P355N / P355NH

Mat. No. 1.0562/1.0565 · Fine-grain steel for pressure vessels and low-temperature service

Mat. No.:	1.0562 (P355N) · 1.0565 (P355NH)
EN designation:	P355N · P355NH · P355NL1 · P355NL2
ASTM/ASME equiv.:	A/SA 333 Gr. 6 · A/SA 420 WPL6 · A/SA 516 Gr. 70
Temperature range:	−50 °C (P355NL2) to +400 °C
Standard:	EN 10216-3 · EN 10253-2
Delivery forms:	Elbows · Tees · Reducers · Caps · Flanges · Pipes

1 Material Equivalents & Comparable Grades

International Equivalents

Standard / Region	Designation	Mat. No. / Grade	Note
EN	P355N	1.0562	Normalised fine-grain steel
EN	P355NH	1.0565	+Notch-impact tested
EN	P355NL2	1.0586	Low-temp. −50 °C
ASTM	A/SA 333 Gr. 6	–	Low-temperature pipes
ASTM	A/SA 420 WPL6	–	Low-temperature fittings

Alternative Materials

Material	Mat. No.	Relation to P355N / P355NH	When to use
P265GH	1.0425	Lower strength	Standard pressure service without low-temp. req.
X12Ni14	1.5637	Nickel steel	Cryogenic to −196 °C

2 Chemical Composition

Values in mass percent (%). Standard: EN 10216-3.

Fine-grain steel. Higher strength than P265GH with good low-temperature toughness.

Element	Sym.	Min. (Heat)	Max. (Heat)	Max. (Prod.)	Function
Carbon	C	–	0.180	0.200	Controlled for fine-grain formation
Manganese	Mn	0.90	1.650	1.750	Main strengthening element
Phosphorus	P	–	0.025	0.030	Limit
Sulphur	S	–	0.015	0.020	Lower than P265GH

Aluminium	Al	0.020	–	–	Fine-grain formation (AlN)
Niobium	Nb	–	0.050	0.060	Grain refinement

3 Mechanical Properties

Room Temperature – Minimum Requirements

Normalised. Good impact toughness at low temperatures.

Property	Sym.	Unit	Min. Value	Note
Yield strength	Rp0.2	MPa	≥ 355	t ≤ 16 mm
Tensile strength	Rm	MPa	490–630	–
Elongation	A	%	≥ 22	–
Impact (−20 °C)	KV	J	≥ 40	P355NH
Impact (−50 °C)	KV	J	≥ 27	P355NL2

Elevated Temperature Yield Strength Rp0.2 in MPa (indicative values)

Temp.	100 °C	200 °C	300 °C	400 °C
Rp0.2 (MPa)	315	285	255	228

4 Physical Properties

Property	Sym.	20 °C	200 °C	400 °C	Unit
Density	ρ	7.85	7.75	7.65	g/cm³
Modulus of elasticity	E	210	197	183	GPa
Thermal conductivity	λ	50	47	43	W/(m·K)
Thermal expansion	α	12.0	13.0	13.8	10^{-6}/K

5 Corrosion Behaviour

Medium / Environment	Notes	Rating
Water / steam (treated)	General pressure service	+
LPG / low-temperature service	−50 °C (P355NL2)	+
Hydrocarbons (dry)	Non-sour service	+
Sour service H_2S	Hardness limits per NACE	o
Chlorides / acids	Not suitable	–

++ excellent	+ good	o limited	– not suitable

P355NH/NL: standard fine-grain steel for pressure vessels and low-temperature applications. Same corrosion limitations as P265GH.

6 Typical Applications

Industry / Plant	Typical Application	Operating Conditions
LPG storage / cryogenics	Low-temperature piping down to −50 °C	Impact-tested grade required
Pressure vessels	Vessel shells, nozzles	EN 13445, PED-compliant
Power plants	High-pressure carbon steel lines	Better strength than P265GH

7 Delivery Forms at Nirotec

Component	Standard (EN)	Standard (ASME/ASTM)	Note
Elbows	EN 10253-2	ASME B16.9 · A/SA 420 WPL6	LR/SR, 90°/45°
Tees	EN 10253-2	ASME B16.9 · A/SA 420 WPL6	Equal and reducing
Reducers	EN 10253-2	ASME B16.9 · A/SA 420 WPL6	Concentric and eccentric
Caps	EN 10253-2	ASME B16.9 · A/SA 420 WPL6	Ellipsoidal
Flanges	EN 1092-1	ASME B16.5 · A/SA 350 LF2	PN 10–400
Pipes	EN 10216-3	A/SA 333 Gr. 6	Seamless

8 Standards, Approvals & Codes

Standard / Code	Title / Application
EN 10216-3	Seamless steel tubes – fine-grain steels
EN 10253-2	Butt-welding fittings
EN 13445	Unfired pressure vessels
PED 2014/68/EU	Pressure Equipment Directive
ASME B31.3	Process Piping

9 Fabrication Notes

Weldability

Parameter	Requirement / Recommendation	Note

Preheat	Generally not required (t ≤ 25 mm)	CE check required
PWHT	Not mandatory; 580–620 °C for thick sections	Improves low-temp. toughness
Filler	ER70S-X / E7018 low-hydrogen	Low-hydrogen preferred
Process	GTAW, SMAW, GMAW	Standard

- Delivery condition: Normalised
- Low-hydrogen consumables recommended
- Impact test of weld metal required for low-temperature applications

10 Enquiry & Contact

For a project-specific quotation, please provide:

- Standard and execution (e.g. LR 90° elbow per EN 10253-4)
- Dimensions: DN / NPS and wall thickness or schedule
- Quantity and requested delivery date
- Documentation: EN 10204 Type 3.1 / 3.2, NDT, third-party inspection
- Any project-specific specifications or special requirements

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All information is provided without warranty. Applicable standards and project specifications at time of order are authoritative.