

APPLICABLE SPECIFICATION

1. Line Pipes (Carbon Steel)

API 5L	Line Pipe (Grade B, X42, X46, X52, X56, X60, X65, X70, X80, X90, X100)
ISO 3183	Petroleum and natural gas industries -Steel Pipe for Pipelines-
DNVGL-ST-F101	Submarine Pipeline Systems (Applicable Design Code)
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Seamless
ASTM A106	Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A333	Seamless Steel Pipe for Low-Temperature Service
CSA Z245.1	Steel Line Pipe
JIS G3454	Carbon Steel Pipes for Pressure Service (STPG)
JIS G3455	Carbon Steel Pipes for high Pressure Service (STS)

2. Line Pipes (Corrosion Resistant Alloy)

API 5LC	CRA Line Pipe
DNVGL-ST-F101	Submarine Pipeline Systems (Applicable Design Code)
ASTM A790	(S31803) Seamless Ferritic / Austenitic Stainless Steel Pipe
ASTM A790	(S31260) seamless Ferritic / Austenitic Stainless Steel Pipe



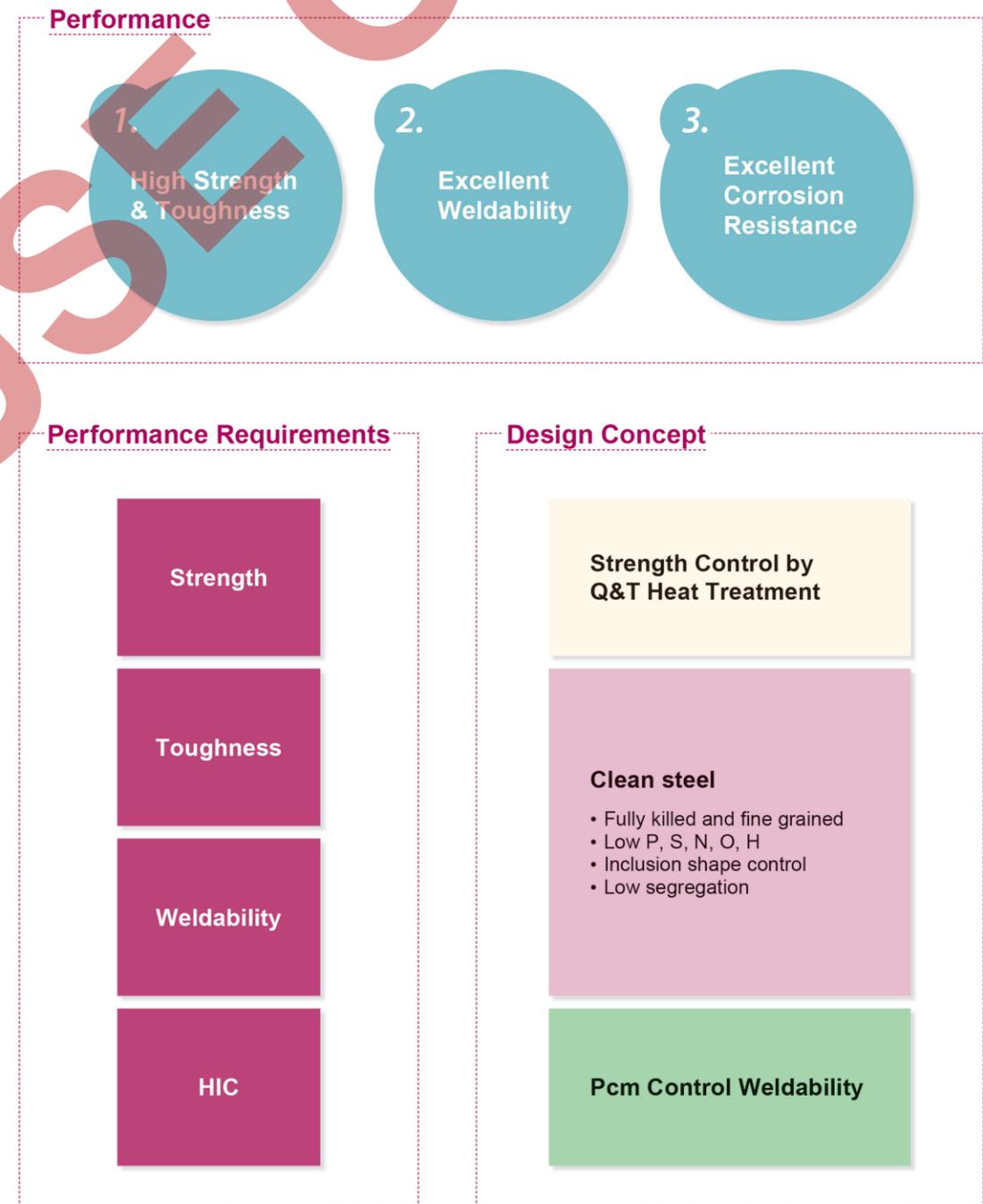
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MATERIAL DESIGN TECHNOLOGY

1. NIPPON STEEL MATERIAL DESIGN CONCEPT FOR SOUR SERVICE



CARBON STEEL LINE PIPE



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NIPPON STEEL has supplied Carbon Steel Line pipe with low carbon and low Pcm material. And we can provide tighter ID tolerance at pipe end.

NIPPON STEEL MATERIAL DESIGN CONCEPT FOR CARBON STEEL

- To Prevent HAZ Hardening in Field Girth Welding, our carbon steel is low carbon and low Pcm.

Table Chemical composition Nippon Steel compared to others

	Size (mm)	C	Si	Mn	P	S	Others	Ceq (IIW)	Pcm
Nippon Steel	355.6OD x 25.4WT	0.05/ 0.07	0.05/ 0.15	1.05/ 1.40	max. 0.015	max. 0.002	Cr, Mo, Ti, and V	0.39	0.17
	Cr, Mo, Ti, and V								
Others	355.6OD x 25.4WT	0.10/ 0.12	0.20/ 0.30	1.05/ 1.40	max. 0.015	max. 0.002	Cr, Mo, Ti, V and Nb	0.37	0.20
	Cr, Ni, Cr, Mo and Nb								

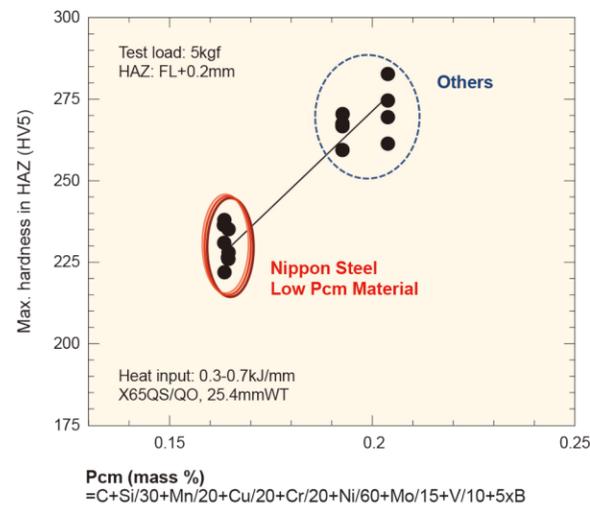


Fig. Hardness test results on typical field girth welds (Mechanized PGMAW)

Low Pcm material prevented HAZ hardening

NIPPON STEEL PIPE END AVAILABLE ID TOLERANCE

Table Available ID Tolerance and control method

Available ID tolerance	End Sizing	End Machining
	+/- 1.0mm	+/- 0.25mm
ID control method	<p>A) Expanding</p>	
	<p>B) Swaging & Expanding</p>	

