

# ASTM F880 Stainless Steel Socket Set Screws — Material Data Sheet

ASTM F880 · ASME B18.3 · UNS S30400 / S31600 group · 303, 304, 316 and related austenitic grades

*Austenitic stainless socket set screws, conditions AF and CW*

The stainless socket set screw specification: 303, 304, 316 and related austenitic grades in annealed or cold-worked condition, torque tested by size, passivated — for shafts and collars in corrosive and food service.

|                           |                                            |                           |                                 |
|---------------------------|--------------------------------------------|---------------------------|---------------------------------|
| ALLOYS                    | 303, 304, 304L, 305, 316, 316L and related | TORSIONAL STRENGTH, ½ IN. | 358 (AF) · 600 (CW) in·lbf      |
| CONDITIONS                | AF annealed · CW cold worked               | CORROSION TEST            | ASTM A262 Practice E capability |
| TORSIONAL STRENGTH, ¼ IN. | 40 (AF) · 67 (CW) in·lbf                   | FINISH                    | Passivated                      |

## Nominal composition

■ Fe balance ~ 68.9% ■ 18.0–20.0 ~ 16.00% ■ 8.0–10.5 ~ 10.00% ■ 2.00 ~ 2.00% ■ — ~ 2.00% ■ 1.00 ~ 1.00% ■ 0.08, 0.045, 0.030 trace  
Midpoints of the specification ranges, for orientation only. Limits are in the table.

## Chemical composition — ASTM F880, Types 304 and 316 (UNS S30400, S31600)

| Element         | 304       | 316       | — |
|-----------------|-----------|-----------|---|
| Carbon, max     | 0.08      | 0.03      |   |
| Manganese, max  | 2.00      | 2.00      |   |
| Phosphorus, max | 0.045     | 0.045     |   |
| Sulfur, max     | 0.030     | 0.030     |   |
| Silicon, max    | 1.00      | 1.00      |   |
| Chromium        | 18.0–20.0 | 16.0–18.0 |   |
| Nickel          | 8.0–10.5  | 10.0–14.0 |   |
| Molybdenum      | —         | 2.0–3.0   |   |
| Copper, max     | 1.00      | —         |   |

Values per ASTM F880-12 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. 303, 304L, 305, 316L and the other permitted alloys are in the same table.

## Physical properties (typical)

|                               |                                                                 |
|-------------------------------|-----------------------------------------------------------------|
| DENSITY                       | 0.289 lb/in³ (8.00 g/cm³)                                       |
| MODULUS OF ELASTICITY         | 28.0 × 10 <sup>6</sup> psi (193 GPa)                            |
| THERMAL EXPANSION (68–212 °F) | 9.6 µin/in·°F                                                   |
| MAGNETIC                      | No in the annealed condition; slightly magnetic after cold work |

## Heat treatment

AF: annealed after manufacture. CW: cold worked from annealed stock. Not hardenable by heat treatment; passivated after machining.

## Torsional strength — ASTM F880 stainless socket set screws (selected sizes)

| Nominal size    | Test torque AF, min (in·lbf) | Test torque CW, min (in·lbf) | — | — | — |
|-----------------|------------------------------|------------------------------|---|---|---|
| #4 (0.112 in.)  | 1.6                          | 3.3                          |   |   |   |
| #10 (0.190 in.) | 16                           | 26                           |   |   |   |
| ¼ in.           | 40                           | 67                           |   |   |   |
| ⅝ in.           | 138                          | 237                          |   |   |   |
| ½ in.           | 358                          | 600                          |   |   |   |

Values per ASTM F880-12 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Torque testing is not required above ½ in. unless specified.

Applicable standards

|                      |                                              |
|----------------------|----------------------------------------------|
| ASTM F880            | Stainless steel socket set screws            |
| ASME B18.3 / B18.6.2 | Socket set screw dimensions and point styles |
| ASTM F912            | Alloy steel socket set screws                |
| ASTM A967 / A380     | Passivation                                  |

Forms we supply in F880

- Hex and heavy hex bolts and cap screws
- Studs and threaded rod
- Nuts and washers to match
- Machined specials to drawing

Typical applications

- Food, beverage and pharmaceutical machinery
- Marine and outdoor equipment collars and couplings
- Instrument and valve hardware
- Any set-screw application where a plated steel screw would corrode