

ASTM A53 Standard Specification

ASTM A53 Standard Spec. for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

This specification covers Seamless and Welded, Black and Hot-Dipped Galvanized nominal (average) wall pipe for coiling, bending, flanging and other special purposes and is suitable for welding. Continuous-Welded pipe is not intended for flanging.

Each length of pipe shall be subjected to the hydrostatic test. Also, each pipe shall be examined by a non-destructive examination method in accordance to the required practices.

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Tag: ASTM A53 Grade A, ASTM A53 Grade B, ASTM A53 Type F, ASTM A53 Type E, ASTM A53 Type S, ERW pipe, Furnace butt welded pipe, Continuous welded pipe

A53 pipe comes in three types and two grades

- **A53 Type F**, which is longitudinally furnace butt welded or continuous welded (Grade A only)
- **A53 Type E**, which is longitudinally electric resistance welded (Grades A and B)
- **A53 Type S**, which is seamless pipe, produced by hot working, and possibly cold finishing, the steel (Grades A and B).

ASTM A53, Type S is now currently an outdated specification and has been replaced by ASTM A106 specification for seamless:

Scope

This is a standard set by the standards organization ASTM International, a voluntary standards development organizations that sets technical standards for materials, products, systems, and services.

This specification covers Seamless and Welded, Black and Hot-Dipped Galvanized nominal (average) wall pipe for coiling, bending, flanging and other special purposes and is suitable for welding. Continuous-Welded pipe is not intended for flanging. Purpose for which pipe is intended should be stated on order. It shall be permissible to furnish pipe having other dimensions provided that such pipe complies with all other requirements of this specification. Supplementary requirements of an optional nature are provided and shall apply only when specified by the purchaser.

Note 1. The dimensionless designators NPS (nominal pipe size) [DN (diameter nominal)] have been substituted in this specification for such traditional terms as “nominal diameter,” “size,” and “nominal size.”

Note 2. The term nominal wall thickness has been assigned for the purpose of convenient designation, existing in name only, and is used to distinguish it from the actual wall thickness, which may vary over or under the nominal wall thickness.

Permissible Variations in Wall Thickness

The minimum wall thickness at any point shall not be more than 12.5% under the nominal wall thickness specified.

Permissible Variations in Weights per Foot

Weight of any length shall not vary more than 10% over and 3.5% under that specified.

NOTE — NPS 4 and smaller — weighed in lots.

Larger sizes shall be weighed separately by length.

Note:

DN — Nominal Diameter

NPS — Nominal Pipe Size

Chemical Requirements ASTM A53

Chemical elements	Type S (SMLS)		Type E (ERW)		Type F (FW)
	Gr. A	Gr.B	Gr. A	Gr. B	Gr. A
Carbon max. %	0.25	0.3	0.25	0.3	0.3
Manganese %	0.95	1.2	0.95	1.2	1.2
Phosphorous, max. %	0.05	0.05	0.05	0.05	0.05
Sulfur, max. %	0.045	0.045	0.045	0.045	0.045
Copper, max.%	0.4	0.4	0.4	0.4	0.4
Nickel, max. %	0.4	0.4	0.4	0.4	0.4
Chromium, max. %	0.4	0.4	0.4	0.4	0.4
Molybdenum, max. %	0.15	0.15	0.15	0.15	0.15
Vanadium, max. %	0.08	0.08	0.08	0.08	0.08

The total composition for these five elements shall not exceed 1.00%.

Tensile Requirements

Properties	SMLS & ERW		Con. welded
	Grade A	Grade B	Grade
Tensile Strength, min., psi	48,000	60,000	45,000
Yield Strength, min., psi	30,000	35,000	25,000

- Seamless and Electric-Resistance-Welded — Bending, flattening, tensile on one length of pipe from each lot of 500 lengths or less of a size.
 - Continuous-Weld — Bending, flattening, tensile
 - Con. welded: Continuous-welded
- $1 \text{ in (inch)} = 25.4 \text{ mm}$
 - $1 \text{ psi (lb/in}^2\text{)} = 6,894.8 \text{ Pa (N/m}^2\text{)} = 6.895 \times 10^{-2} \text{ bar}$

General Information

Couplings — Applied handling tight. Couplings, 2" and smaller straight tapped, other sizes taper tapped.

Thread Protection — Applied to pipe 4" and larger.

End Finish (unless otherwise specified) –

STD or XS, or wall thicknesses less than 0.500 in. (excluding XXS): Plain and beveled

All XXS and wall thicknesses over 0.500 in.: Plain end square cut.

Hydrostatic testing

Hydrostatic inspection test pressures for plain end and threaded and coupled pipe are specified. Hydrostatic pressure shall be maintained for not less than 5 seconds for all sizes of seamless and electric-resistance-weld pipe.

Mechanical tests specified

Tensile Test — Transverse required on ERW for NPS 8 and large.

Sending Test (Cold) — STD and XS-NPS 2 and under XXS-NPS 1 1/4 and under.

Application	Degree of Bend	Diameter of Mandrel
For Normal A53 Uses	90	12 x nom dia. of pipe
For Close Coiling	180	8 x nom dia. of pipe

Flattening Test — NPS 2 and larger STD and XS. (Not required for XXS pipe.)