Socket Weld Flange — ASME B16.5 Class 300

ANSI / ASME B16.5 Class 300 socket welding raised face (SWRF) flanges · NPS ½" to 3" · Carbon steel ASTM A105, stainless steel ASTM A182 F304 / F316, alloy steel

ASME B16.5 CLASS 300 SOCKET WELD FLANGE

A socket weld flange (SW / SWRF) has a counterbored socket into which the pipe is inserted and then fillet-welded on the outside of the hub. The socket locates the pipe and gives a smooth bore with no weld protrusion, so it is the preferred small-bore flange for high-pressure, clean and hygienic lines where a butt weld is impractical. ASME B16.5 standardises socket weld flanges in NPS ½ to 3 (Class 1500 to 2½).

TESCO Steel & Engineering manufactures ASME B16.5 Class 300 socket weld flanges in Mumbai, India, with RF, FF or RTJ facing, socket bored to the pipe OD and through-bored to the pipe schedule.

KEY FEATURES

- **Full ASME B16.5 compliance** — dimensions, socket bore and depth, tolerances, facing and marking to ASME B16.5-2020.
- **Machined socket** — socket bore ID sized to the pipe OD with close clearance; depth D per B16.5; through-bore ID 2 matched to the pipe schedule.
- **Single fillet weld** — no bevel preparation, no weld-root intrusion; 1.6 mm bottoming gap before welding (ASME B31.1 / B31.3).
- **Materials and certification** — ASTM A105, A350 LF2, A182 F304/F316/F321, F11/F22, duplex; EN 10204 3.1 certificates.

SPECIFICATION SUMMARY

Product	Socket weld flange (socket welding, SW / SWRF), forged
Standard	ASME B16.5 — Pipe Flanges and Flanged Fittings (formerly ANSI B16.5)
Pressure class	Class 300 (300 lb / #300)
Size range	NPS ½" – 3" (DN 15 – DN 80)
Facing	Raised face (RF) 2 mm standard; FF or RTJ on request
Face finish	Serrated, 125 – 250 µin Ra (3.2 – 6.3 µm) per ASME B16.5
Socket	Socket bore ID = pipe OD + clearance, depth D per B16.5; through-bore ID 2 to pipe schedule (STD shown)
Weld	External fillet weld, leg ≥ 1.09 × pipe wall (ASME B31.3 Fig. 328.5.2C)
Materials	ASTM A105 / A105N; A350 LF2; A182 F304/L, F316/L, F321; A182 F11, F22, F91; duplex F51 / F53

INSTALLATION — SOCKET WELDING

- Insert the pipe to the bottom of the socket, then withdraw ≈ 1.6 mm (1/16") before tacking — the expansion gap prevents weld cracking (ASME B31.1 §127.3, B31.3 §328.5.2).
- Fillet weld all round: throat ≥ 0.7 × pipe wall, leg ≥ 1.09 × wall or 3.2 mm, whichever is greater; two passes recommended above Class 300.
- Socket weld joints are not recommended where crevice corrosion or severe erosion is expected, or where radiography of the weld is mandatory.

APPLICATIONS

Instrument and sample lines · hydraulic and lubricating-oil systems · steam tracing and condensate · chemical injection and dosing · boiler feed and blow-down small bore · compressor and pump auxiliary piping · offshore, refinery and petrochemical small-bore process connections where a smooth bore and a compact fillet-welded joint are required.

TESCO Steel & Engineering — socket weld flange manufacturer & exporter · 9-A, 52-A, Sindhi Lane, Mumbai – 400004, India · +91 22 6659 5662 · sales@tescosteel.com · www.tescosteel.com
Dimensions per ASME B16.5-2020 Tables 10 and 11 (NPS ½ – 3); weights approximate; bore per pipe schedule; P–T ratings per ASME B16.5 Table 2 — verify for material group and service.

Socket Weld Flange ASME B16.5 Class 300 (SWRF) — Dimension chart in mm · NPS ½ – 3

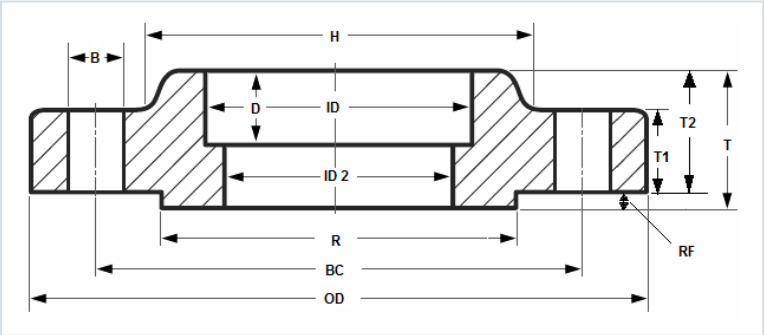
ASME B16.5 CLASS 300 SOCKET WELD FLANGE DIMENSIONS (MM)

ASME B16.5 · CLASS **300** SOCKET WELD FLANGE · RAISED FACE · DIMENSIONS IN MM — 8 sizes

NPS inch	OD Flange Ø	T1 Thick.	H Hub Ø	T Length thru hub	ID Socket Ø	D Socket depth	ID 2 Bore STD	R RF Ø	BC Bolt circle	Bolting No.	Bolting B · Hole Ø	Bolting Stud	Weight kg approx.
1/2"	95	14.3	38	22	22.2	9.6	15.8	35	66.7	4	15.9	1/2"	1.2
3/4"	115	15.9	48	25	27.7	11.2	20.9	43	82.6	4	19.1	5/8"	1.4
1"	125	17.5	54	27	34.5	12.7	26.6	51	88.9	4	19.1	5/8"	1.4
1 1/4"	135	19.1	64	27	43.2	14.3	35.1	64	98.4	4	19.1	5/8"	1.8
1 1/2"	155	20.7	70	30	49.5	15.7	40.9	73	114.3	4	22.2	3/4"	2.7
2"	165	22.4	84	33	61.9	17.5	52.5	92	127.0	8	19.1	5/8"	3.2
2 1/2"	190	25.4	100	38	74.6	19.1	62.7	105	149.2	8	22.2	3/4"	4.6
3"	210	28.6	117	43	90.7	20.6	77.9	127	168.3	8	22.2	3/4"	5.9

- All dimensions in millimetres per ASME B16.5-2020 Tables 10 and 11 (metric). Thickness T1 includes the 2 mm raised face; length through hub T is measured from the raised face (hub height T2 = T − T1).
- Socket bore ID and depth D per ASME B16.5; ID suits ASME B36.10M / B36.19M pipe OD. Bore ID 2 shown for STD pipe; supplied to the schedule ordered (XS, Sch 80, 160, XXS) so the socket shoulder matches the pipe ID.
- Studs per ASME B16.5 Table B1; hole Ø is 3 mm larger than the stud. Weights approximate, carbon steel, STD bore.

SOCKET WELD FLANGE DIMENSIONAL DRAWING



OD Flange outside diameter

T1 Flange thickness (incl. 2 mm RF)

H Hub diameter

T Length through hub (incl. RF)

T2 Hub height above flange back (= T − T1)

RF Raised face, 2 mm high

ID Socket bore diameter

D Socket depth

ID 2 Bore (to pipe schedule)

R Raised face diameter

BC Bolt circle diameter (PCD)

B Bolt hole diameter

SOCKET WELD VS OTHER SMALL-BORE FLANGES

Socket weld (SW)	Pipe in socket, one external fillet weld; smooth bore; NPS ½ – 3
Slip-on (SO)	Pipe through bore, two fillet welds; lower strength; all sizes
Threaded (TH)	NPT thread, no welding; low pressure / non-critical
Weld neck (WN)	Butt weld; highest strength; preferred above NPS 2

SOCKET WELD JOINT — GOOD PRACTICE

Keep the socket and pipe end clean and dry · match pipe OD tolerance to the socket (ASTM A106 / A312 pipe fits B16.5 sockets) · avoid socket weld joints in cyclic-vibration service without support · for sour service limit hardness per NACE MR0175 on the weld and HAZ.

Also known as: ANSI B16.5 300 lb SW flange · 300# socket welding flange · SWRF Class 300 · socket weld raised face flange (≈ PN 50).

SOCKET WELD FLANGE MATERIALS

Carbon steel	ASTM A105 / A105N (most common)
Low-temperature CS	ASTM A350 LF2 Cl.1 / Cl.2, LF3
Stainless steel	ASTM A182 F304 / F304L, F316 / F316L, F321, F347
Alloy steel	ASTM A182 F5, F9, F11, F12, F22, F91
Duplex / super duplex	ASTM A182 F51 (UNS S31803 / S32205), F53 (S32750), F55 (S32760)
Nickel & copper alloys	Monel 400, Inconel 600 / 625, Hastelloy C276, Cu-Ni 90/10 — on request
Equivalent EN / DIN grades	P250GH (1.0460), 1.4301, 1.4401, 1.4404, 1.4571 on request

PRESSURE–TEMPERATURE RATINGS

PRESSURE–TEMPERATURE RATING — Class 300 — BAR, ASME B16.5 TABLE 2			
Temperature °C	**Group 1.1** A105 / A350 LF2	**Group 2.1** A182 F304	**Group 2.2** A182 F316
–29 to 38	51.1	49.6	49.6
100	46.6	42.2	43.2
150	45.1	38.5	39.5
200	43.8	35.7	36.8
250	41.9	33.4	34.4
300	39.8	31.6	32.6
350	37.6	30.3	31.3
400	34.7	29.4	30.4
450	28.8	28.8	29.4

Working pressure in bar (gauge) from ASME B16.5-2020 Table 2-1.1, 2-2.1 / 2-2.2. Ratings apply to the flange; confirm for the specific material group, bolting, gasket and weld.

QUALITY & DOCUMENTATION

- Forged from certified bars / billets; normalised, quenched-and-tempered or solution-annealed per material specification.
- Manufactured under an ISO 9001:2015 quality management system; marking per ASME B16.5 and MSS SP-25.
- EN 10204 3.1 material test certificates with chemical analysis, mechanical properties and heat-number traceability; 3.2 with third-party endorsement on request.
- Socket bore and depth gauged 100 %; dimensional inspection to ASME B16.5 tolerances; face finish per MSS SP-6.
- NDT (MPI / DPT), PMI for stainless and alloy grades, IBR, NACE MR0175 / ISO 15156 and PED compliance on request.

FREQUENTLY ASKED QUESTIONS

Why are socket weld flanges limited to NPS 3?

ASME B16.5 provides socket dimensions only for NPS ½ – 3 (½ – 2½ in Class 1500); above that a fillet-welded socket joint is less economical and less robust than a butt-welded weld neck flange.

Which pipe schedule should I specify?

The socket bore ID fits the pipe OD regardless of schedule, but the through-bore ID 2 must match the pipe ID — state the schedule (e.g. Sch 80, Sch 160) on the order.

Why the 1.6 mm gap at the socket bottom?

The gap lets the pipe expand as the weld cools and prevents root cracking of the fillet weld; it is required by ASME B31.1 and B31.3.

Is a socket weld flange suitable for corrosive service?

The crevice between pipe and socket can trap fluid; for corrosive or hygienic service a weld neck flange with a full-penetration butt weld is preferred.

ORDERING INFORMATION

Specify: quantity · size (NPS) · ASME B16.5 Class 300 socket weld · facing (RF / FF / RTJ) · pipe schedule for bore · material grade · certification (3.1 / 3.2, NACE, IBR, PED) · surface protection (anti-rust oil, paint, galvanising).