

Pipes and Tubes for Nuclear Application

Pipes
& Tubes

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Material Series for Nuclear Application

NIPPON STEEL has developed "Fit for Purpose" materials for Nuclear applications with its sophisticated technologies.

Material Grade

Stainless steels and Ni base alloys (see table below) in addition to carbon and low alloy steels can be manufactured.

Category	ASME		EN		JIS	
Austenitic stainless steel	SA-213 SA-312 SA-376	TP304	1.4301	X5CrNi18-10	G3459 G3463	SUS304TP, SUS304TB
		TP304L	1.4306	X2CrNi19-11		SUS304LTP, SUS304LTB
		TP316	1.4401	X5CrNiMo17-12-2		SUS316TP, SUS316TB
		TP316L	1.4404	X2CrNiMo17-13-2		SUS316LTP, SUS316LTB
		TP317N	1.4406	X2CrNiMoN17-12-2		SUS317NTP, SUS317NTB
		TP321	1.4541	X6CrNiTi18-10		SUS321TP, SUS321TB
Ferritic stainless steel	SA-312	TPXM-19	—	—	—	—
	SA-268	TP439	—	—	G3463	SUSXM8
	—	—	—	—		SUS410TiTB
Ni base alloy	SA-479	Type410	—	—	G4903 G4904	SUS410TB
	SB-163	N06600	—	—		NCF600TP, NCF600TB
	SB-167	N06690	—	—		NCF690TP, NCF690TB
		N08800	1.4558	X10NiCrAlTi32-20		NCF800TP, NCF800TB

Properties of NIPPON STEEL's Pipes and Tubes

Basic Function

Dimensional range

From 6 to 952.5 mm (0.24 to 37.5 inches) in outside diameter.

High corrosion resistance

High corrosion resistance achieved by optimizing the chemical composition and manufacturing processes. Nuclear grade 304 and 316 with high IGSCC* resistance. (*IGSCC: intergranular stress corrosion cracking)

Optional Function

Extra low cobalt (Co≤0.02%)

Stainless steels with extra low Co are available for dose reduction.

High cleanliness

Sulfur (S), phosphorus (P) and/or impurities can be minimized with sophisticated melting and refining processes.

Pre-filming

Tight and uniform protective film prevents metal release such as Cr or Ni to coolant. The technology was applied to TP304 feed water heater tubes and contributed the dose reduction in the actual nuclear power plant. (ABWR, Higashidori Unit 1 in Japan)

Good weldability

Ferrite content in the steel can be controlled for better weldability upon customer's request for further reliability of nuclear power plant.

Certificate

ISO 9001

: International Organization for Standardization

ASME Sec.Ⅲ

: American Society of Mechanical Engineers

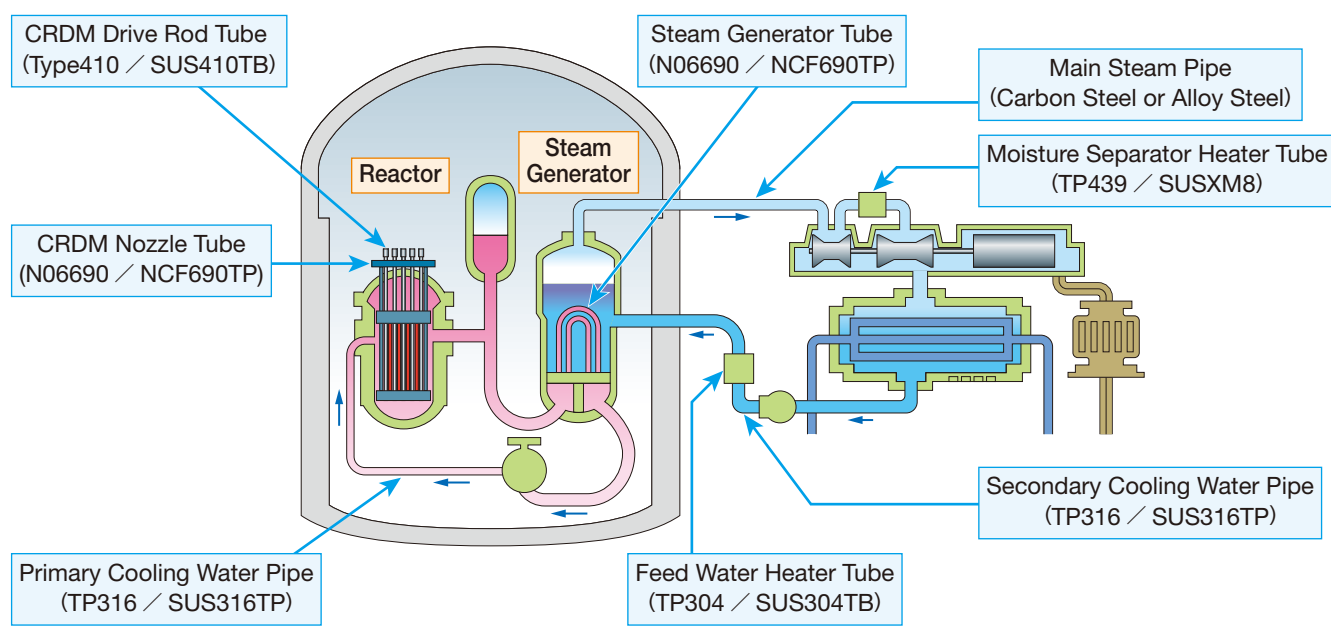
HAF604

: Code on Supervision of Civil Nuclear Safety Equipment



ISOE* technical award for Pre-filming technology
(*Information System on Occupational Exposure)

Typical Application of NIPPON STEEL's Pipes and Tubes



NIPPON STEEL can supply various kinds of products with sophisticated manufacturing equipments.

Manufacturing Equipments

Process	Equipments
Steel making	Blast furnace
	Electric arc furnace
	AOD (Argon Oxygen Decarburization) equipment
	VOD (Vacuum Oxygen Decarburization) equipment
	VIM (Vacuum Induction Melting) furnace
	VAR (Vacuum Arc Remelting) furnace
	ESR (Electro Slag Remelting) equipment
Casting	Ingot casting
	Continuous casting machine
Forging	Super forging press
Blooming	Blooming mill
Hot working	Toe-angle piercing type tube making mill
	Extrusion tube mill
Cold working	Hollow forging pipe mill
	Hydraulic cold drawing bench
	Oil hydraulic drawing bench
	Chain type cold drawing bench
	High pressure drawing bench
	Cold pilger mill
	Low fin machine
Heat treatment	Continuous type furnace
	Batch type furnace
	Barrel type furnace
	Bright furnace
	Vacuum annealing furnace
Bending	Die bender
Pipe finishing	Dieless bender
	OD and ID grinding machine
Examination	Boring and trepanning machine
	Lathes for OD machine
	Shot blast equipment
	Sand blast equipment
	Ultrasonic testing
	Eddy current testing
	Fluorescent penetrant testing
	Hydraulic testing

Products

