



SLS600 WEARPIPE

Induction Hardened Pipe



ST. LAWRENCE

Alloys for Industry Since 1955

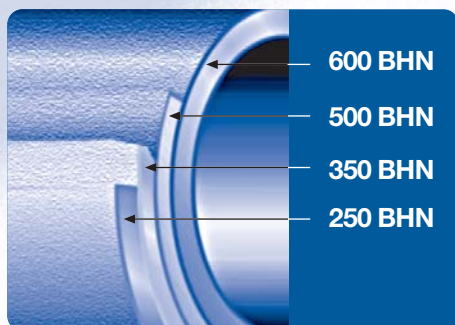
SLS600 WEARPIPE

Premier Abrasion Resistant Steel Pipe

Induction Hardened Pipe

SLS600 WEARPIPE is achieved by a unique heating/quenching process that alters the steel's microstructure through the pipe wall.

Hardness Gradient Through Pipe Wall



- The structure of the inner surface becomes very hard, typically 600 BHN
- The microstructure of the outer surface, cooling slower, remains more ductile, having a hardness of 250 BHN

In the hardening process the raw pipe, a medium carbon-low alloy steel, is heated to a fully austenitic temperature of approximately 1550° F. The inside diameter is then rapidly quenched with a treated coolant thus producing different microstructures and BHN hardness throughout the wall thickness. Induction hardening leaves a hard abrasion resistant inner

surface so as to withstand flow deterioration and a ductile outer surface to accommodate handling and welding.

- Ferrite / Pearlite
- Bainite / Ferrite
- Martensite / Bainite
- Martensite

Induction hardening alters the microstructure to produce an inner surface of high hardness which tapers to a ductile outer surface.

CHOOSE SLS600 WEARPIPE FOR:

- High abrasion/erosion applications, especially sliding abrasion
- Improved wear resistance; up to 6 times the life of mild steel
- Lower life-cycle cost
- Easy installation, as well as field repair or modifications
- Ultrasonic monitoring for well-timed rotations or replacement
- Custom fabrications to fit your specific assembly

Why Use SLS600 WEARPIPE?

For applications where abrasion from shear and erosion are the major wear factors – SLS600 is engineered for outstanding wear resistance. Together we can jointly find a solution tailored to your particular applications. We can mix and match technologies and customize a piping system.

SLS600 Pipe Sizes

Size	O.D.	Wall Thickness	Length (Ft.)	Wt. per Ft.
	2 7/16"	.276"	20	7.66
3" Sch 80	3 1/2"	.300"	20	10.30
	4"	.500"	24	18.69
4" Sch 80	4 1/2"	.337"	20	14.98
5" Sch 80	5 9/16"	.375"	20	20.78
6" Sch 40	6 5/8"	.280"	20	18.97
6" Sch 80	6 5/8"	.432"	20	28.57
8" Sch 40	8 5/8"	.322"	20	28.55
8" Sch 80	8 5/8"	.500"	20	43.39
10" Sch 40	10 3/4"	.365"	20	40.48
10" Sch 80/ExHvy	10 3/4"	.500"	20	54.74
12" Sch 40	12 3/4"	.375"	20	49.56
12" Sch 80/ExHvy	12 3/4"	.500"	20	65.42
14" Sch Std	14"	.375"	20	54.57
14" Sch ExHvy	14"	.500"	20	72.09
16" Sch ExHvy	16"	.500"	25	104.10
18" Sch Std	18"	.375"	20	70.59

AVAILABLE FABRICATIONS:

- Spooled to length
- End attachments of flanges or weld rings
- Bends
- Tees
- Wyes and True Wyes
- Laterals
- Elbows

- Available in single lengths (20 ft.)
- Available in double lengths (40 ft.) on special order
- 20", 24" and 26" OD pipe available upon request

ADDITIONAL FEATURES:

- SLS600 also features the flexibility of medium carbon steel pipe which allows tremendous flexibility in both design and fabrication
- The 600 BHN inner surface provides maximum wear resistance where heavier wall pipe was previously used
- SLS600 is manufactured as one piece of steel – NOT LAMINATED
- Service temperature up to 450° F

Cutting and Forming

Caution: Induction hardening process imparts internal stresses in the pipe wall. Pipe should never be cut lengthwise. To prevent personal injury or property damage, all cutting and welding should be done with caution.

- Plasma arc cutting is recommended- however abrasive disc saws and oxy-fuel can be used
- SLS600 can only be formed during the induction hardening process
- SLS600 can only be custom formed in standard pipe sizes 3" to 16" dia.
- Radius options include a min. 20" centerline radius or 3D (3 x diameter) up to 96" max. centerline radius
- Precision wall thickness is maintained through special induction bending

Joint Preparation

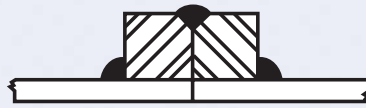
- Remove all slag and discolored material after cutting in weld area
- Inspect surfaces to be welded - avoid welding areas that have tears, cracks and other discontinuities
- Clean joint area at least 1/2" (12.7 mm) from welding joint; remove all loose scale, rust, moisture, grease, etc.

Fit Up

- Bring parts into as close contact as practical; root opening should not exceed 3/16" (4.76 mm)
- For separations greater than 1/16" (1.58 mm), increase leg of fillet weld by the amount of the opening

End Options / Coupling Methods

St. Lawrence supplies (3) styles of ends:



Standard Weld Rings

- Typically no face seal weld
- Most common style
- Butt weld field applied



Self-Aligning Weld Rings

- Male/Female recess
- Butt weld field applied



Standard Flanges

- 150#, 300# most common; others available
- Industry standard dimensions
- Raised face (shown) and plate flanges

Welding

- If ambient temperature of parts are below 70° F (21° C), preheat weld zone and 6" (152.4 mm) of adjacent material to 100° F (38° C)
- Place welds on exterior of pipe
- Keep weld beads as small as possible; length should not exceed 5 to 6 inches (127 mm to 152.4 mm)
- Allow pipe to cool before applying additional beads. Do not exceed 450° F
- Use stringer beads; avoid weaving beads.
- Use low hydrogen electrodes, E-7018 series
- Weld using multiple passes - five to six passes for 3/8" (9.5 mm) fillet welds, ten to twelve passes for 1/2" (12.7 mm) fillet welds

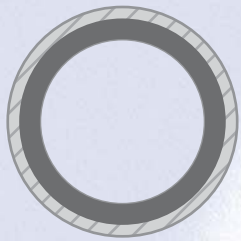


SLS CAST LINED PIPE

Chrome Carbide Insert Lined Elbows Designed for Long Life in High Abrasion Piping Systems

Applications include pneumatic and hydraulic piping systems for extremely abrasive materials such as foundry sand, lime/ash injection, glass transport, and mine backfill.

Chrome carbide insert components are ideal for improving system performance and life – upgrading, renovations, or component replacement.



Carbon Steel Pipe
Chromium Carbide Cast Insert

Featuring:

- Chrome carbide wear material maximizes abrasion resistance
- Chrome carbide wear performance similar to hard face weld overlay
- Cast segments offer a thick outer wall on bends where impact and sliding abrasion occur
- Cast chromium carbide inserts offer 360 degree protection
- Chrome carbide inserts are contained in a carbon steel outer pipe
- Available sizes of 3", 4", 5", 6", 8" diameter, bends have CLR = 5D for 3", 4", 6", 8", and CLR = 2D for 5"
- Various tangent lengths provide dimensional flexibility, Chrome Carbide Insert lined tangents available for continued wear resistance
- Multiple end options available, including flanges, couplings or plain ends

Chrome Carbide Insert Elbows Offer:

- Long life in highly abrasive applications
- Smooth laminar flow – superior to pocket elbows or blind tees
- Improved performance compared to alternate linings – basalt, steel, or cast elbows
- Excellent service life at economical pricing



ULTRA-MET PIPE

Ultra-Met Overlay Lined Pipe

Ultra-Met pipe is recommended for severe sliding abrasion applications. The result is a surface possessing an excellent combination of high resistance to erosion, severe abrasion and moderate impact strength.

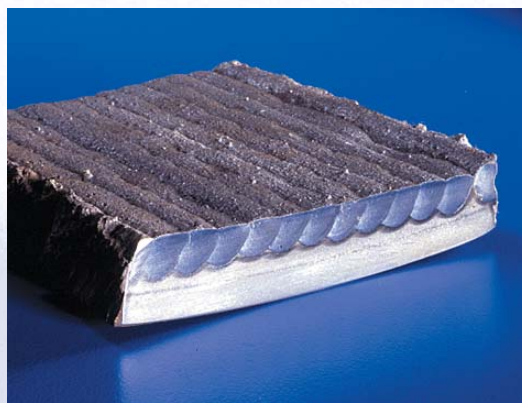
Ultra-Met overlay can be applied to spool sections, pipe bends and fabricated fittings.

Wire alloy is deposited upon the carbon steel inner pipe bore. For straight sections or bends, the entire inner surface is welded in one or two layers.

Overlaid bends and fittings can be used in conjunction with induction hardened pipe within the total system to afford the additional abrasion resistance needed in areas of extreme turbulence and wear.

Choose Ultra-Met Pipe for:

- Severe abrasion/erosion applications, especially sliding abrasion
- Improved wear resistance; up to 10 times the life of mild steel
- Lower life-cycle cost
- Easy installation
- Custom fabricated for flexibility in pipe system design
- Available Sizes: straights, 10" through 40" NPS custom bends, 8" through 30" NPS
- Slip-on flanges and weld rings available



COMPARISON CHART (Based on mild steel)

	MILD STEEL	SLS 600 WEARPIPE	ULTRA-MET PIPE	SLS CAST LINED PIPE
HARDNESS	120-150 BHN	480-650 BHN	> 600 BHN	300-700 BHN
ABRASION RESISTANT	Poor	Very Good	Excellent	Excellent
IMPACT RESISTANT	Good	Low Marginal	Low Marginal	Poor
STRENGTH	Good	Excellent	Good	Excellent
SIZES	Unlimited	50'	Limited to 50'	18'
HANDLING & INSTALLATION	Excellent	Very Good	Very Good	Very Heavy Very Brittle
FABRICATION	Unlimited	Some Limitations	Some Limitations	Very Limited (to patterns)
WEAR MONITORED	Ready with Ultrasonic	Ready with Ultrasonic	No	No
EMERGENCY REPAIR	Easily Completed	Easily Patched	Easily Patched	No
INITIAL COST		2-3 times above Mild Steel	4-5 times Mild Steel	3-6 times Mild Steel
LIFE EXPECTANCY		Up to 6 times Mild Steel	Up to 10 times Mild Steel	Up to 10 times Mild Steel
ADVANTAGES	Low cost Readily available	Excellent combination of abrasion & impact resistance	Excellent for abrasion wear	Excellent for abrasion wear
DISADVANTAGES	Poor abrasion resistance; Costly change-out	No corrosion resistance; Low ductility	Limited length and diameter	Very heavy; supports req'd; Very Brittle; Costly



ST. LAWRENCE

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