



GENERAL SPECIFICATION FOR PORT PLUG

1. SCOPE

This specification describes the dimensional and performance requirements of an internally driven o-ring plug intended for installation into a WM921, ISO 6149-1 or SAE J2244/1 port.

The plug original application was to seal hydraulic pressure to 63 MPa (630 Bar). Actual performance will vary when installed into typical engine or transmission component material and when sealing fluid other than hydraulic fluid. However, it is expected that the sealing performance shall be sufficient for most engine and transmission applications.

This plug is intended to seal engine oil, engine coolant and transmission fluids between -30° and 150°C.

- The plug generally follows the dimensions of the ISO 6149-4 internal hex plug except:
- Plugs seats on the angled surface for improved sealing and anti-loosening Smaller o-ring for better fit in the smaller groove area
- Different o-ring material for increased temperature range and fluid compatibility
- Hex size, s, increased for weight savings on larger size plugs
- Hex chamfer diameter increased for better bit engagement during automated assembly
- Hex drill diameter modified to provide relief for hex broach
- Identification groove is not permitted.
- Recommended torque is reduced because of wedging action created by the angles seat
- Permissible indent on pilot end for weight savings.
- Short pilot added to improve automated assembly.

1.1 REFERENCES

ASTM D2000, Classification system for rubber products in automotive applications

ISO 261:1998, ISO general-purpose metric screw threads — General plan

ISO 4759-1:2000, Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C

ISO 6149-1, Connections for fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 1: Ports with truncated housing for O-ring seal

ISO 6149-2, Connections for fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 2: Dimensions, design, test methods and requirements for heavy-duty (S series) stud ends

ISO 6149-4:2006, Connections for fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 4: Dimensions, design, test methods and requirements for external hex and internal hex port plugs.

SAE J 403, Chemical compositions of SAE carbon steels

2. DIMENSIONS

Plug dimensions

Shall conform to the dimensions shown in Table 1.

Undercut and seat run-out

If undercut (d5, d20) and seat angle (Z°) are generated with a single tool (form, shave) run-out may be checked at single location.

**Hex dimensions**

Socket countersink 90° x diameter d11.

Shall conform be in accordance with ISO 4759-1, product grade A

Across corner dimension emin = 1.145smin

Threads

The screw threads shall be in accordance with ISO 261. Thread class before plating may be 6e, 6f, or 6g depending on plating thickness. After coating/plating the threads shall meet the requirements of tolerance class 6h GO screw ring gage. For acceptability of thread damage after plating/coating the torque applied to the GO screw ring gage shall not exceed 0.1xd Nm.

Pilot end indent

Indent presence, shape and form are optional. Indent diameter shall not be greater than diameter dy.

O-ring dimensions

Shall conform to the dimensions shown in Table 2.

3. WORKMANSHIP

Plugs shall be free from visual contaminants, all hanging burrs, loose scale and slivers that can be dislodged in use and any other defects that can affect the function of the parts. Unless otherwise specified, surface finish on all surfaces shall be $Ra \leq 6.3 \mu m$.

4. SURFACE FINISH

An electroplated finish like –S437 is recommended. Dip-spin coatings are not recommended because of the potential for hex recess fill and undercut fill for smaller plug sizes.

5. RECOMMENEED TORQUE SPECIFICATION

Recommended installation torque is shown in Table 3.

Testing is recommended to validate installation torque.

The torque shall be released on the engine assembly (543 or ECH) chart or component drawing or WERS.