

CHOOSE STEEL WATER PIPE

- **STRONG**
Easily designed to withstand high internal and other service pressures.
- **FLEXIBLE**
Value-added design and manufacturing flexibility. Virtually any thickness, joint length, and fitting configuration allows uniquely difficult alignments and in-field modifications.
- **DURABLE**
150-year history, long life expectancy, indefinite serviceability.
- **SUSTAINABLE**
Steel is the world's most recycled material, with 80 million tons recycled annually in the United States alone.



Scan this QRC for
more Steel Facts



STI + SPFA

Steel Facts

Number 7

Steel: The first choice for large-diameter water pipe

Since the introduction of steel to make water pipe in the mid-1800s, developments and improvements in the steel-making process, welding technology, and pipe forming equipment enable steel pipe to proudly point to a record of performance that spans more than 150 years.

Consistent Strength

Steel pipe is inherently strong and fully elastic, unlike pipe made of lower strength, visco-elastic materials where strength is time- and temperature - dependent. This consistent material strength assures steel is capable of maintaining high internal and other service pressures over full design life.

Steel Pipe Manufacturing

Today's steel-making processes consistently provide excellent control of mechanical and chemical properties, as well as precision dimensional control. These controls assure end users that steel pipe manufactured by a Steel Tank Institute/Steel Plate Fabricators Association (STI/SPFA) quality-certified member, it will be of the highest quality available.

Design and Manufacturing Flexibility

The manufacture of steel water pipe also builds on steel's flexibility. Steel pipe is routinely manufactured to standard lengths that accommodate the demands of the project site and contractor equipment limitations or innovations. Fitting configurations are limited only by the imagination of the designer.

Due to the ease with which steel pipe can be cut, formed, and welded into various configurations during production, steel pipe accommodates challenging installation situations that require field flexibility and adaptability.

Durability and Long Life

Whether installed by direct-bury or above ground on supports, steel pipe can be coated and lined with innovative products to address external or internal corrosion concerns.

The variety of quality coatings and linings offered by STI/SPFA quality-certified manufacturers ensures that steel water pipe provides unmatched durability for large diameter pipe. Further, the application of appropriate cathodic protection extends the life of steel pipelines indefinitely, a principle that cannot be applied to non-ferrous pipes.

Sustainability

Finally, steel is sustainable, an important consideration as we look to the future. Steel is the world's most recycled material, with 80 million tons recycled annually in the United States alone.



60 inch pipe in valve vault

STI/SPFA Pipe Quality Certification Program

STI/SPFA's Pipe Quality Certification is a requirement in most piping specifications in the US water transmission industry. There are currently 20 pipe manufacturing plants certified. The STI/SPFA program assesses:

- Quality assurance and control.
- Lining and coating operations.
- Equipment and welding procedures specific to steel water piping.
- Management, organization, engineering and procurement practices.

Rigorous annual audits are administered by a third-party quality assurance organization. Full inspection and recertification is required every three years.

Pipe system owners and engineers who require STI/SPFA Pipe Quality Certification can be confident that their pipe and fittings will conform to both the defined requirements of AWWA steel pipe standards and the intent of a quality product.

Steel pipe: A century of service life

Steel pipe has been used for water lines in the United States since the early 1850s. The pipe was first manufactured by rolling steel sheets or plates into shape and riveting the seams.

This method of fabrication continued, with improvements, into the 1930s. Pipe wall thicknesses could be readily varied to fit the different pressure heads of a pipeline profile.

Lock-Bar pipe, introduced in 1905, had nearly supplanted riveted pipe by 1930. Fabrication involved planing 30-ft long plates to a



Cement mortar lined and coated steel pipe that was installed in 1855 in the City of St. John, New Brunswick, Canada.

width approximately equal to half the intended circumference, upsetting the longitudinal edges, and rolling the plates into 30-ft long half-circle troughs. H-shaped bars of special configuration were applied to the mating edges of two 30-ft troughs and clamped into position to form a full-circle pipe section.

Welding leads the way

By the early 1930s, both the riveting and Lock-Bar methods were being replaced by welding. Pipe produced using automatic electric-fusion welding was advantageous because fewer pieces were used, fewer operations were performed, seam protrusion was reduced, and welded seams yielded 100-percent efficiency.

The next improvement was helically formed and welded pipe, developed in the early 1930s. It was used extensively in diameters from 4 in. through 36 in. Welding was performed using the electric fusion method.

After World War II, German pipe manufacturing machines were imported and subsequently developed domestically. They were capable of spirally-welding seams to

improve pipe integrity and ensure maximum water flow.

A durable future

Today, improved quality of steel and innovations in coatings and linings make steel water pipe a highly viable choice for water infrastructure. Dielectric coatings or cement-mortar coatings provide external corrosion protection. Centrifugally-spun cement-mortar linings provide internal corrosion protection and a smooth interior surface that insures maximum water flow.

A century of service life

There are steel pipelines installed more than 100 years ago that are still in service. In 2013, STI/SPFA presented its first Pipe Century Club award to Denver Water, for a 2500-foot section of water pipe built in 1911 and still in service today.



Steel pipe standards and resources

Established in 1881, the American Water Works Association is the largest nonprofit, scientific and educational association dedicated to managing and treating water.

Ever since, AWWA has been the leading force in setting standards for steel pipe flanges, joints, fittings, coatings, linings—more than 25 standards for the steel water pipe industry.

AWWA's Steel Pipe Committee includes design engineers, manufacturers, and owners/operators. The Steel Water Pipe Manufacturers Technical Advisory Committee (SWPMTAC) meets twice each year to continually update all standards. SWPMTAC's recommendations go to the AWWA Steel Pipe Committee for consideration.

AWWA's C200 series of standards covers steel pipe, coatings and linings. AWWA M11 Manual is the primary reference for steel

water pipe design and installation. These standards and manual have been continually peer-reviewed for more than 40 years.

The American Society of Civil Engineers (ASCE) hosts the annual Pipelines conference, where engineers share their large water pipe experiences and research. Numerous manuals and reports on topics such as directionally-drilled flexible steel pipe are presented at the conference.

The Steel Pipe Fabricators Association (SPFA) partners with the Steel Tank Institute to research, advocate and market the benefits of steel water pipe.

- American Water Works Association, www.awwa.org
- American Society of Civil Engineers, www.asce.org
- Steel Plate Fabricators Association, www.spfa.org

RESOURCES

STI/SPFA offers a number of publications and archived webinars developed by industry experts to assist in designing, specifying and installing steel water pipe. These resources and more are available at www.steeltank.com:

- Welded Steel Pipe Design Manual
- Welded Steel Pipe, Suggested Specification
- Welded Steel Pipe, Steel Plate Engineering Data Vol. III
- Buried Steel Penstocks, Steel Plate Engineering Data Vol. IV
- The Story of Buried Steel Pipes and Tanks, by Dr. Reynold K. Watkins
- Steel Water Pipe Overview
- Steel Water Pipe Design
- Steel Water Pipe Linings and Coatings