

# Special Fittings & Custom Components

*Project-specific pipe fittings outside standardised product ranges*

**Configurations:** Special radii · special angles · Type B (EN 10253-2) · transition pieces · combination fittings · custom parts

**Standards:** EN 10253-2 · ASME B16.9 · ASME B31.1 / B31.3 · EN ISO 15614 · ASME IX

**Manufacturing:** Hydraulic presses 150 – 1,500 t · wall thicknesses up to 100 mm · OD up to 610 mm · heat treatment volume up to 10 m<sup>3</sup>

**Materials:** Carbon · low-temp · high-temperature steels · P91/P92 · stainless · duplex · super duplex · nickel-based · special grades

**Test certificates:** EN 10204 type 3.1 / 3.2 · NDT per ITP · external inspection available

**Certifications:** ISO 9001 · AD 2000 · ISO 19443 (nuclear)

## 1 Product Overview

Special fittings and custom components are pipe fittings outside standardised product ranges. They are produced on the basis of technical drawings, project-specific specifications or individual customer requirements – precisely adapted to the respective operating conditions.

Nirotec manufactures special fittings for applications where standardised components do not meet the technical requirements – particularly for special geometries, heavy wall thicknesses or increased requirements for materials and documentation.

## 2 Typical Configurations

Type	Description	Typical application
Elbow special radius	Non-standard radii (e.g. 2D, 4D, 5D) outside EN 10253-2 Form 2/3/5	Space-restricted plant engineering
Elbow special angle	Angles < 45° or between standard angles	Project-specific routing
Elbow Type B (EN 10253-2)	Increased wall thickness $t_{int}$ for safety-critical systems	Nuclear, high-pressure, power plants
Tee special dimension	Non-standard dimensions, asymmetric branches	Special constructions
Tee Type B (EN 10253-2)	Increased $T_s$ and $T_b$ dimensions	Nuclear, high-pressure
Transition piece	Connection of different wall thicknesses or geometries	Transition piece, pipe transitions
Combination fittings	Combinations of multiple geometries in one component	Compact plant components

Type	Description	Typical application
Eccentric elbow	Eccentric expansion / reduction	Equipment and machinery construction
Heavy-wall caps	Wall thicknesses outside standard programme	Pressure vessel, high-pressure
Custom components (general)	Any component to customer drawing	On request

### 3 Manufacturing Processes

Different manufacturing processes are used depending on component geometry, material and wall thickness:

Process	Application	Key feature
Hot forming	Heavy walls, high-temperature steels, special geometries	Up to 1,500-tonne press, wall thickness up to 100 mm
Cold forming	Smaller dimensions, austenitic steels	High dimensional accuracy
Machining (turning, milling)	Precision parts, sealing faces, threaded flanges	Tight tolerances
Welding + machining	Transition pieces, combination fittings	Per WPS / ASME IX / EN ISO 15614
Forming + welding (combined)	Complex special geometries	Project-specific

**Manufacturing capacity:** hydraulic presses 150 – 1,500 t · wall thicknesses up to 100 mm · OD up to 610 mm · heat treatment volume up to 10 m<sup>3</sup>

### 4 Materials

Special fittings are manufactured from all materials available at Nirotec:

Material group	Examples
Carbon / low-alloy steels	P235GH · P265GH · 16Mo3 · 13CrMo4-5 · 10CrMo9-10
High-temperature steels	X10CrMoVNb9-1 (P91) · X20CrMoV11-1 · X11CrMo5
Austenitic stainless steels	1.4301 · 1.4307 · 1.4404 · 1.4541 · 1.4550 · 1.4571
Duplex / super duplex	1.4462 · 1.4410 · 1.4501
High-alloy austenitics	1.4539 (904L) · 1.4529 · 1.4876 (Alloy 800H/HT)
Nickel-based alloys	2.4819 (C-276) · 2.4858 (825) · 2.4360 (Monel 400)
Line pipe steels	L360NB/NE (X52) · L415NB/NE (X60)
Low-temperature steels	P265NL · P355QH1

Material group	Examples
Special materials	On request – all weldable materials possible

## 5 Standards & Codes

Standard / code	Application
EN 10253-2	Butt-welding pipe fittings – Type A and Type B
ASME B16.9	Factory-Made Wrought Buttwelding Fittings
EN ISO 15614	Qualification of welding procedures
ASME IX	Qualification Standard for Welding Procedures (USA)
AD 2000-W0 / HP0	German pressure vessel code
PED 2014/68/EU	European Pressure Equipment Directive
ASME B31.1 / B31.3	Power piping / process piping (USA)
DIN EN ISO 9001	Quality Management System Nirotec (certified)
EN ISO 19443	Quality management for the nuclear supply chain

## 6 Quality Inspection & Documentation

All special fittings are inspected and documented according to an individual Inspection and Test Plan (ITP).

Inspection	Availability
Visual inspection and dimensional check	Standard
Non-destructive testing (RT, UT, MT, PT)	On request
PMI analysis (material identification)	On request
Material testing (tensile, impact, hardness)	On request
Third-party inspection (TÜV, SGS, client inspector)	On request
$t_{int}$ , $T_s$ , $T_b$ dimension verification (Type B)	Standard for Type B components
Test certificate EN 10204 type 3.1 or 3.2	Standard
Full material traceability	Standard

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## 7 Nirotec as Project Supplier

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We supply special fittings from a single source – based on your drawings or specifications, with project-specific ITP, material traceability and complete documentation. On request integrated into an overall delivery together with standard fittings.

**Your benefit:** Custom and standard production from one supplier – with no interfaces and a uniform quality and documentation chain.

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## 8 Inquiry & Contact

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For an enquiry, please provide:

- Technical drawing or component description with main dimensions
- Material (EN or ASME designation)
- Application and operating conditions (pressure, temperature, medium)
- Quantity and required delivery date
- Required standards, inspections and documentation
- Project-specific specification or ITP requirements if applicable

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