

ASTM A694 / ASME SA694

Standard Specification for Carbon and Alloy Steel Forgings for Pipe Flanges, Fittings, Valves, and Parts for High-Pressure Transmission Service

This specification covers forged or rolled steel pipe flanges, forged fittings, valves, and parts suitable for use with high-strength transmission-service pipe. Included are flanges, fittings, and similar parts ordered either to dimensions specified by the purchaser or to ASME or MSS dimensional standards

A. General Requirements :-

1. Product furnished to this specification shall conform to the requirements of Specification A 961.
2. In case of conflict between the requirements of this specification and Specification A 961, this specification shall prevail.

B. Heat Treatment:-

1. All items shall be heat treated. Heat treatment of carbon steel and high-strength low-alloy steel may consist of normalizing, normalizing and tempering, or quenching and tempering.
2. Heat treatment of alloy steel may consist of normalizing and precipitation heat treatment or quenching and precipitation heat treatment.
3. The tempering temperature shall be at least 1000°F [540°C]. The precipitation heat treatment of the alloy steel shall be in the range from 1000 to 1225°F [540 to 665°C].

C. Chemical Composition :-

The material shall conform to the chemical composition requirements in Table 1.

Table 1

| | Composition, % | |
|-----------------|----------------|------------------|
| | Heat Analysis | Product Analysis |
| Carbon, max | 0.26 | 0.265 |
| Manganese, max | 1.4 | 1.44 |
| Phosphorus, max | 0.025 | 0.03 |
| Sulfur, max | 0.025 | 0.03 |
| Silicon | 0.15–0.35 | 0.1–0.4 |

D. Tensile Requirements:-

The material shall conform to the requirements as to tensile properties prescribed in Table 2, when tested in accordance with the mechanical testing requirements of Specification A 961.

Table 2

| Grade | Tensile Strength, min, MPa [ksi] | Yield Strength (0.2 % Offset), min, MPa [ksi] | Elongation in 2 in. or 50 mm, min % |
|-------|-------------------------------------|--|--|
| F42 | 415 (60) | 290 (42) | 20 |
| F46 | 415 (60) | 315 (46) | 20 |
| F48 | 425 (62) | 330 (48) | 20 |
| F50 | 440 (64) | 345 (50) | 20 |
| F52 | 455 (66) | 360 (52) | 20 |
| F56 | 470 (68) | 385 (56) | 20 |
| F60 | 515 (75) | 415 (60) | 20 |
| F65 | 530 (77) | 450 (65) | 20 |
| F70 | 565 (82) | 485 (70) | 18 |

E. Supplementary Requirements:-

1. Special Flanges: Flanges shall meet the requirements of MSS SP-44, except the chemical requirements shall conform to Table 1.

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