



SURFACE VEHICLE STANDARD

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Automotive Straight Thread Filter and Drain Plugs

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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1. SCOPE

This SAE Standard includes complete general and dimensional specifications for those types of filler and drain plugs (shown in Figures 1 to 7 and Tables 1 to 3) having straight threads which are commonly used with gaskets or seals in automotive and related industrial applications.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J548/1 Spark Plugs

SAE J548/2 Spark Plug Installation Sockets

SAE J846 Coding Systems for Identification of Fluid Conductors and Connectors

2.1.2 ASTM Publication

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM B 117 Method of Salt Spray (Fog) Testing

3. GENERAL SPECIFICATIONS

3.1 Dimensions and Tolerances

Except for nominal sizes and thread specifications, dimensions and tolerances are given in both SI units and U.S. customary as designated. Tabulated dimensions shall apply to the finished plugs, plated, hardened, or otherwise processed, as specified by the purchaser. The minimum across corner dimensions of external hexagons shall be 1.092 times the nominal width across flats, but shall not result in a side flat width less than 0.43 times the nominal width across flats. The minimum across corner dimensions of external squares shall be 1.25 times the nominal width across flats, but shall not result in a side flat width less than 0.75 times the nominal width across flats. The diameter of the washer face on hexagon outside head plugs shall be equal to 95% of the maximum width across flats within a tolerance of $\pm 5\%$. At maximum material condition, the radii at corners of hexagon and square sockets in broached or upset plugs shall not exceed 0.13 mm (0.005 in).

Tolerance on dimensions not otherwise limited shall be ± 0.25 mm (± 0.010 in).

3.2 Straight Threads

Unified standard Class 2A external and Class 2B internal threads shall apply to inch sizes of plain finish (unplated) plugs and holes into which they assemble. For externally threaded parts with additive finish, the maximum diameters of Class 2A may be exceeded by the amount of the allowance, that is, the basic diameters (Class 2A maximum diameter plus the allowance) shall apply after plating. The pitch diameter tolerance for special diameter-pitch combinations shall be based on diameter, pitch, and a length of engagement of 9 times the pitch.

For metric sizes of plugs and mating holes, threads shall conform with SAE J548.

For convenient reference, the data generally required to specify threads is given in Table 1 for both the plugs and mating holes. (Inasmuch as threads are normally produced and gaged with equipment made to the respective measurement system, conversion of size designations and dimensions to other measurement systems is considered unnecessary.)

External threads shall be chamfered or rounded from the diameters tabulated in Table 4 to produce a length of chamfered or partial thread as specified.

3.3 Material and Manufacture

Plugs may be made from low carbon steel, cast iron, malleable iron, brass, bronze, or aluminum alloy as specified by purchaser, by casting, milling from the bar, or by upsetting from a grade of material free of defects which can adversely affect their serviceability.

3.4 Corrosion Protection

The external surfaces and threads of all carbon steel parts shall be plated or coated with a suitable material that passes a 96 h salt spray test in accordance with ASTM B 117. Any appearance of red rust during the 96 h salt spray test shall be considered failure, except for the following:

- a. All internal fluid passages
- b. Edges such as hex points, serrations and crests of threads where there may be mechanical deformation of the plating or coating typical of mass-produced parts or shipping effects.

- c. Areas where there is mechanical deformation of the plating or coating caused by crimping, flaring bending and other post-plate metal forming operations.
- d. Areas where the parts are suspended or affixed in the test chamber where condensate can accumulate.

Parts manufactured to this specification shall not be cadmium plated. Hexavalent chromate coatings are not preferred for commercial and industrial usage due to environmental reasons. Internal fluid passages shall be protected from corrosion during storage and shipping. Changes in plating can affect torque and require requalification when applicable.

3.5 Workmanship

Workmanship shall conform to the best commercial practice to produce high-quality parts. Plugs shall be free from all hanging burrs, loose scale, and slivers which might become dislodged in usage and all other defects which might affect their serviceability.

SQUARE AND HEXAGON HEAD

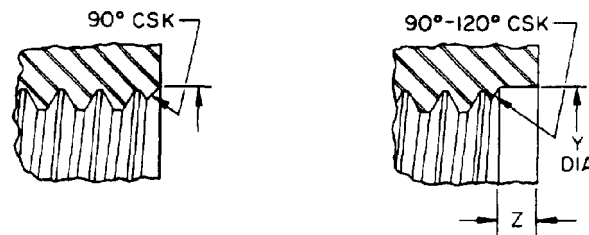


FIGURE 1 - RECOMMENDED HOLE DATA

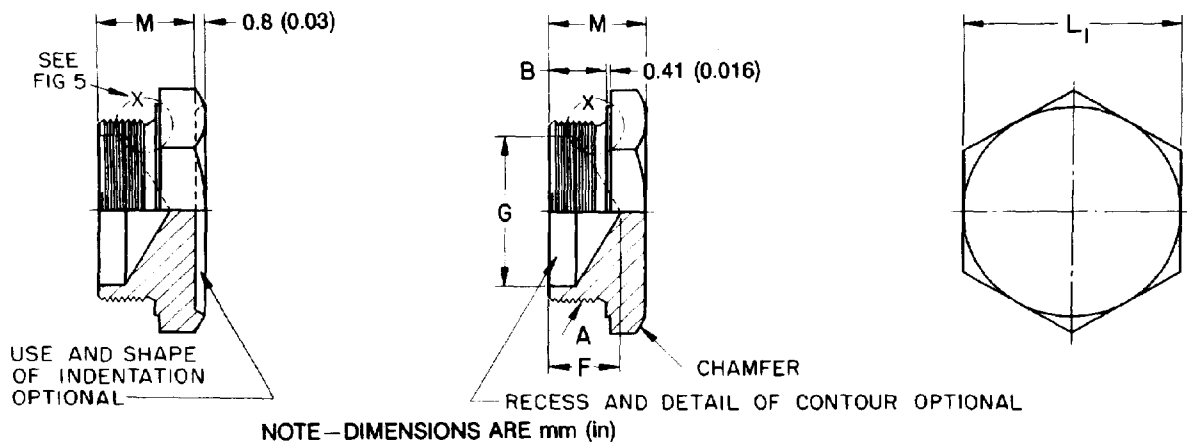


FIGURE 2 - HEXAGON OUTSIDE HEAD PLUG (420109A)