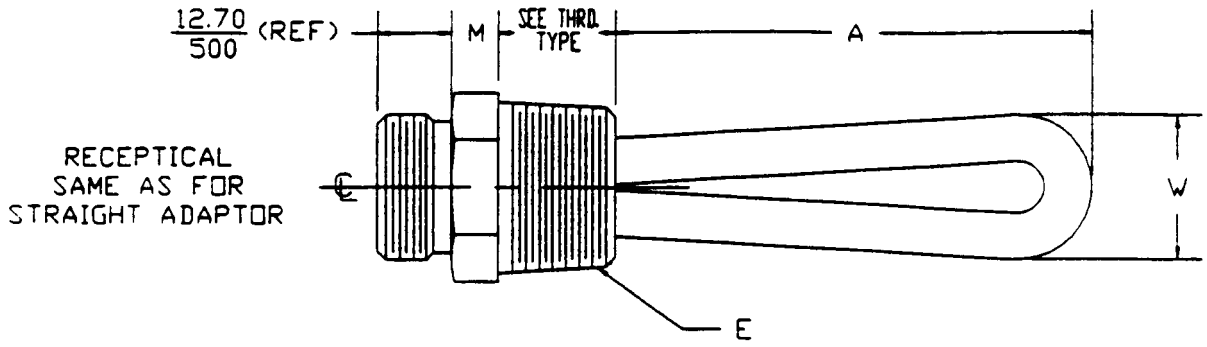

FIGURE 2—THREADED BUSHING DESIGN

TABLE 2—THREADED BUSHING DESIGN

E Thread Type	Dim. M mm	Wattage Rating	Volts	Dim. A mm	Dim. W Max mm	B Wire (HPN or SJ Series)
1	7	750	120	100	14	16-3/18-3
1	7	750	240	100	14	16-3/18-3
2	8	1000	120	120	25	16-3
2	8	1000	240	120	25	16-3
2	8	1500	120	160	25	16-3
2	8	1500	240	160	25	16-3
2	8	2000 (1)	120	200	25	14-3
2	8	2000	240	200	25	16-3

1 Includes 1/2 in NPT, 3/4 in straight and metric threads 18 to 24 mm
2 Includes 3/4 in NPT, 1 in NPT, 1 in straight and metric threads 26 to 50 mm
Dimension "A" may be reduced in certain applications, consult manufacturers.

Other wattages available, consult manufacturers.

1. Requires 20 amp circuit and 20 amp NEMA configuration male cap.

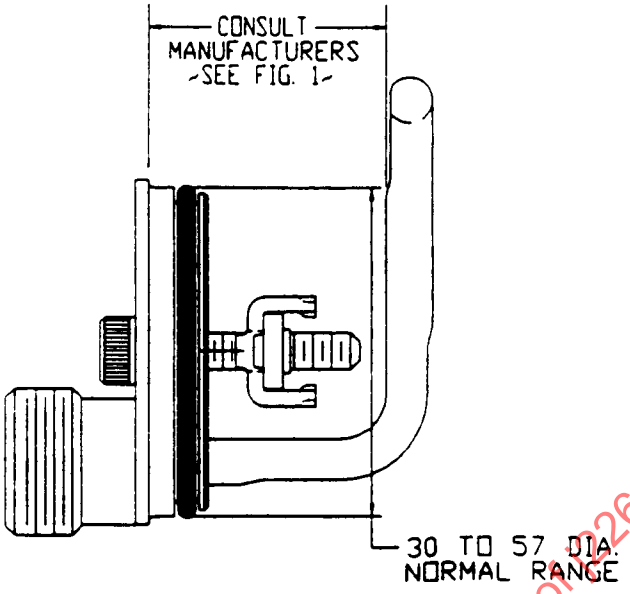

FIGURE 3—CORE PLUG DESIGN

3.4 Core Plug, Tear Drop Type—This type is designed to fit an existing core plug opening in the engine coolant system with adjacent threaded hole(s) in the engine block for accepting mounting bolt(s). See Figure 4. Sealing can be accomplished by either an O-ring against side walls or if core hole has cast surface walls, a flat gasket can be used under the mounting plate.

Table 1 applies to heating element design and cordset attachment.

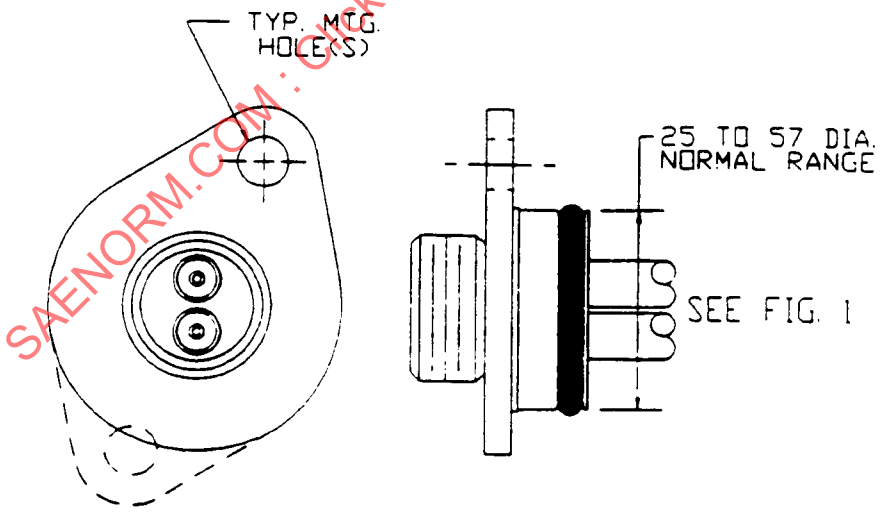

FIGURE 4—TEAR DROP DESIGN