

DENAIS® Wearable Products

— High Chrome White Iron (HCWI) Lined Steel Pipes & Spools

WHAT'S DENAIS® HCWI?

DENAIS® HCWI, ASTM A532 Class III Type A, is a high chrome white iron which is a hypoeutectic structure consisting of very hard primary and secondary carbides in a matrix of martensite. By centrifugal molding process, a target thickness of HCWI alloy layer is lined on inner side of steel pipe. The straight pipe can be seamless or DSAW or customer-specified API standard steel pipe. The elbow is hot crucible elbow, also lined with HCWI alloy layer, which not only has the wear resistance, but also has high mechanical properties and pressure resistance.

Our engineered chemistry together with our proprietary heat treatment allows us to harden HCWI alloy to a minimum of 600 BHN. Dimensions are calculated to allow for dimensional changes during the hardening process.

This alloy has very good abrasion resistant properties, especially against gouging, grinding and scratching. It meets the requirements for many applications such as mining crusher liners, chute liners, ball mill liners (and lifter bars), slurry pumps, frac pumps, dredge pumps, impellers, oil sands applications, concrete rock crushing and recycling-machine parts (blow bars).

WHY IS DENAIS® HCWI PROVEN SUPERIOR ABRASION RESISTANCE?

Chrome white iron is comprised of carbides and martensite. This combination makes chrome white iron exceptionally wear resistant and hard. The carbides, in form of 'M7C3' type, in chrome white iron have a hardness range of 1500-1800HV and are primarily eutectic carbides. These 'Ka' type carbides form as bundles of hollow hexagonal rods. The growth of these rods will drastically affect the properties of the casting, which is controlled through the careful engineering of the chemical composition.

Abrasion resistance is the property most desired when selecting a chrome white iron casting. At the foundry level the microstructure (carbides and martensite) is controlled to maximize the abrasion resistance for an application. There are many phenomena at work during cutting, gouging or scratching types of abrasion. The presence of carbides, the fatigue resistance and the toughness of high chrome white iron all play an important role in its abrasion resistance.

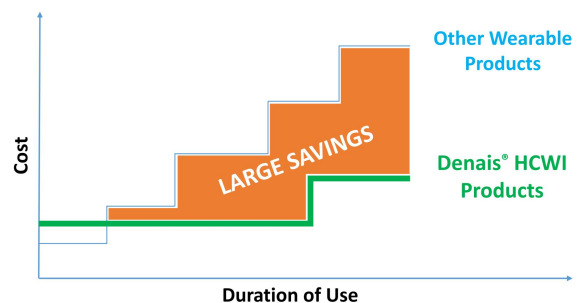
In a nutshell - the carbides in the matrix allow chrome white iron to have such exceptional wear life.



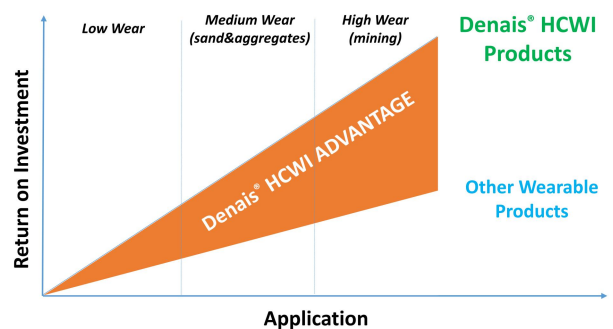
THE BENEFITS OF USING DENAIS® HCWI LINED STEEL PIPES?

Cost of Wear and Corrosive

Because of its unique microstructure, high chrome white iron offers superior abrasion resistance, heat and corrosive resistance over other alloys, including steel and CCO. By replacing steel or CCO with high chrome white iron you can significantly extend the wear life of a casting or product. This reduces the total amount of material used over the life of a project, saving downtime and money.



Although the initial upfront costs of using DENAIS® HCWI might be slightly higher, the superior performance results in a lower total cost of ownership. Meaning DENAIS® HCWI products pay for themselves over and over again.



When using DENAIS® HCWI products, experience proves that the more aggressive the wear environment, the greater the return on investment.

***PLEASE NOTE:** Graphical representation is for illustrative purposes only. Actual performance and cost savings may differ depending on factors such as the type, size, velocity and density of particles within the media that the product is exposed to.



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WHERE TO USE DENAIŠ® HCWI LINED STEEL PIPES FOR BEST EFFECT?

Typically, if the application involves transporting an abrasive media, using chrome white iron significantly extends the life of the part, reducing downtime in the process and resulting in substantial cost savings.

- Mining crusher liners
- Oil sands applications
- Chute liners
- Ball mill liners (and lifter bars)
- Slurry pumps
- Frac. pumps
- Dredge pumps
- Pumps impellers and suction or bearing liners
- Concrete rock crushing and recycling-machine parts (blow bars, anvils and throw shoes).

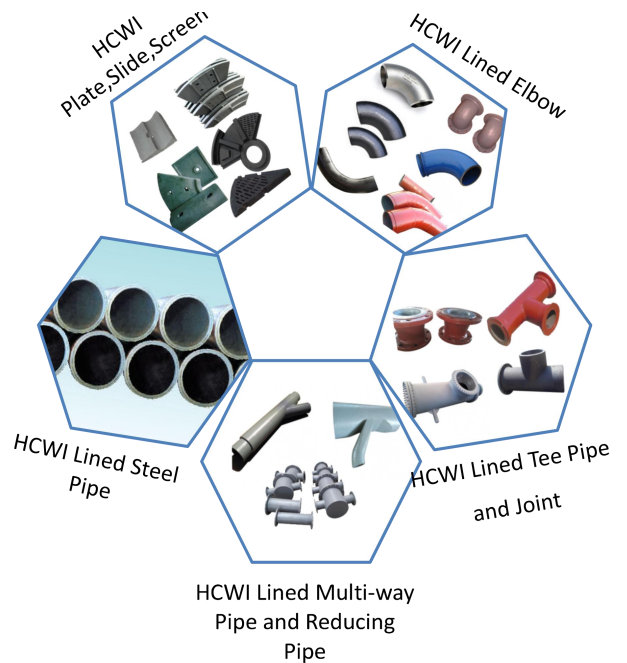
In severe applications (like flue gas desulfurization) consider using a 28% - 30% Cr alloy. Please contact DENAIŠ

TYPICAL PHYSICAL PROPERTIES

Typical Hardness	Brinell (depends on thickness)
As-Cast	450-550
Annealed	300-450
Hardened	600-700
Wear Loss: 0.0004g/12hrs	
Coefficient of Thermal Expansion: 1.2X10 ⁻⁷ E/C	
Density: 8.0 g/cm ³	



PRODUCTS RANGE



SPECIFICATIONS

DENAIŠ® HCWI Lined Steel Pipe
Typical Connection: Flange Connection

Nominal Dia. DN	Steel Pipe Spec.	Inner Lining Thickness (mm)	Unit Length (m)
100	Φ108x4	Up to 65	Up to 6
125	Φ133x4		
150	Φ159x5		
175	Φ194x6		
200	Φ219x6		
225	Φ245x6		
250	Φ273x6		
300	Φ325x7		
350	Φ377x7		
400	Φ426x7		
450	Φ480x7		
500	Φ530x8		
600	Φ630x8		
700	Φ720x10		
800	Φ820x10		
900	Φ920x10		
1000	Φ1020x10		
1200	Φ1220x10		

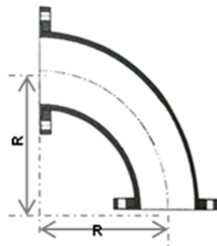
*We offer customer design service for non-standard products.

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SPECIFICATIONS

DENAIS® HCWI Lined Elbow Typical Connection: Flange Connection

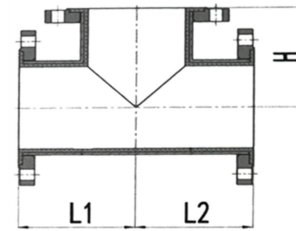


Nominal Dia. DN	Steel Pipe Spec.	Inner Lining Thickness (mm)	Bending Radius (mm)
100	Φ108x4	Up to 50	150
125	Φ133x4		190
150	Φ159x5		230
175	Φ194x6		260
200	Φ219x6		300
225	Φ245x6		340
250	Φ273x6		375
300	Φ325x7		450
350	Φ377x7		525
400	Φ426x7		600
450	Φ480x7		675
500	Φ530x8		750
600	Φ630x8		900
700	Φ720x10		1050
800	Φ820x10		1200
900	Φ920x10		1350
1000	Φ1020x10	1500	
1200	Φ1220x10	1800	

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SPECIFICATIONS

DENAIS® HCWI Lined Tee Pipe Typical Connection: Flange Connection



Nominal Dia. DN	Steel Pipe Spec.	Inner Lining Thickness (mm)	Main Pipe Length (mm)		Branch Height H (mm)
			L1	L2	
100	Φ108x4	UP to 65	150	150	150
125	Φ133x4		190	190	190
150	Φ159x5		205	205	205
175	Φ194x6		230	230	230
200	Φ219x6		230	230	230
225	Φ245x6		240	240	240
250	Φ273x6		280	280	280
300	Φ325x7		305	305	305
350	Φ377x7		350	350	350
400	Φ426x7		400	400	400
450	Φ480x7		450	450	400
500	Φ530x8		500	500	450
600	Φ630x8		600	600	500
700	Φ720x10		700	700	550
800	Φ820x10		800	800	650
900	Φ920x10		900	900	700
1000	Φ1020x10	1000	1000	800	
1200	Φ1220x10	1100	1100	850	

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