



AEROSPACE RECOMMENDED PRACTICE

MAP1201

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Tolerances, Hexagon Bar, Machined Flat and Forged Wrenching
Flat Sizes for Fluid Fittings, Metric

RATIONALE

MAP1201 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

This SAE metric Aerospace Recommended Practice (MAP) lists wrenching surface sizes and tolerances for fluid fittings which utilize machined or unmachined hex bar dimensions and machined or forged wrenching surfaces across the center body section of shape fittings.

2. REFERENCES:

2.1 Applicable Documents:

There are no referenced publications specified herein.

2.2 Related Publications:

The following publications are provided for information purposes only and are not a required part of this document.

ANSI/ASME B107.7M	Gages, Wrench Opening, Reference
ISO/R286	ISO System of Limits and Fits

3. TECHNICAL REQUIREMENTS:

3.1 Sizes and Tolerances:

The sizes and tolerances across the hex flats and center body section of shapes for fluid fitting wrenching surfaces shall be as shown in Table 1.

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TABLE 1 - Size and Tolerances Across Hex Flats and Center Body Section of Shapes for Fluid Fitting Wrenching Surfaces

Nominal Width Across Hex Flats or Center Body Section or Shape Fittings	Tolerance Hex Flats of Unmachined Bar or Machined Hexes and Machined Flats of Center Body Section of Shape Fittings	Tolerance as Forged Center Body Section of Shape Fittings
To 11 incl.	+0.06/-0.3	+0.06/-0.5
Over 11 to 14 incl.	+0.06/-0.4	+0.06/-0.6
Over 14 to 13 incl.	+0.1 /-0.4	+0.1 /-0.6
Over 30 to 34 incl.	+0.1 /-0.7	+0.1 /-0.8
Over 34 to 50 incl.	+0.2 /-0.7	+0.2 /-0.8
Over 50 to 70 incl.	+0.3 /-0.8	+0.3 /-1.0
Over 70 to 75 incl.	+0.4 /-0.8	+0.4 /-1.0

4. NOTES:

4.1 Dimensions in millimeters:

4.2 Derivation of Tolerances:

The maximum tolerance "E" was determined by calculating the minimum wrench opening to three decimal places as $B = W + (.005W + 0.025)$ in accordance with the General Notes under Table 2 in ANSI B107.7M - 1991 where W is the nominal width of the part dimension. "E" was then set at two decimal places up through size 14 and one decimal place for larger widths, at a value equal to or no more than 0.1 smaller than "B". "E" was compared to and does not exceed the maximum tolerance of hex bar stock material. The minimum tolerance for hex flats or machined flats was chosen to match tolerances on published MA fitting standards, generally h13 up through size 32 and h14 for larger widths per ISO/R286. The minimum tolerance for as forged center sections was chosen as a compromise to give as much tolerance as possible for closed die forgings and still provide a minimum wall thickness necessary to meet pressure and performance test requirements and to minimize fitting weights.

4.3 Key Words:

Aerospace, fittings, tolerances, wrenching, wrench flats

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