SAE Aerospace
An SAE International Group

# AEROSPACE RECOMMENDED PRACTICE

SAE ARP493 REV. A

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Reaffirmed 2011-08

Superseding ARP493

## Knobs, Control Aircraft, Recommended Design

FOREWORD

Changes in this revision are format/editorial only.

1. SCOPE:

   This recommended practice is intended to recommend the basic shapes and dimensions for knobs used in aircraft. Two basic types of knobs, the bar shape and the round shape, are described, as well as several widely used variations of these two basic shapes.

2. PURPOSE:

   The purpose of this document is to recommend shapes and sizes of knobs which will guide the design of these components toward eventual uniformity.

3. REQUIREMENTS:

3.1 Materials:

It is recommended that materials conform to requirements of the latest issue of MIL-K-25049 and meet the environmental conditions stated therein.

3.2 Metals:

It is recommended that metals used in knobs shall be of the corrosion-resistant type or be suitably treated to resist corrosion in salt spray or atmospheric conditions.

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3.3 Set Screws:

Two locking-type set screws should be employed to hold the knob to the shaft. The set screws should be the "hex socket head" type, as shown on drawing AN565. Set screws should be in accordance with SAE standards. Where applicable, set screws should be 90° to 135° apart, located on either side of the center line of the flat of the shaft. This is to push the flat of the shaft against the flat of the insert.

3.3.1 A minimum of three threads in metal should be provided for the set screws.

3.3.2 Where molded plastic knobs with metal inserts are used, set screw holes in the plastic should be counterbored to a size to clear the outside diameter of the set screw.

3.4 Torque:

The knob, when mounted on a shaft, should withstand a torque of 25 inch-pounds in either direction.

3.5 All plastic knobs should have metal inserts molded or cast in the plastic to fit around shafts.

3.6 All shaft holes in knobs should have a flat on one side.

4. SKIRTS - KNOBS:

4.1 Fastening Skirt to Knob:

It is recommended that, where a skirt is a separate part, it should be fastened to the knob by a positive means of fastening such as spinning insert over the skirt and 1/16 inch diameter pin through the skirt into the knob, so as not to allow movement of either skirt or knob with respect to each other. Another suitable method, where space allows, is to screw skirt to the knob, using flat head screws. In this case, skirt screw holes are to be countersunk.

4.2 Runout:

T.I.R. on skirts after assembly should be held to 0.032.

4.3 Wobble:

T.I.R. on knobs including wobble should be held to 0.020.

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5. REFERENCE SPECIFICATIONS:

MIL-P-7788A - Plate, Plastic Lighting
MIL-K-25049 - Knobs, Control, Equipment Aircraft
MIL-S-7742 - Screw Threads, Standard, Optimum Selected Series: Gen Spec for
MIL-C-18012 - Control, Configuration and Markings (for Plastic Lighting Plates, Control Panels and Placards)

6. ILLUMINATION:

All knobs with requirements for illumination shall be made in accordance with the latest issue of MIL-K-25049.

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SAE SUBCOMMITTEE A-20, FLIGHT CREW STATION,
OF COMMITTEE A-20, AIRCRAFT LIGHTING

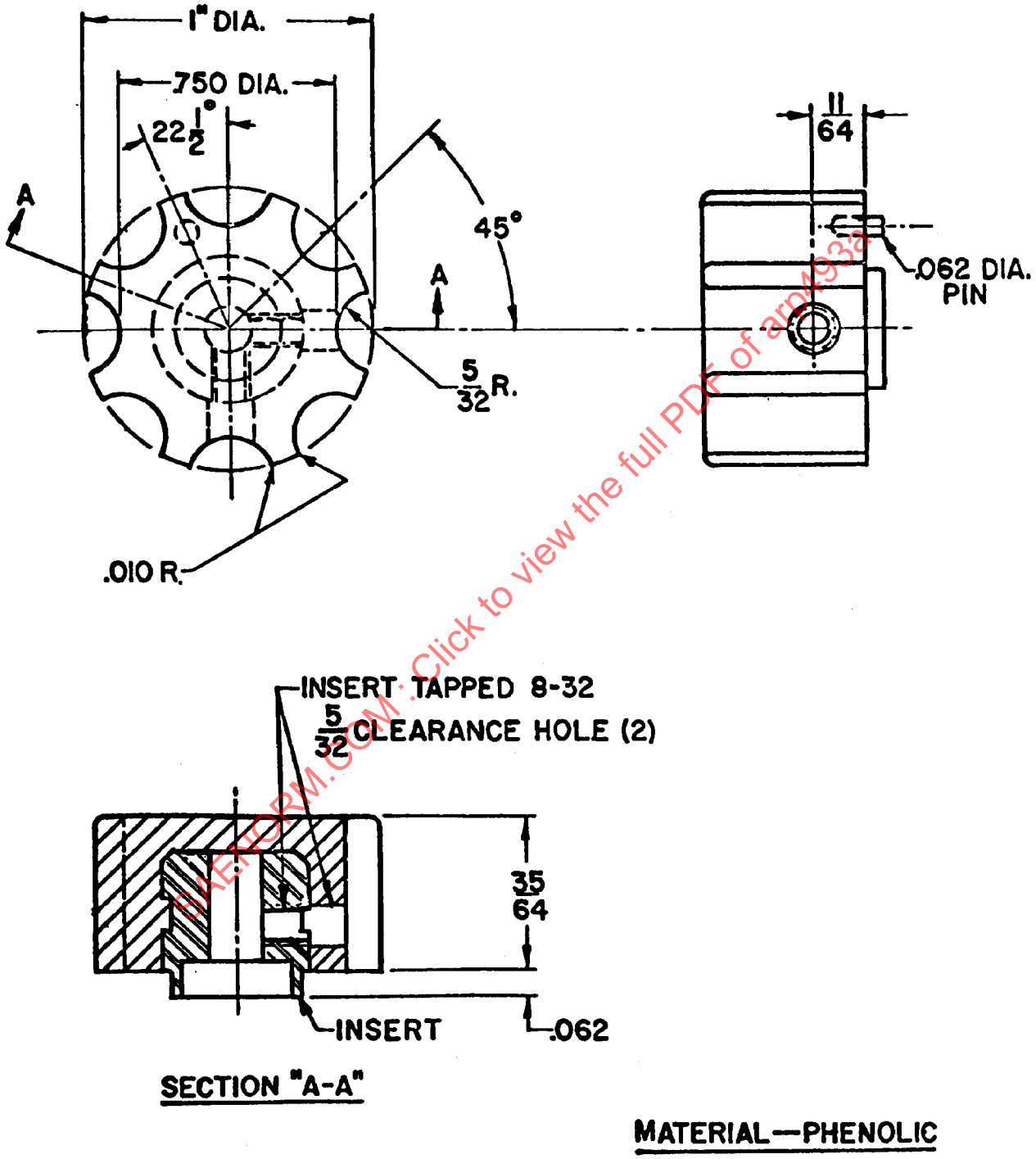


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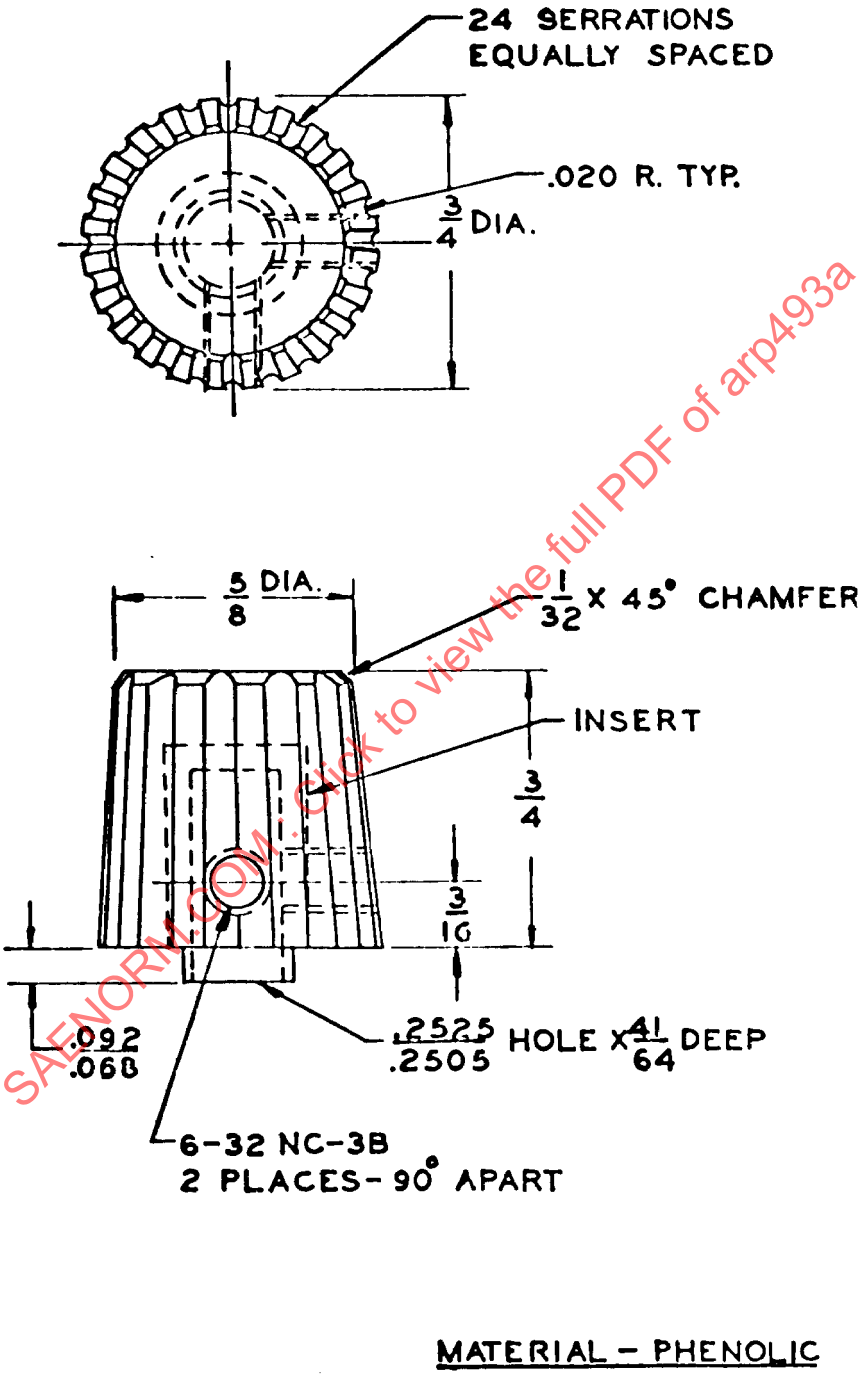
FIGURE 1




MATERIAL – PHENOLIC

FIGURE 2

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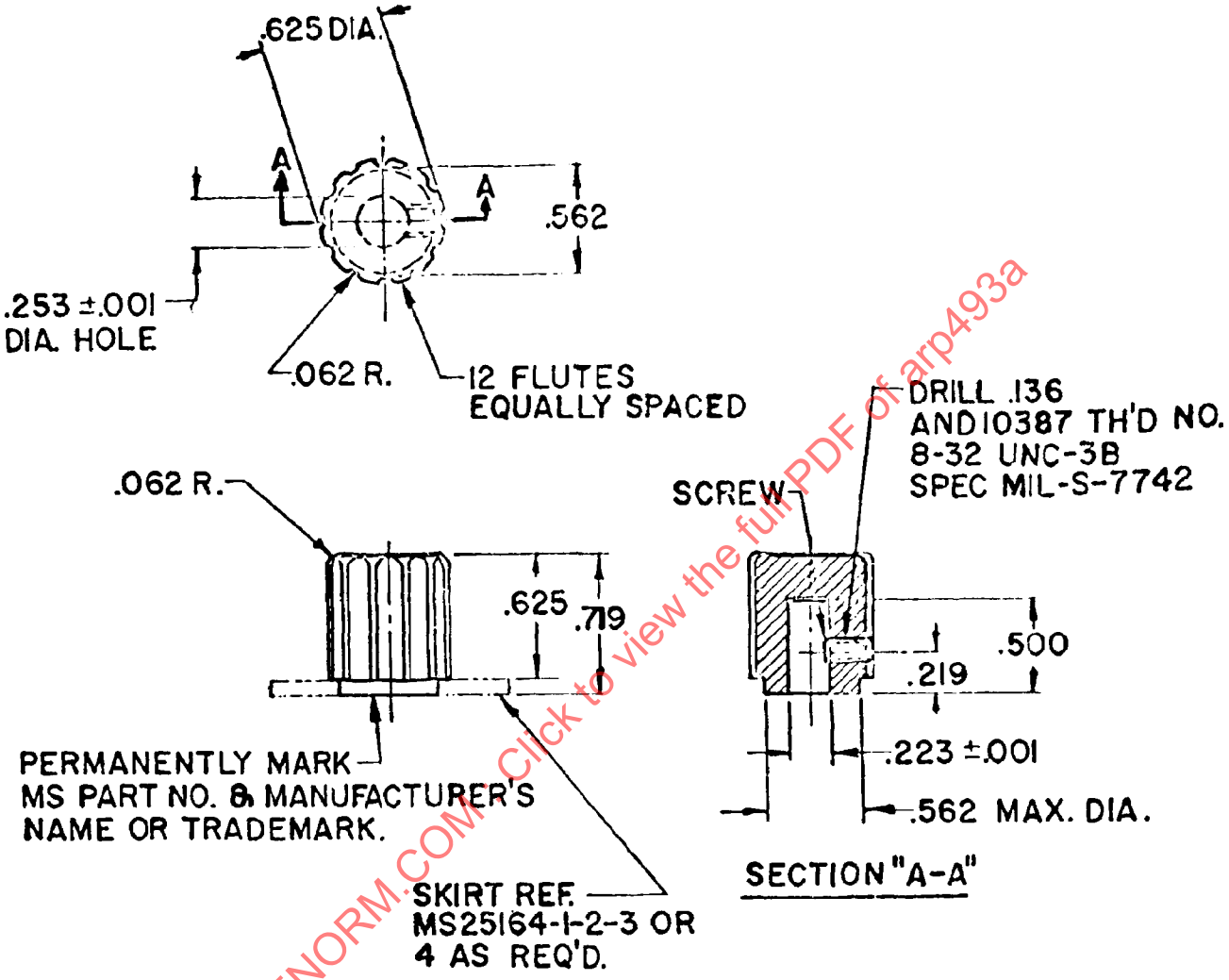


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POINTER INDICATION ON SKIRTS SHALL BE LOCATED OPPOSITE TO AND ON CENTERLINE OF KNOB SET SCREW.

METHOD OF KNOB TO SKIRT ASSEMBLY, OPTIONAL.

BREAK ALL SHARP EDGES.

DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED,
TOLERANCES: DECIMALS ±.016

FIGURE 3

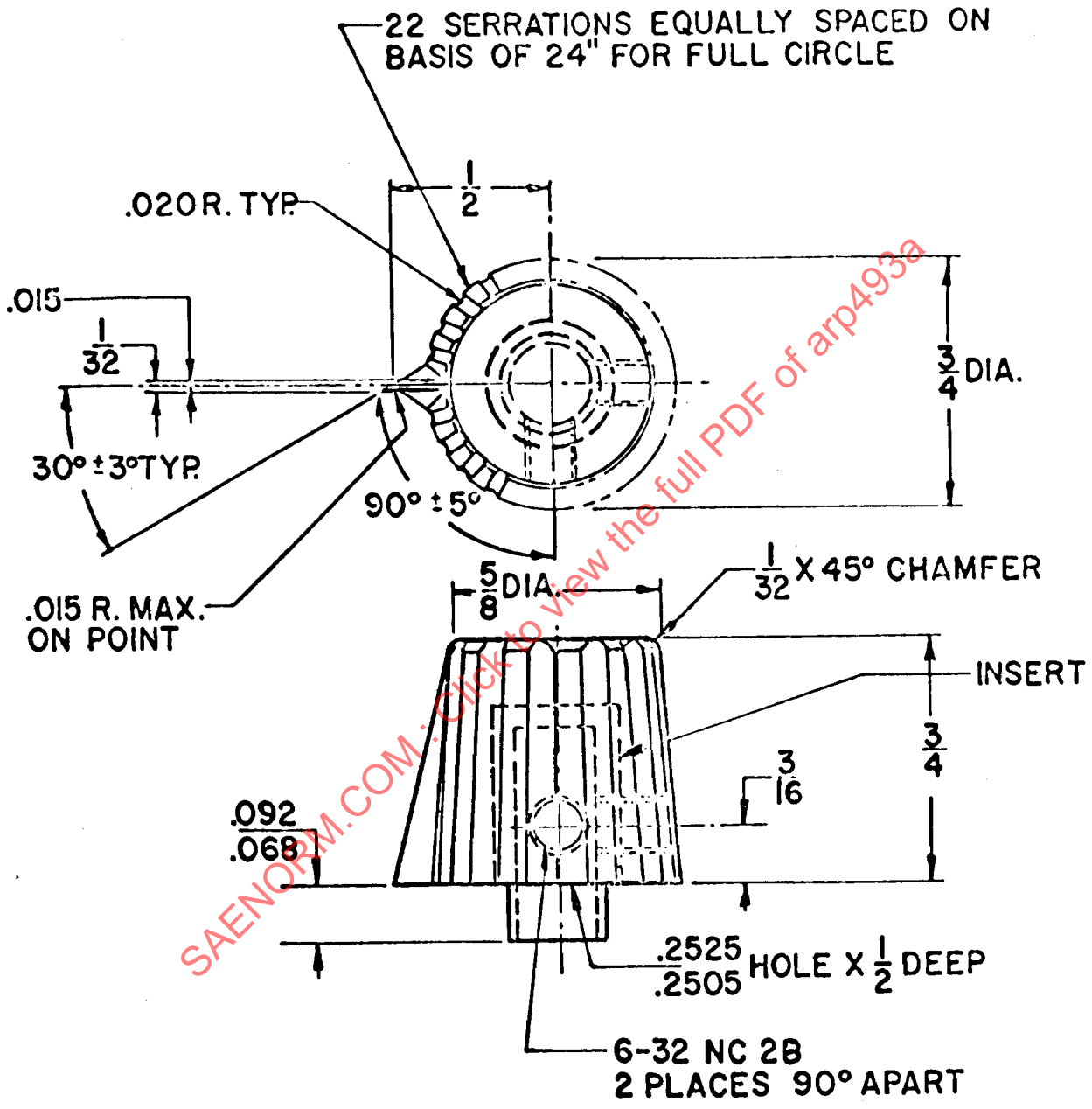


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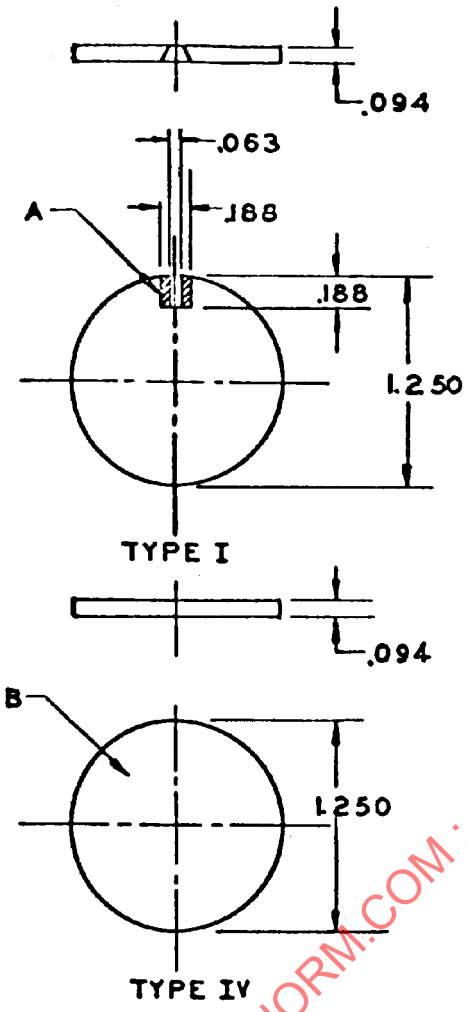
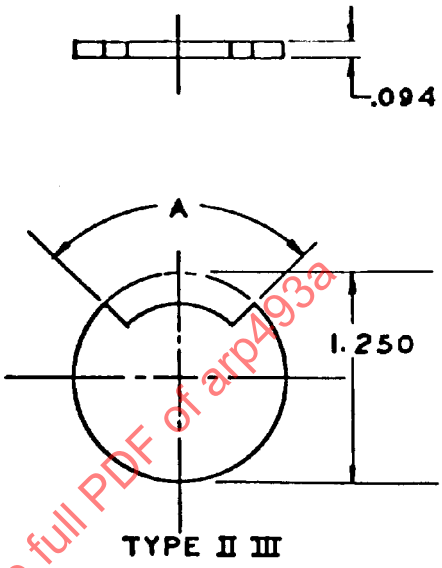
FIGURE 4




| MS REF. NO. | A | TYPE |
|---|---|---|
| MS25164-1 | – | I |
| MS25164-2 | 90° | II |
| MS25164-3 | 120 | III |
| MS25164-4 | – | IV |
| | | |

TYPE I, V, VI, AND VII SKIRTS AT SHADED AREA SHALL BE COATED MAT WHITE WITH MATERIAL HAVING A REFLECTANCE OF NO LESS THAN 80%. TYPE IV AND VIII SKIRTS SHALL EMPLOY MARKINGS IN ACCORDANCE WITH SPECIFICATION MIL-C-16012.

(B) SKIRTS SHALL BE FINISHED WITH A DURABLE BLACK MAT FINISH HAVING A REFLECTION NO GREATER THAN 5 PERCENT. TYPES I, II, III, V, VI, VII SKIRTS MAY BE MADE OF METAL. TYPE IV AND VIII SKIRTS SHALL BE MADE IN ACCORDANCE WITH SPECIFICATION MIL-P-7788, EXCEPT FOR THICKNESS AND BACK COATING.

DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED TOLERANCES: DECIMALS ±.010.

THIS IS A DESIGN STANDARD. NOT TO BE USED AS A PART NUMBER.

FIGURE 5

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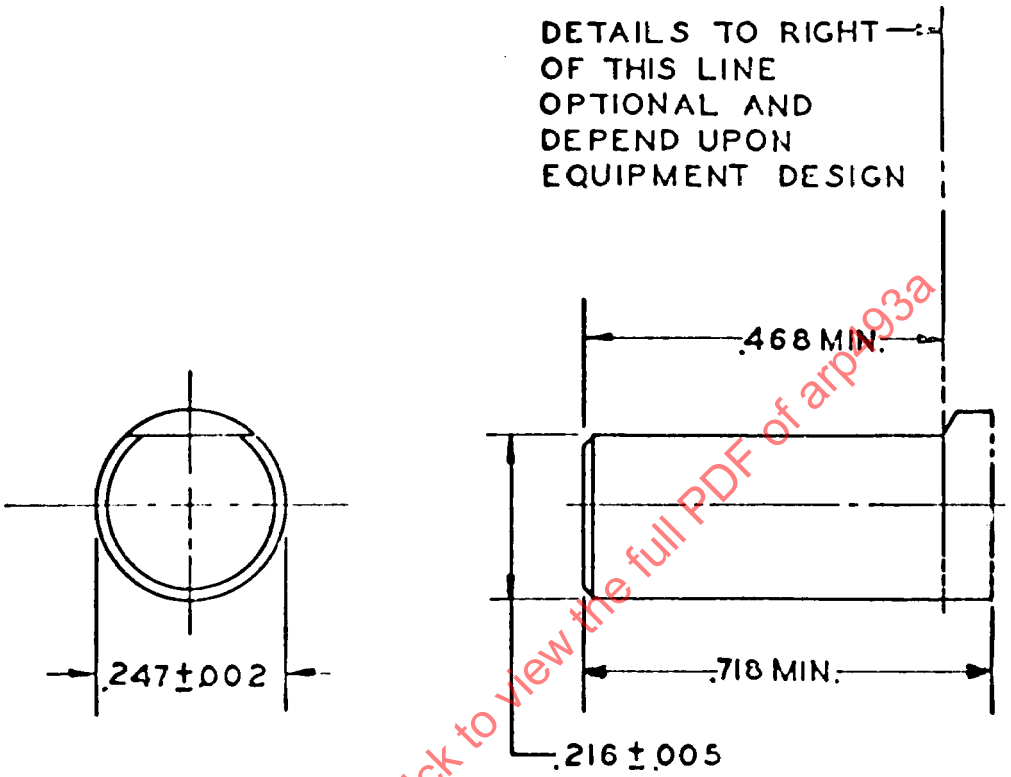


DIMENSIONS IN INCHES.

SHAFT

FIGURE 6

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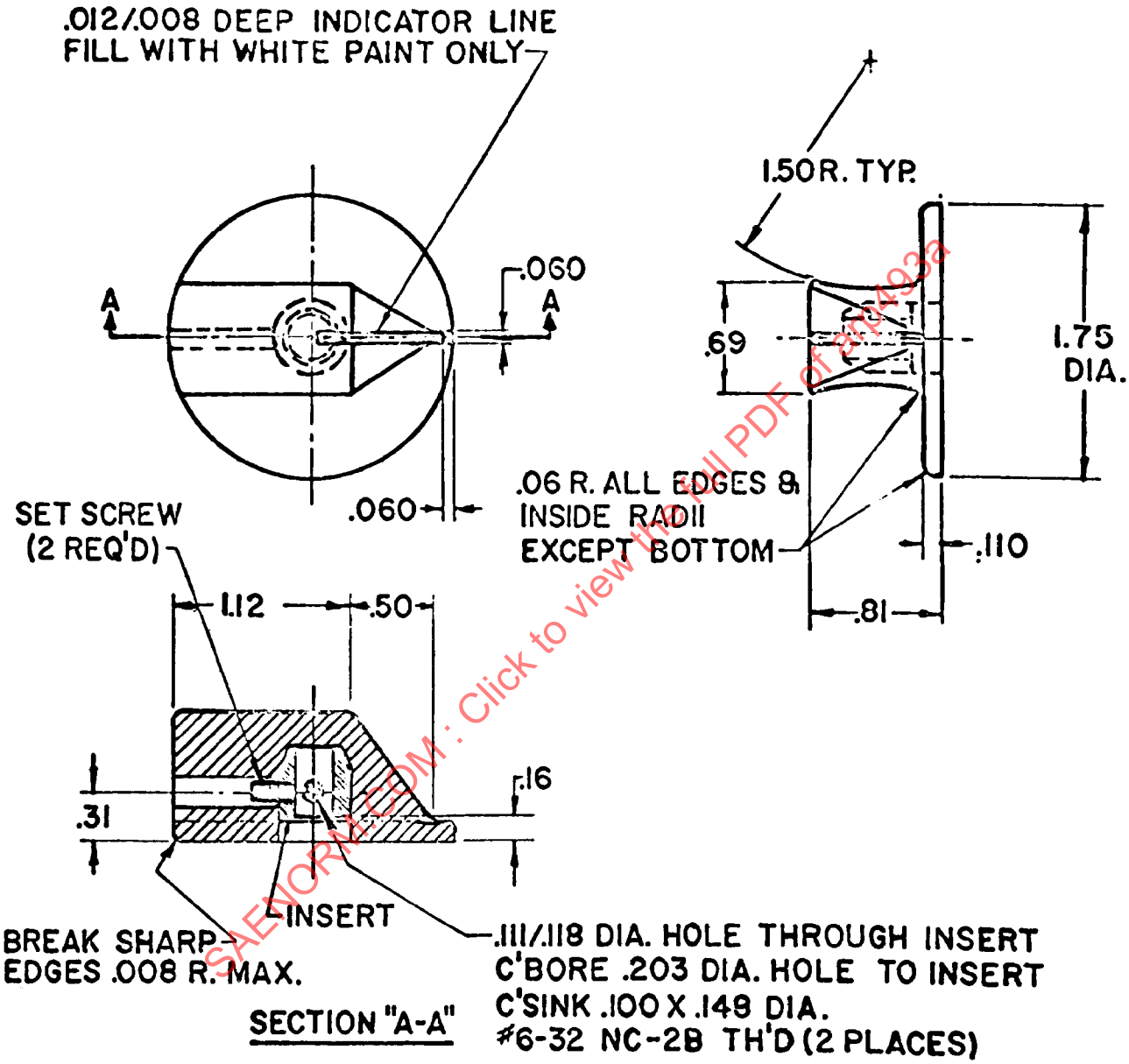


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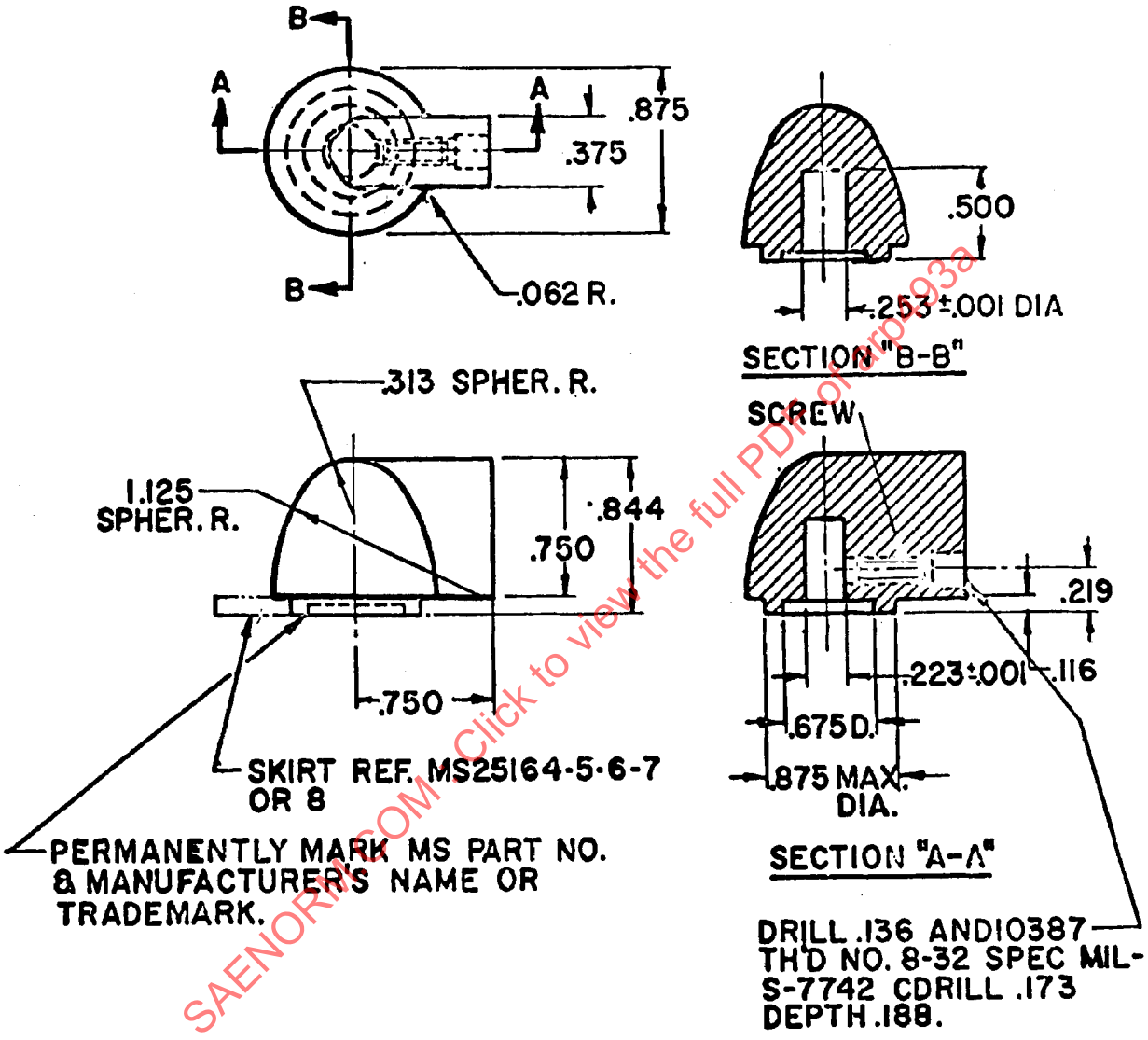
FIGURE 7




POINTER INDICATION ON SKIRTS SHALL BE LOCATED OPPOSITE TO AND ON. CENTERLINE OF KNOB SET SCREW.

METHOD OF SKIRT TO KNOB ASSEMBLY, OPTIONAL.

BREAK ALL SHARP EDGES.

DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS ±.016

FIGURE 8

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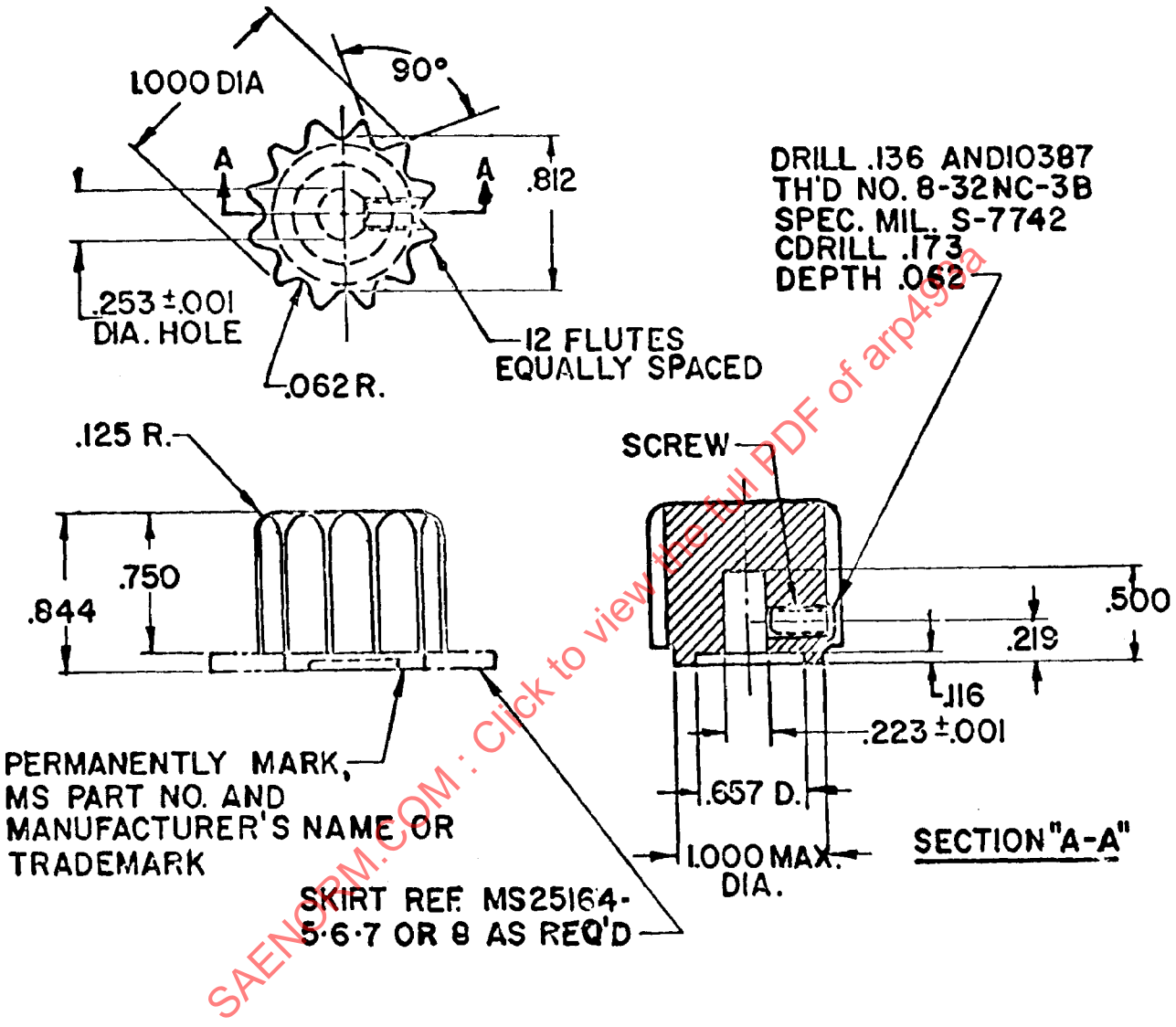


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POINTER INDICATION ON SKIRTS SHALL BE LOCATED OPPOSITE TO AND ON CENTERLINE OF KNOB SET SCREW.

DETAILS OF KNOB TO SKIRT ASSEMBLY, OPTIONAL.

BREAK ALL SHARP EDGES.

DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED, TOLERANCE: DECIMALS ±.016, ANGLES ±2°

FIGURE 9

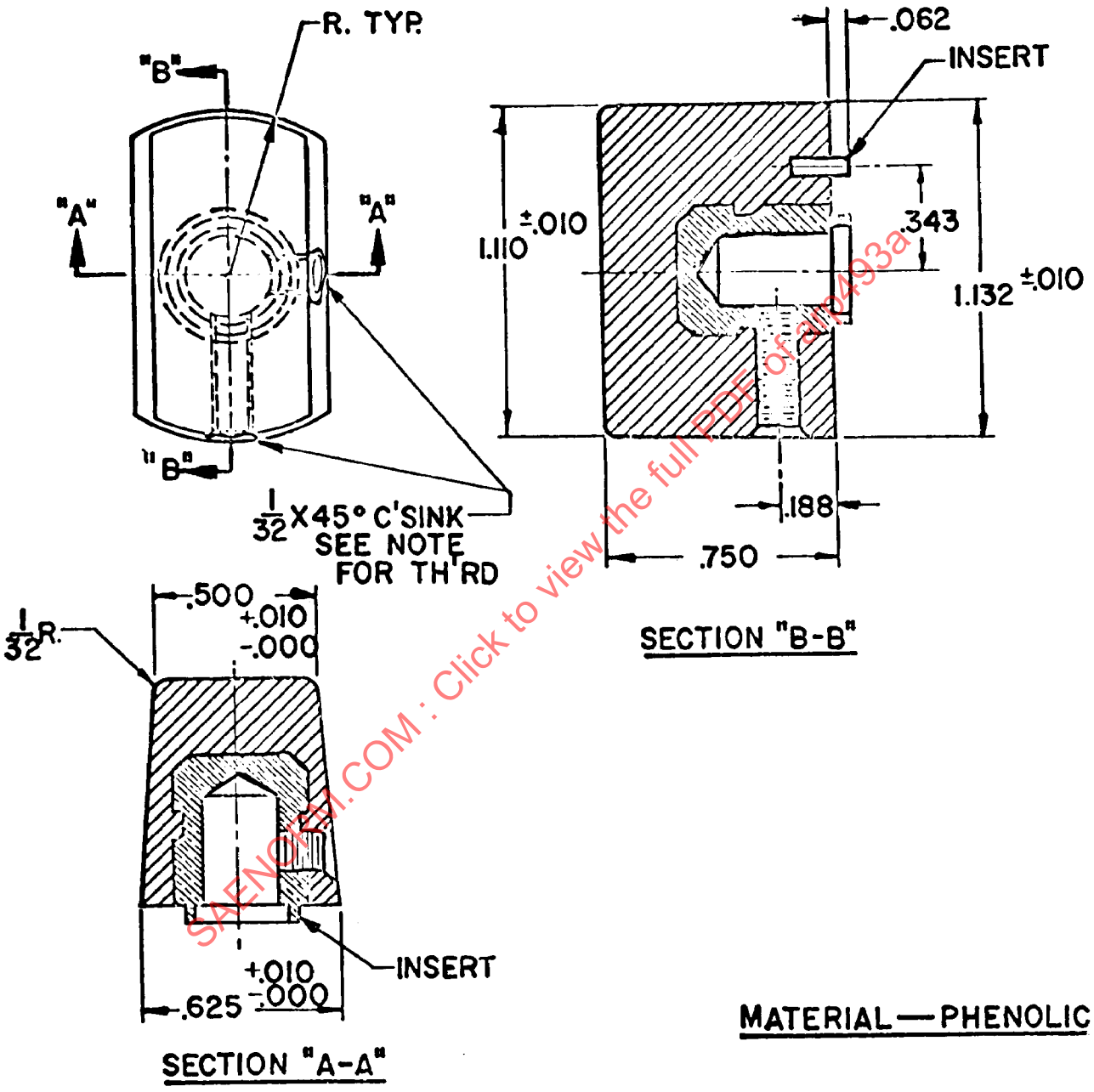


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FIGURE 10