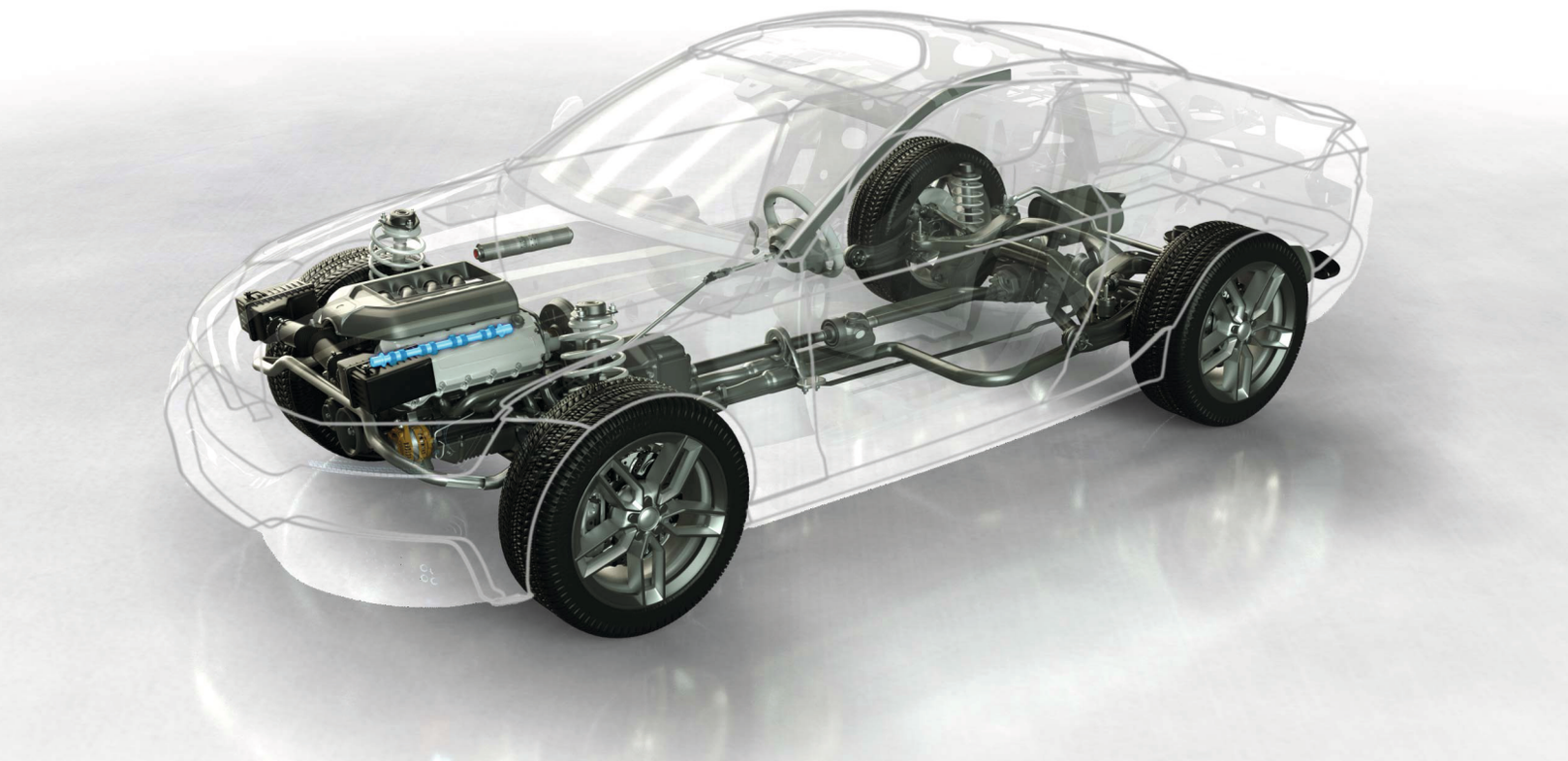
Mubea
PRECISION STEEL TUBES



Camshaft
assembled

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded-drawn precision steel tubes made of standard materials and high-tensile steel grades for assembled camshafts.

For the manufacturers of camshafts, accurate concentricity, high degrees of roundness and straightness as well as stringent dimensional tolerances are important aspects in the selection of tubes. Low levels of surface decarburisation allow a partial hardening. As a result of the trend towards lightweight design, high-tensile materials are increasingly in demand. The use of modern high-tensile materials allows further weight savings by reducing the wall thickness while maintaining the comparable physical properties.

Tube requirements

- High strength values (elongation at break, tensile strength)
- High torsional strength and reverse bending strength
- High geometrical accuracy
- Excellent surface condition
- High levels of strength and hardness after Q+T

Material properties

- High torsional strength and durability
- High levels of tensile strength
- Homogeneous strength properties and ductility
- Potential for reduced wall thickness

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Very good weld seam quality

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Low levels of deviation from straightness
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered, completely processed/chamfered

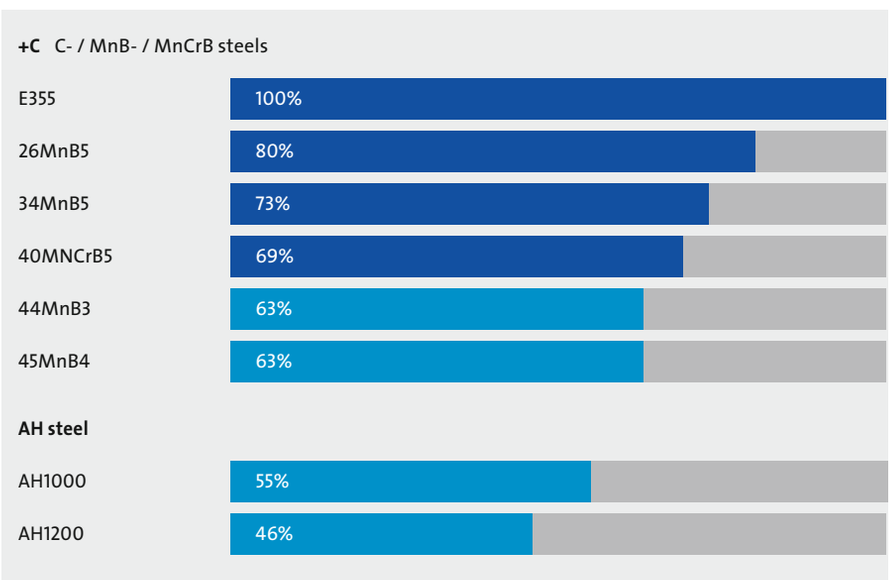
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Camshaft	✔ EN 10305-2	✔ E355 ✔ 26MnB5 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4 ✱ AH1000 ✱ AH1200	✔ +C	✔ OD 22 - 60 ✔ WT 2.5 - 6.5 also available as TDT tube with variable wall thickness

Extract from achievable weight-savings



✔ ■ Series production
✱ ■ in validation

AH: air hardening
TDT: Tailor Drawn Tube
OD: ø outside diameter
WT: wall thickness

3078752 | Product information_Camshaft_aasembled | EN | 04.2024

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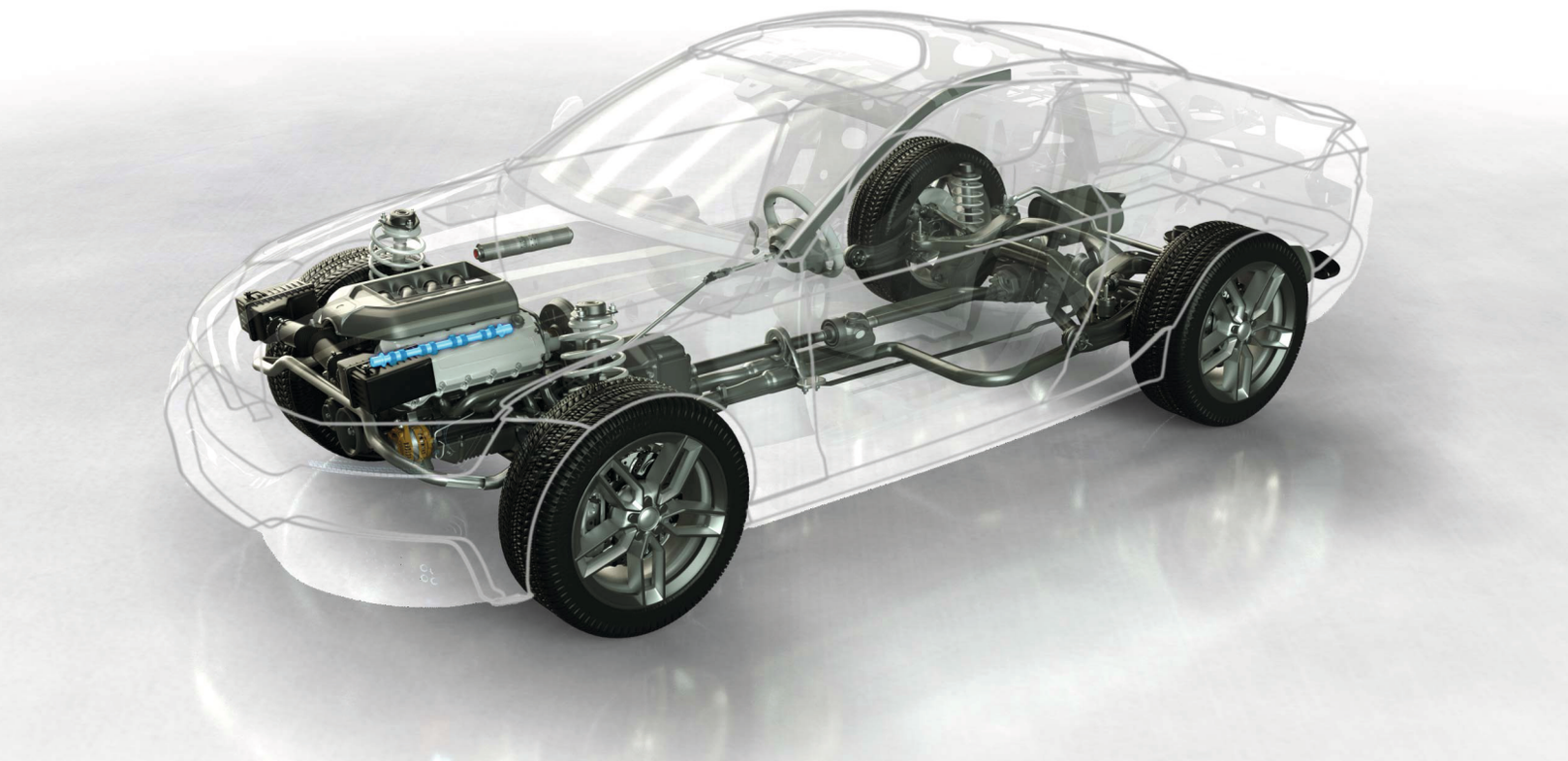
PRECISION STEEL TUBES



Camshaft
hydroformed

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded-drawn precision steel tubes made of modified C-grade steel for hydroformed camshafts.

For the manufacturers of hydroformed (HF) camshafts, accurate concentricity, high degrees of roundness and straightness as well as consistent formability properties are important aspects of the tube selection process. These criteria guarantee ideal tube processing on production systems as well as smooth operation of installed camshafts in engines.

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Tube requirements

- Very good formability
- High torsional strength and reverse bending strength
- High geometrical accuracy
- Excellent surface condition

Material properties

- High tensile strength
- Homogeneous strength properties and ductility
- Potential for reduced wall thickness

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Very good weld seam quality
- Very good reforming properties

Geometry

- Minimised fluctuation in wall thickness and diameter across the entire circumference and length
- Tube end processing: sawn/brushed; chamfered, completely processed/chamfered
- High accuracy in tube end processing (chamfer geometry)

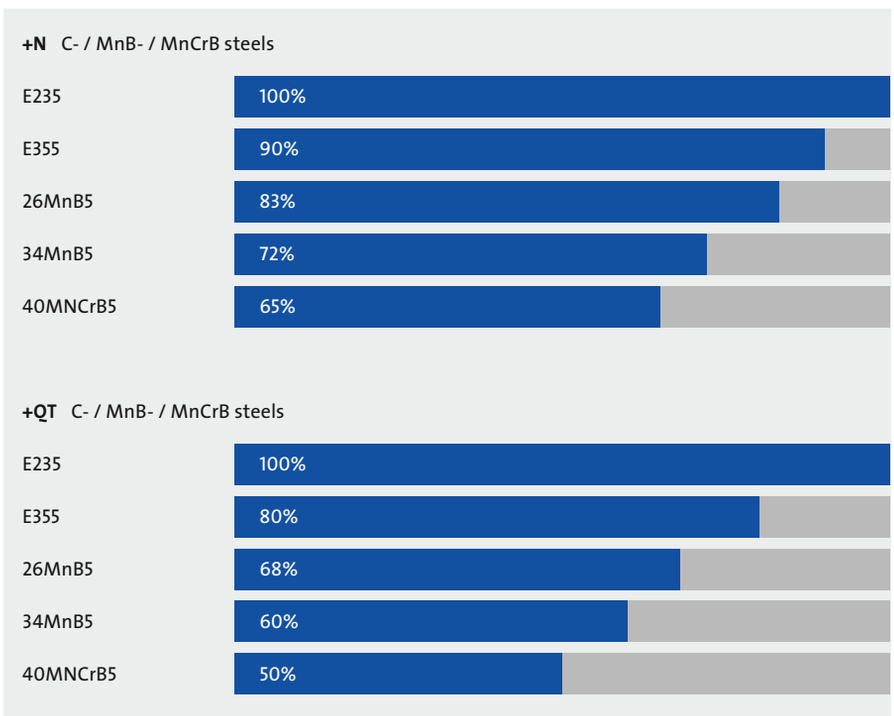
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Camshaft (car)	✔ EN 10305-2	✔ E235 ✔ E355 ✔ 26MnB5 ✔ 34MnB5 ✔ 40MnCrB5	✔ +N	✔ OD 22 - 60 ✔ WT 4 - 6,5 also available as TDT tube with variable wall thickness

Extract from achievable weight-savings

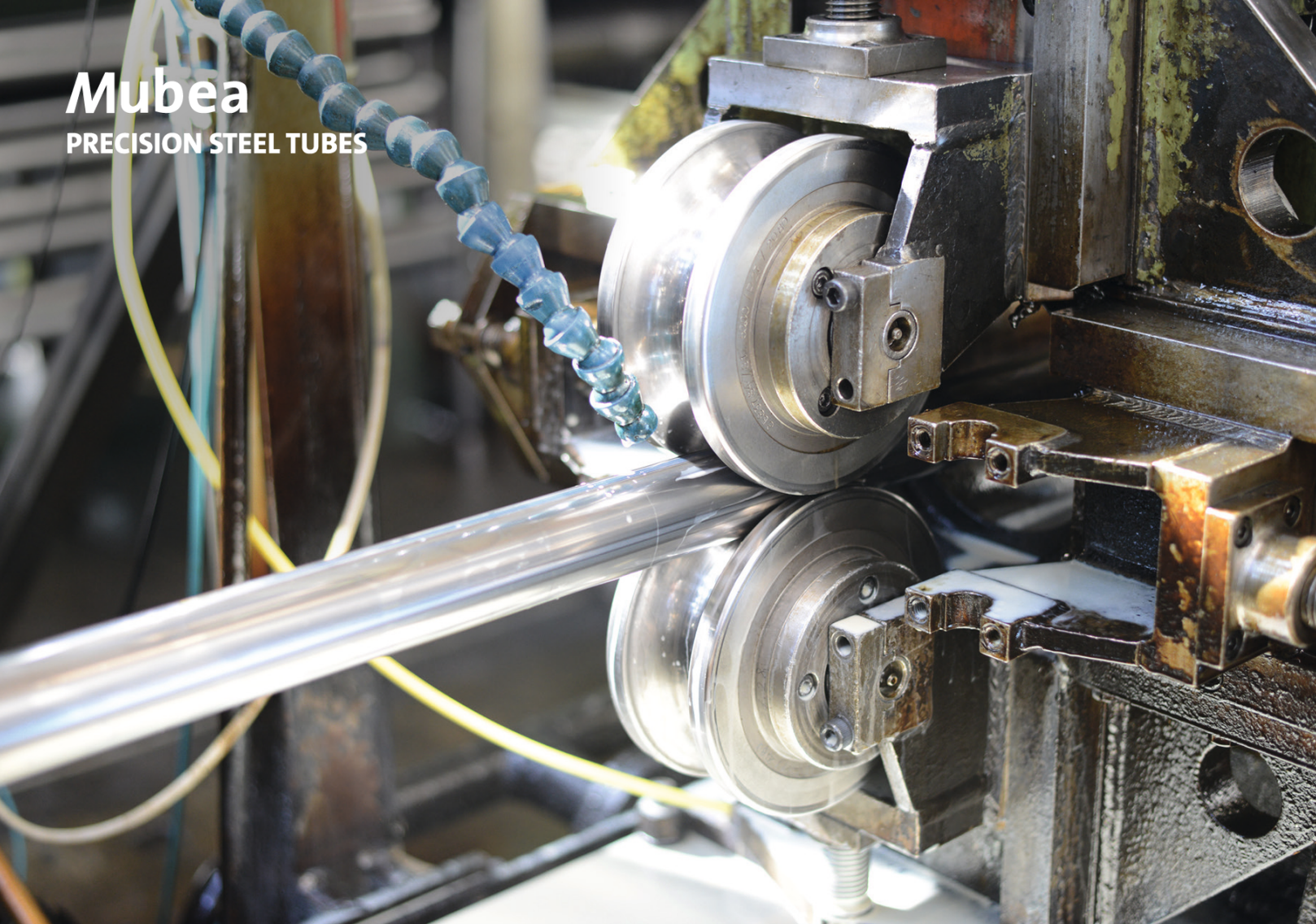


✔ ■ Series production
✱ ■ In validation

TDT: Tailor Drawn Tube

OD: ø outside diameter
WT: wall thickness

3078749 | Product information_Camshaft_hydroformed | EN | 04.2024



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PRECISION STEEL TUBES

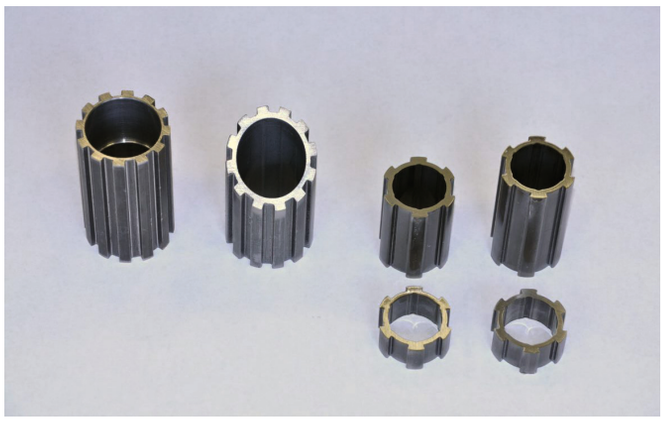
Cold Drawn Special Profiles

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded cold drawn spe-cial profiles for various applications.

Simulations and tools developed and manufactured in-house enable high-degrees of deformation and tight radii. By using thick walled tubes, we minimize the number of drawing operations required, so that you avoid the need for expensive processes such as cold extrusion. And thanks to our comprehensive 3D measuring technology, you do not have to compromise on the customary level of precision, even with the tightest form and position tolerances.

Cold Drawn Special Profiles



Tube requirements

- Individually selectable dimensions and shapes
- Highest demands on shape and position tolerances
- Minimized surface discontinuities (adhesions, scratches, dents etc.)
- High geometry accuracy
- Excellent sliding properties
- High strengths possible in +C/+SR

Materials & dimensions

Examples of applications	Tube standard	Steel grades	Delivery condition	Dimensions range mm*
Automotive e-rotor steering wheel adjustment steering wheel lock seating braking system	EN 10305-2	DD11 E235 E35-5 26MnB5 34MnB5	+C +N (+SR)	OD 20 - 70 WT 1,5 - 5,5
Furniture Lifting column Actuator Seating furniture		in validation AH 1000 AH 1200		*The feasibility will be agreed individually.

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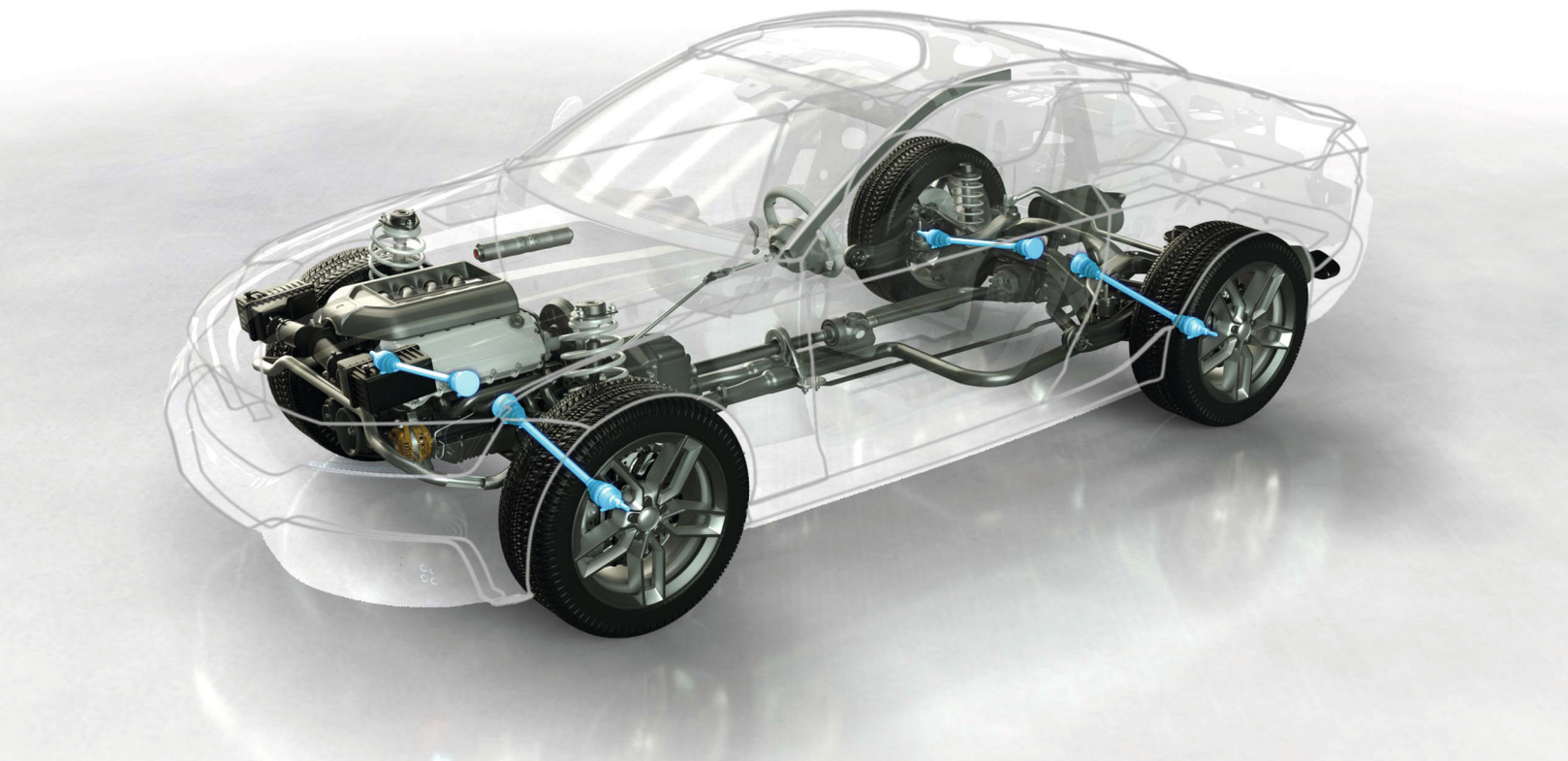

Drive shaft
3-part

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded-drawn precision steel tubes made of high-tensile materials for three-part drive shafts.

Tubes for the 3-part drive shafts are welded to other components to form one unit. Consequently, there are stringent requirements to dimensional tolerance, roundness, end processing qualities and the tubes' welding characteristics. The trend of light-weight design is increasingly demanding high-tensile materials.

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Tube requirements

- High strength values (elongation at break, tensile strength)
- High torsional strength and durability
- Very good welding properties
- High geometrical accuracy (eccentricity, roundness)
- Excellent surface condition

Material properties

- High torsional strength and fatigue strength
- Homogeneous strength properties and ductility
- Very good suitability for welding
- Potential to reduce wall thickness

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Excellent weld seam quality

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised deviations in straightness
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered, completely processed/chamfered

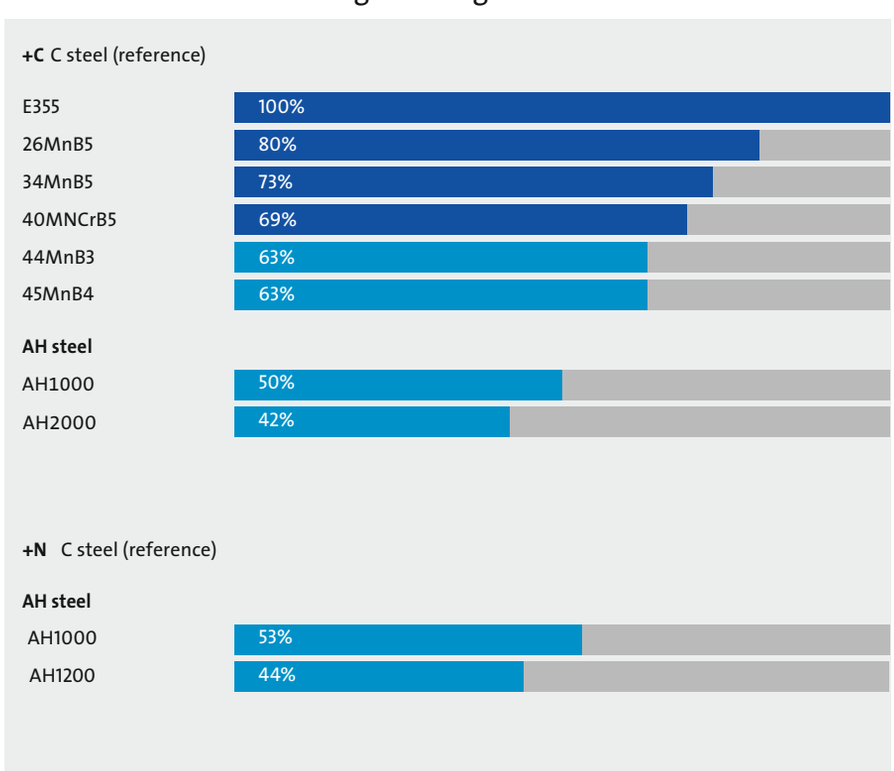
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Drive shaft (3-part)	✔ EN 10305-2	✔ E355 ✔ 26MnB5 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4 ✱ AH1000 ✱ AH1200	✔ +C ✔ +N	✔ OD 22 - 60 ✔ WT 2.5 - 6.5

Extract from achievable weight-savings



✔ Series production
✱ In validation

AH: air hardening

OD: outside diameter
WT: wall thickness

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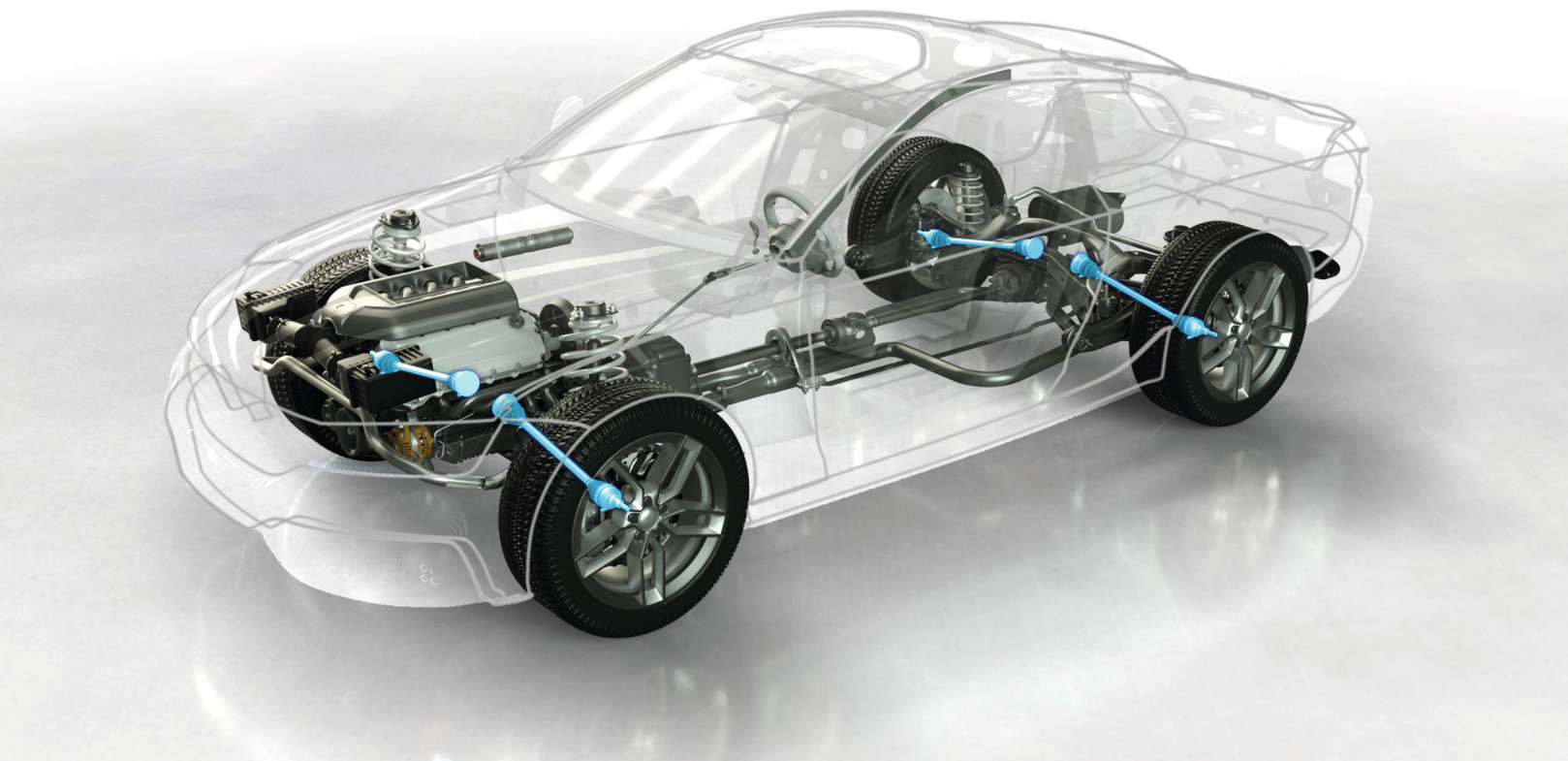
PRECISION STEEL TUBES



Drive shaft
monobloc

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded-drawn precision steel tubes made of high-tensile materials for one-part drive shafts.

The tubes for the one-part drive shafts (monobloc) are cold-formed during manufacturing. For this reason, manufacturers of monobloc drive shafts greatly value identical reshaping properties and high levels of dimensional stability in the delivery condition of the tubes. Additionally, after inductive hardening, high strength values with low levels of surface decarburisation are required. The trend towards light-weight design increasingly demands high-strength materials, which allow for weight reduction with comparable physical properties.

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Tube requirements

- Very good formability
- High torsional strength and durability
- High geometrical accuracy (eccentricity, roundness)
- Excellent surface condition

Material properties

- High torsional strength and fatigue strength
- Excellent reforming properties
- Homogeneous strength properties and ductility
- Excellent hardening properties

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Very good weld seam quality
- Very good reforming properties

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered, completely processed/chamfered

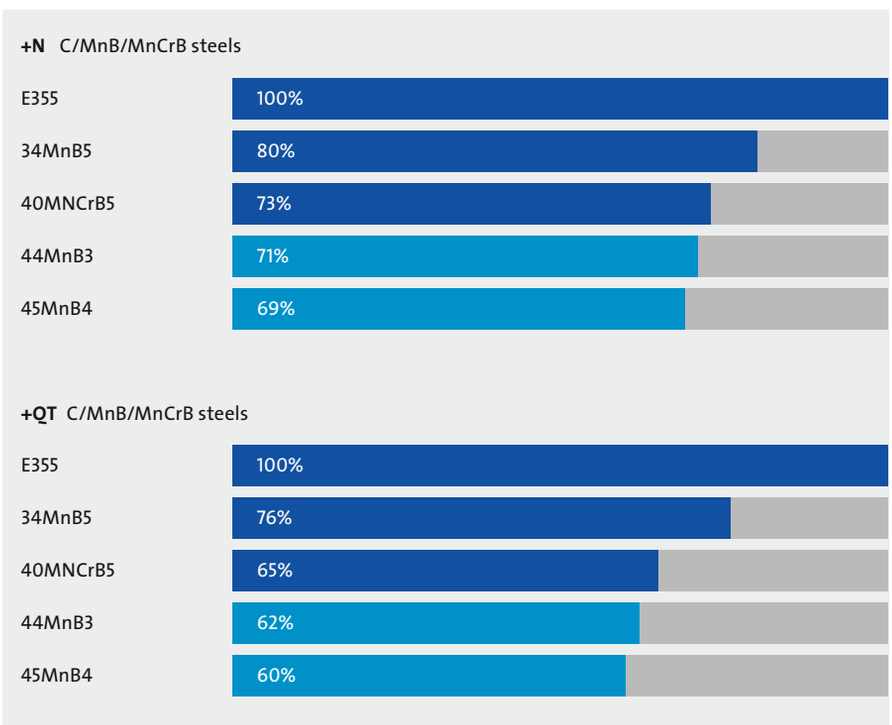
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Drive shaft (Monobloc)	✔ EN 10305-2	✔ E355 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4	✔ +N	✔ OD 25 - 60 ✔ WT 2 - 6,5

Extract from achievable weight-savings



✔ ■ Series production
✱ ■ In validation

OD: outside diameter
WT: wall thickness

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PRECISION STEEL TUBES

Furniture

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded and welded cold-drawn precision steel tubes for lifting columns and chromium-plated furniture appli-cations.

Excellent, tailormade precision and profi le steel tubes allow the complex linking of form and function. Mubea Precision Steel Tubes fulfi ll indivi-dual customer requirements, from tight tolerances and high-quality surfaces to tubes suitable for chromium plating with homogeneous refl ection characteristics. High dimensional and geometric accuracy as well as perfect surface smoothness meet the high aesthetic demands.

Refinable tubes WBKV/Swiss-Gloss quality

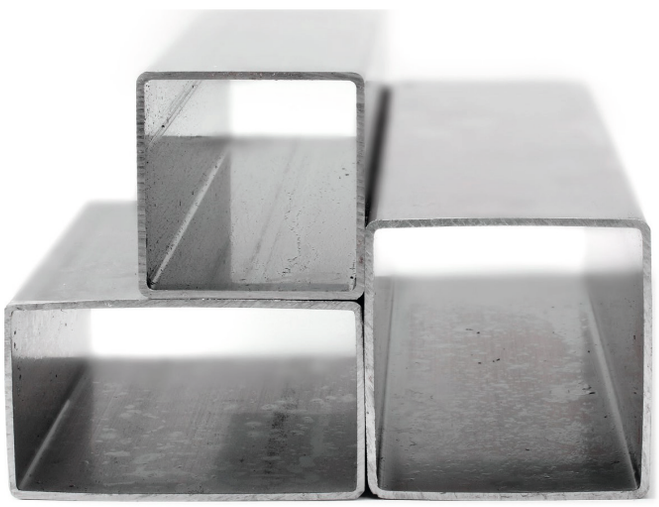
Tube requirements

- Perfect surface smoothness for a flawless reflective finish
- Highest surface quality for direct chromium plating (roughness < Ra 0.3)
- No prior grinding necessary for chrome plating
- Minimised surface discontinuities (adhesions, scratches, dents etc.)
- High dimensional and geometric accuracy, individually specified geometric and positional tolerances

Lifting columns

Tube requirements

- Individually selectable dimensions and shapes
- High dimensional and geometric accuracy, individually specified geometric and positional tolerances
- Customer-specific finish of corner radii
- Consistently high surface quality
- Minimised surface discontinuities (adhesions, scratches, dents etc.)
- Perfect surface smoothness for optimum height adjustability
- Excellent sliding properties



Materials & dimensions, refinable tubes

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Refinable tubes	EN 10305-3 EN 10305-5	DC01 HC420	+CR1 +CR2	Circular outside diameter 19 - 50 mm Wall thickness 1.0 - 2.5 mm Various shapes (e.g. square/rectangular tubes) in all sizes commonly available on the market with cross-sectional developed length 60 - 160 mm and others on request.

Materials & dimensions, lifting columns

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Lifting columns	EN 10305-2 EN 10305-3 EN 10305-5	E235 DD11 DC01 DC04	+CR1 +CR2 +C +LC	Circular outside diameter 30 - 90 mm Wall thickness 1.5 - 3.0 mm Various shapes (e.g. square/rectangular tubes) in all conventional sizes, with cross-sectional developed length 50 - 280 mm and others on request.

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High pressure hydraulic pipes

Product information | Technical data sheet

Mubea Precision Steel Tubes manufacture welded precision steel tubes of the highest quality out of multiphase steels for the production of high-pressure hydraulic line pipes as a substitute for seamless drawn precision steel tubes.

The applications in this area of yellow goods are highly quality-sensitive. The quality of the tubes is ensured by a very good quality of the primary material, a very stable welding process in conjunction with extensive testing of the seam quality and tight production and dimensional tolerances. The tubes produced in this way can withstand high operating pressures and can be bent into the required shape without any additional heat treatment.

High pressure hydraulic pipes

Tube requirements

- excellent formability
- High operating pressure guaranteed
- High geometric accuracy
- excellent weldability
- Small bending radii
- Excellent surface condition

Materialproperties

- Homogeneous strength and elongation
- Very good forming behavior

Microstructure

- Homogeneous, fine-grained microstructure in weld seam and base material
- Very good weld seam quality
- Very good forming behavior

Geometry

- minimierte Schwankungen der Wanddicke und
- minimized excentricity
- Excellent surface condition
- Minimized surface imperfections (adhesions, scratches, dents, ...)

Materials & dimensions

Application examples	Pipe standard	Steel grade	Delivery condition	Dimension range mm*
High-pressure Hydraulic pipes	EN 10305-3	Multiphase steel	+CR1	AD 25 - 60 WD 2.5 - 6.0

3079355 | Produktinformation_Hochdruckhydraulikleitungen | DE | 04.2024

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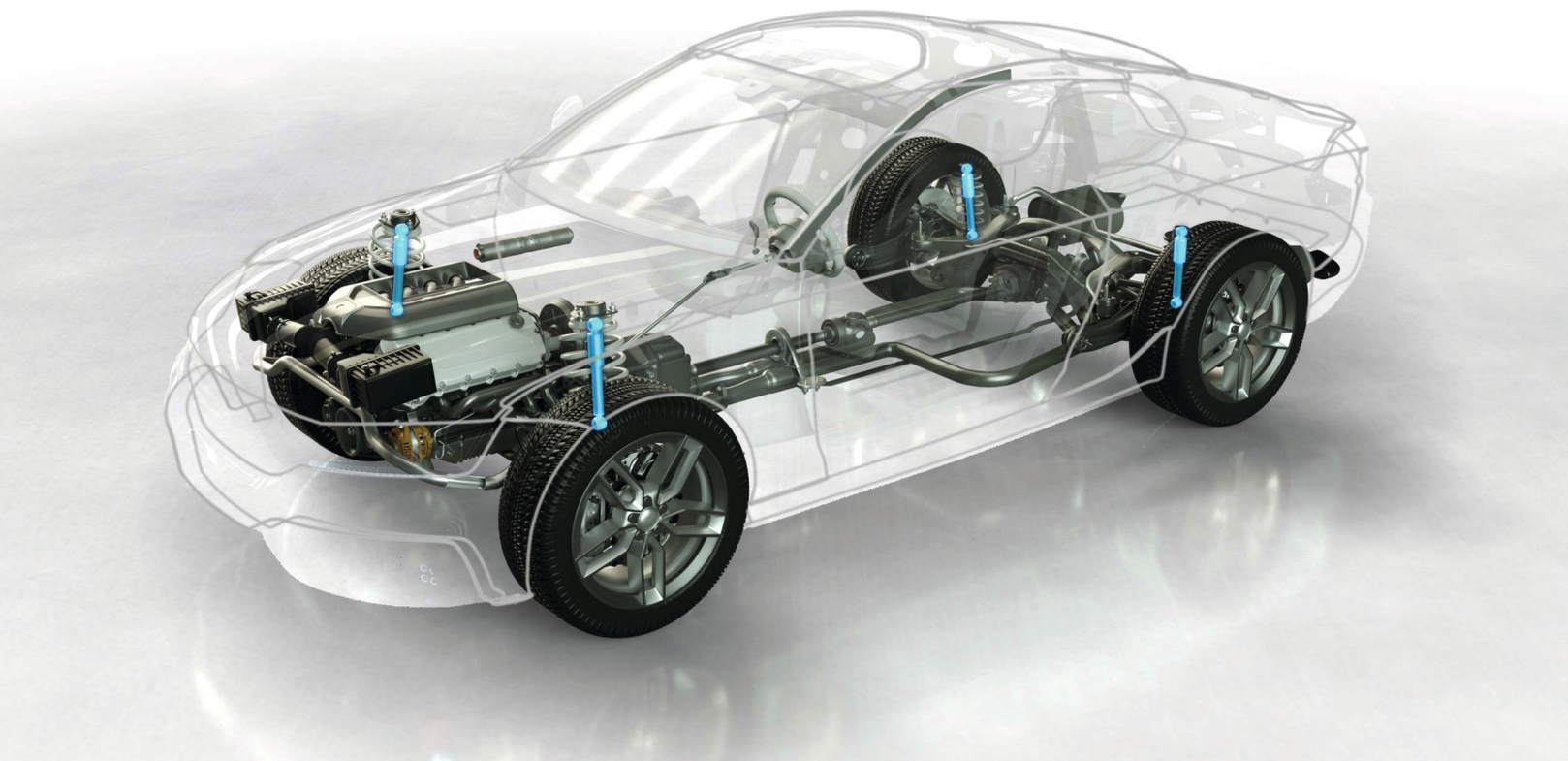
PRECISION STEEL TUBES



Piston rods

Product information | Technical data sheet

Mubea Precision Steel Tubes produce precision steel tubes for piston rods in shock absorbers.

There are a variety of demands on tubes for piston rods. Processing and refining the outer surface requires excellent tube surface qualities. Very good, homogeneous reshaping properties are required for the rolling of the thread. Stringent tolerances ensure the efficient production of the piston rods. High levels of material purity guarantee the fatigue strength of shock absorbers. The increasing demand for light-weight design can be met by using high-tensile materials.

Tube requirements

- High strength values (elongation at break, tensile strength)
- Excellent surface condition
- High levels of fatigue strength
- Very good geometrical accuracy
- Good formability (sufficient elongation)

Material properties

- High strength (YS, TS) and fatigue strength
- Homogeneous strength properties and ductility
- Potential to reduce wall thickness

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Excellent weld seam quality

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised deviations in straightness
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered

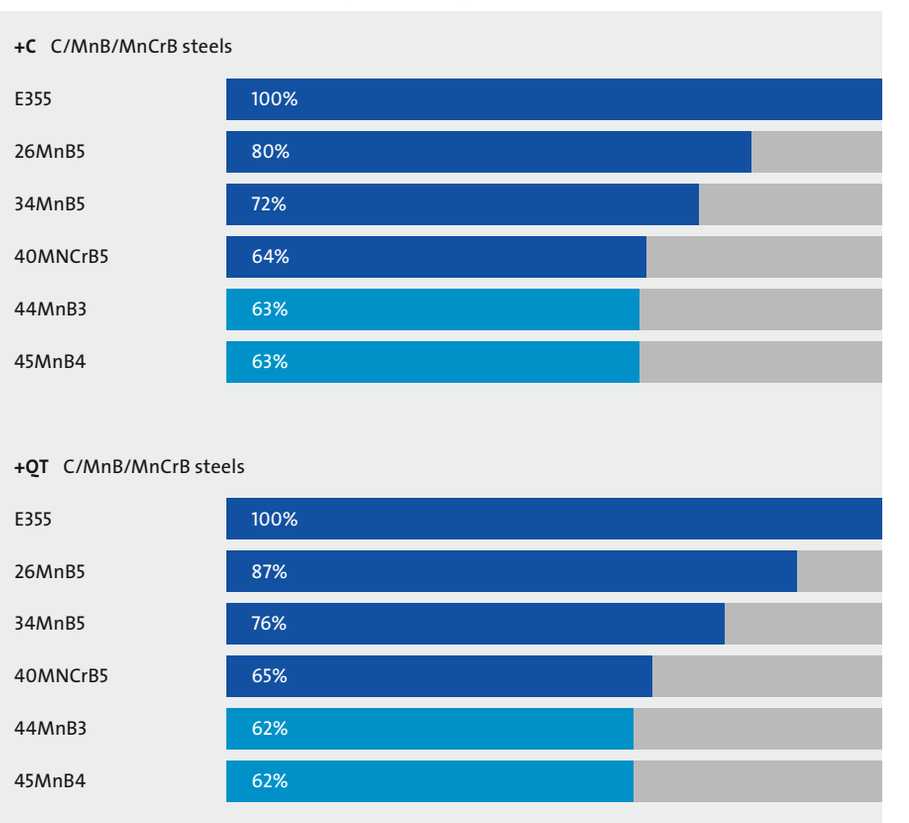
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Increased surface hardness thanks to surface coatings/hardening
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Piston rods (Car)	✔ EN 10305-2	✔ E355 ✔ 26MnB55 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4	✔ +C	✔ OD 16 - 85 ✔ WT 2 - 5.5

Extract from achievable weight-savings



✔ ■ Series production
✱ ■ In validation

OD: outside diameter
WT: wall thickness

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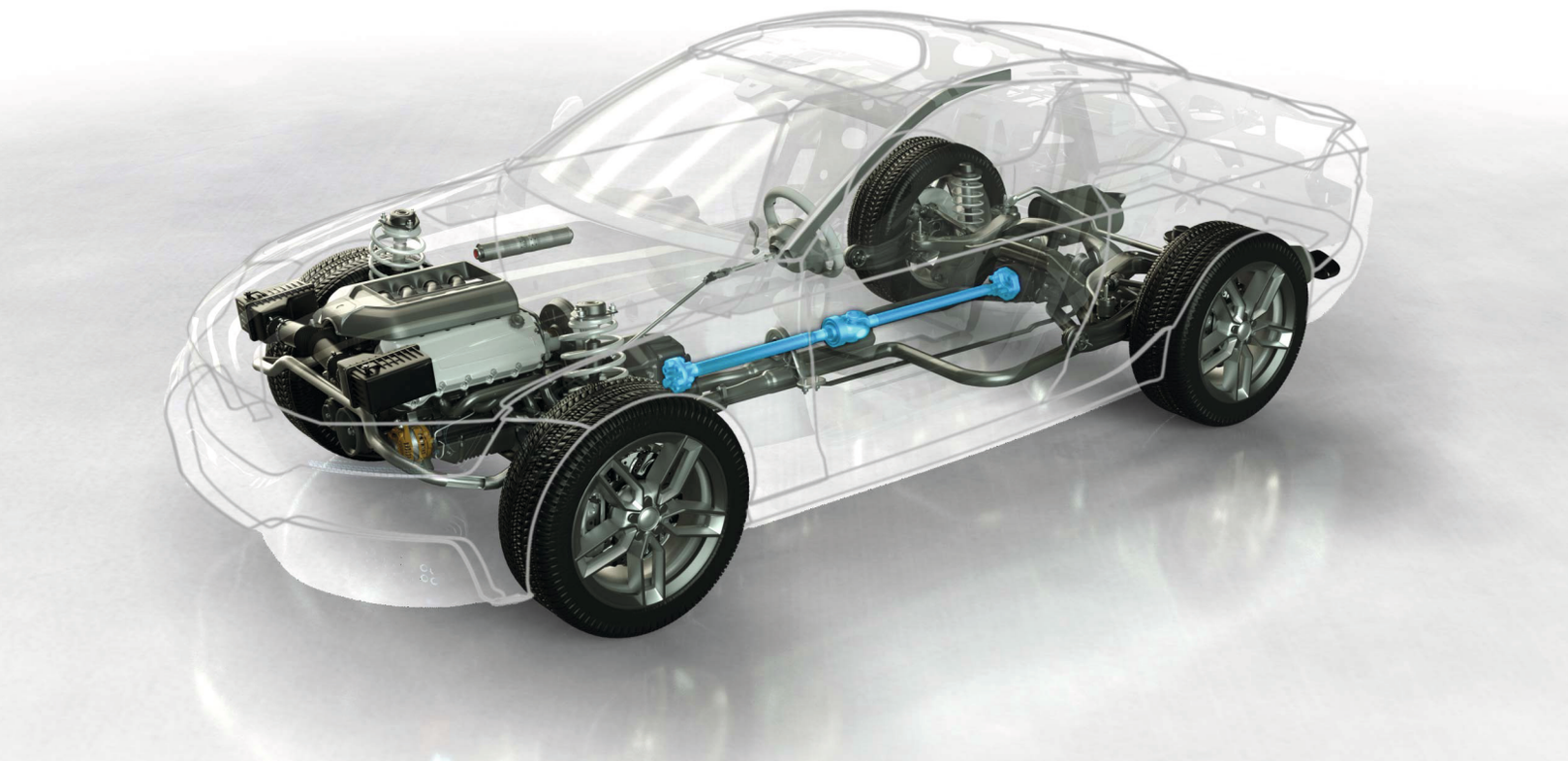
PRECISION STEEL TUBES



Propeller shaft

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded-drawn precision steel tubes for propeller shafts.

During processing, tubes for the propeller shafts are partly drawn in at the ends, leading to high demands on the formability and the quality of the weld seam. Stringent tolerances in terms of concentricity, straightness and wall thickness are necessary to prevent NVH (Noise, Vibration, and Harshness) issues. This guarantees smooth propeller shaft operation within the vehicle. The use of modern air hardening steel materials creates new opportunities to reduce weight.

Tube requirements

- Excellent formability (drawing in, hammering)
- High torsional strength and durability
- Very good welding properties
- High geometrical accuracy (eccentricity, roundness)
- Excellent surface condition

Material properties

- High torsional strength and fatigue strength
- Excellent reforming properties
- Homogeneous strength properties and ductility
- Excellently suitable for welding

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (<50 µm)
- Very good weld seam quality
- Very good reforming properties

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised deviations in straightness
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered

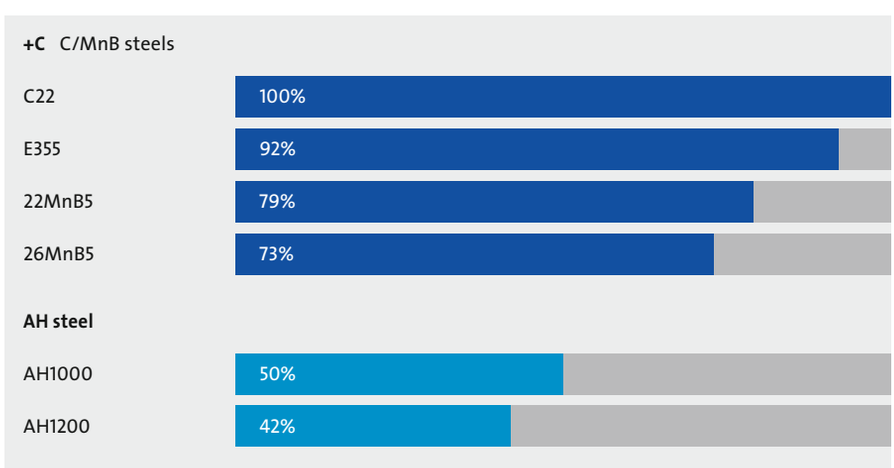
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Propeller shaft	✔ EN 10305-2	✔ C22 ✔ E355 ✔ 22MnB5 ✔ 26MnB5 ✱ AH1000 ✱ AH1200	✔ +C	✔ OD 50 - 85 ✔ WT 1.5 - 5

Extract from achievable weight-savings



✔ ■ Series production
✱ ■ In validation

AH: air hardening

OD: outside diameter
WT: wall thickness

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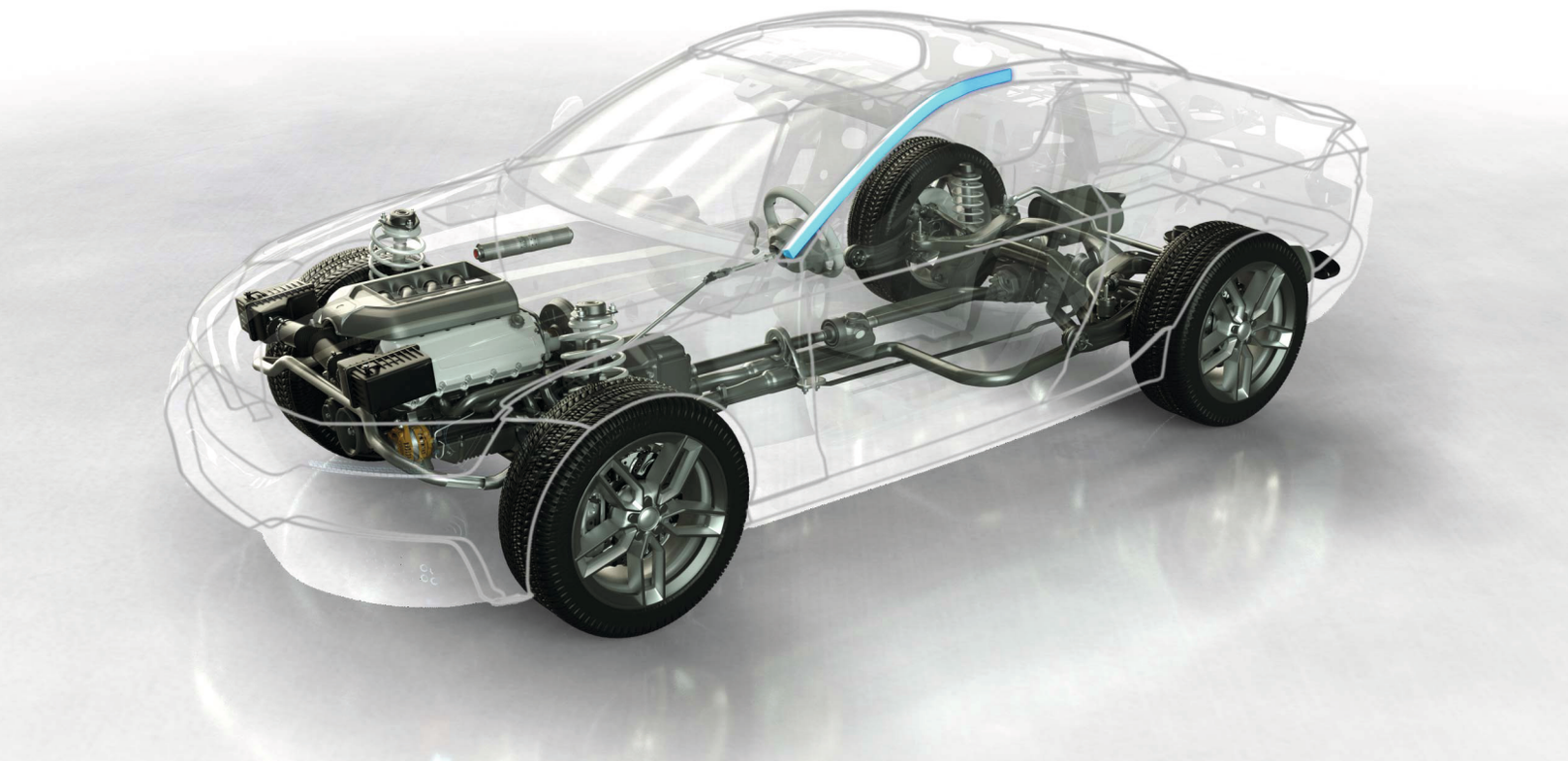
PRECISION STEEL TUBES



Reinforcement tube

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded precision steel tubes and profiles used as structural reinforcements in the automotive industry.

High-tensile materials are used for the tructural reinforcement tubes. Applications within this automotive industry segment are very sensitive to quality and component failure in the event of an undesired deformation of the component may have serious consequences. The tight production tolerances guarantee efficient and thus cost-effective tube processing during component production. The use of new modern air-hardening materials allows a significant reduction of the work involved by eliminating the tempering process, and thus a significant reduction in costs.

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Tube requirements

- Excellent formability
- High levels of fatigue strength
- High levels of strength and hardness according to Q+T
- excellent surface conditions

Material properties

- High levels of fatigue strength
- Excellent reforming properties
- Excellent hardening properties
- Homogeneous strength properties and ductility

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Very good weld seam quality
- Very good reforming properties

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Tube end processing: sawn/brushed; chamfered

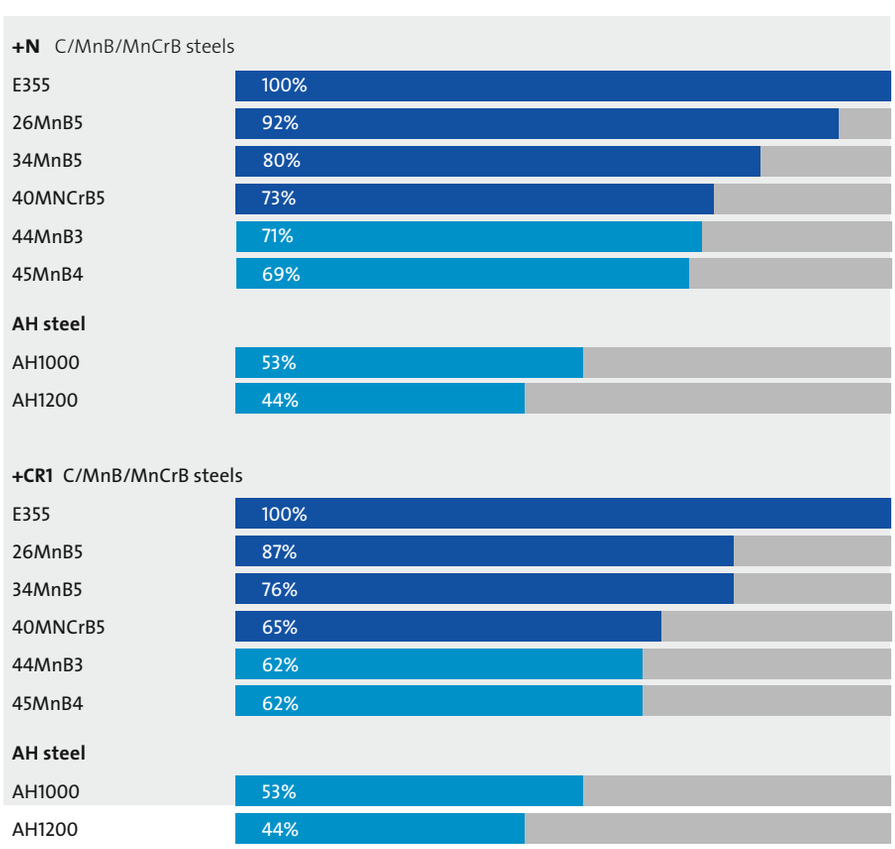
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Reinforcement tube	✔ EN 10305-2 ✔ EN 10305-3	✔ E355 ✔ 26MnB55 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4 ✔ 5700 ✱ AH1000 ✱ AH1200 ✱ OP1000 ✱ CP800	✔ +N ✔ +CR1	✔ AD 35 - 80 ✔ WD 2 - 6.5

Extract from achievable weight-savings



✔ ■ Series production
✱ ■ in validation

AH: air hardening
TDT: Tailor Drawn Tube
OD: ø outside diameter
WT: wall thickness

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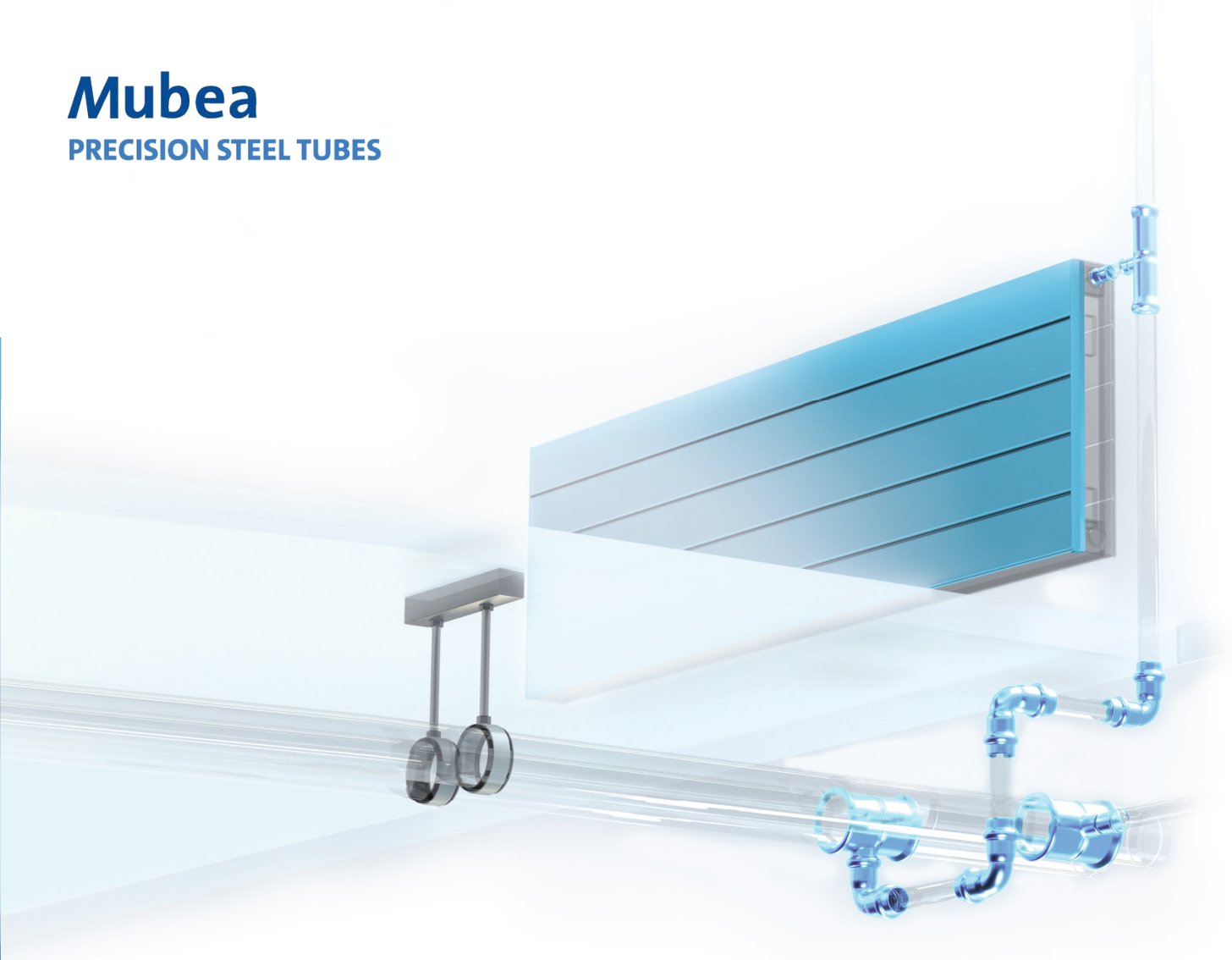
PRECISION STEEL TUBES



Services installations

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded precision steel tubes for a range of applications in services installations.

Precision, circular and profi le steel tubes by Mubea Preci-sion Steel Tubes ensure the best assembly characteristics thanks to tight geometric and material-related tolerances. Radiators and other articles made from products by Mubea Precision Steel Tubes are not only used as a source of heat but also make a significant contribution towards individual living space and bathroom styling as high-quality design elements. Fitting tubes are another example of how high customer expectations are met.

Fittings

Tube requirements

- Excellent formability
- Homogeneous strength and elongation
- Minimised fluctuations in wall thickness
- Very good weld seam quality
- Homogeneous, fine-grain microstructure in weld seam and basic material
- Excellent welding properties
- Excellent surface condition (internal and external)
- Minimised surface discontinuities (adhesions, scratches, dents etc.)

Radiators

Tube requirements

- Good formability
- Very good weld seam quality
- Homogeneous microstructure in weld seam and basic material
- Excellent welding properties
- Good joining properties (welding/soldering)
- Minimised fluctuations in wall thickness and inner/outer dimensions
- Excellent surface condition
- Good suitability for chromium plating and coating
- Minimised surface discontinuities (adhesions, scratches, dents etc.)

Materials & dimensions, fittings

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Fittings	EN 10305-3	E195 E235	+N	Outside diameter 12 - 90 mm Wall thickness 1.3 - 3.5 mm

Materials & dimensions, radiators

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Radiators	EN 10305-3 EN 10305-5	E195 E235	+CR2	Various precision and circular tubes, in all conventional sizes and others on request.

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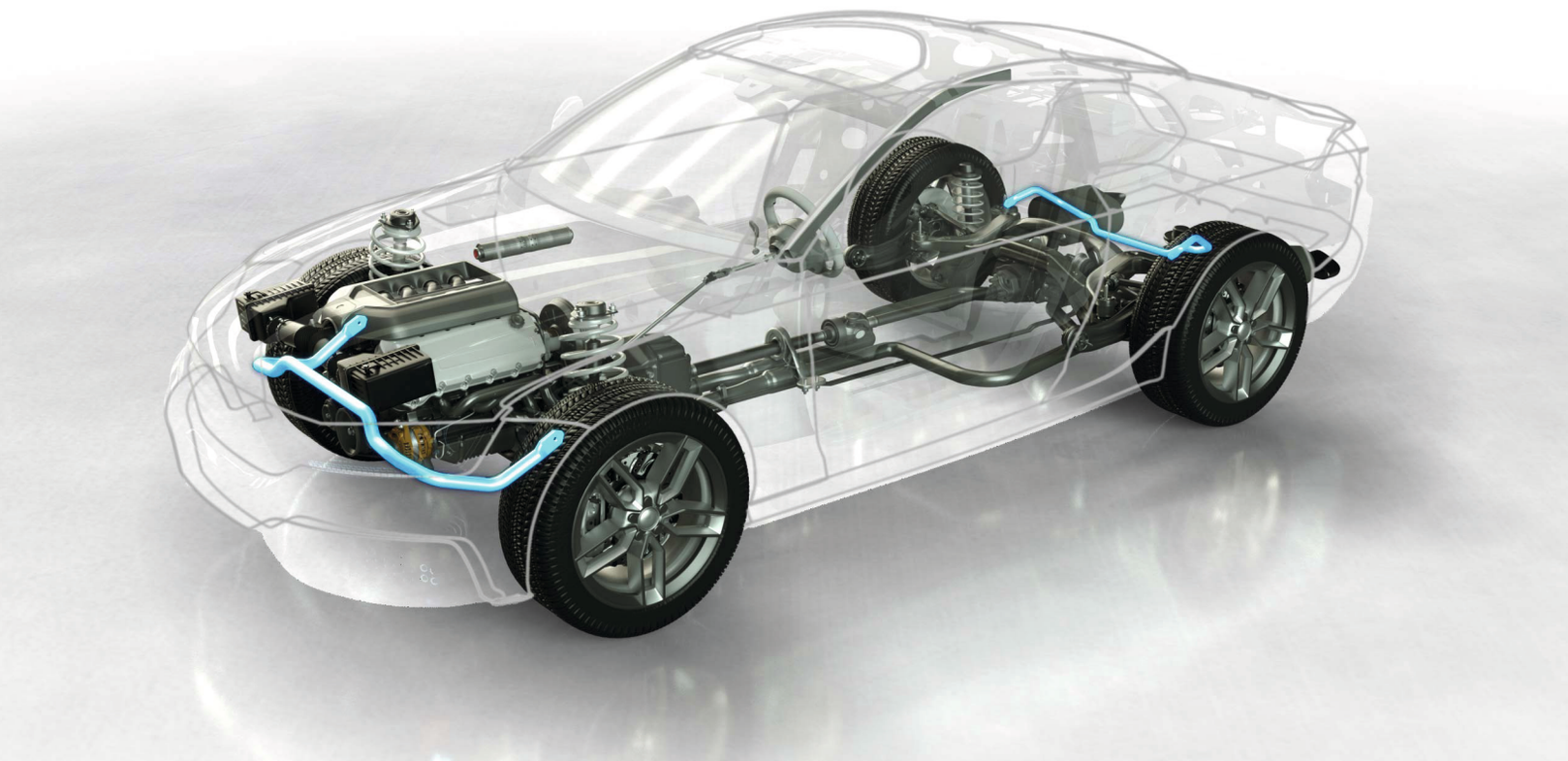
Mubea
PRECISION STEEL TUBES



Stabilizer

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded and welded-drawn precision steel tubes meeting the highest quality standards made of high-tensile grade steels for stabilizers.

The application in the area of the automotive industry is very reliant on quality. Any failure of the component must not be relevant to safety. Lightweight construction is possible in drawn tubes with varying wall thickness - as Tailor Drawn Tubes (TDT) - or by utilizing high-tensile materials.

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Tube requirements

- Very good formability
- High torsional strength and durability
- Very good welding properties
- High geometrical accuracy
- Excellent surface condition

Material properties

- High strength, in particular heat treatment (Q+T) rather than just tempering (T)
- Excellent reforming properties
- Minimised residual stress
- Potential to reduce wall thickness

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (<50 µm)
- Very good weld seam quality
- Very good reforming properties

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered

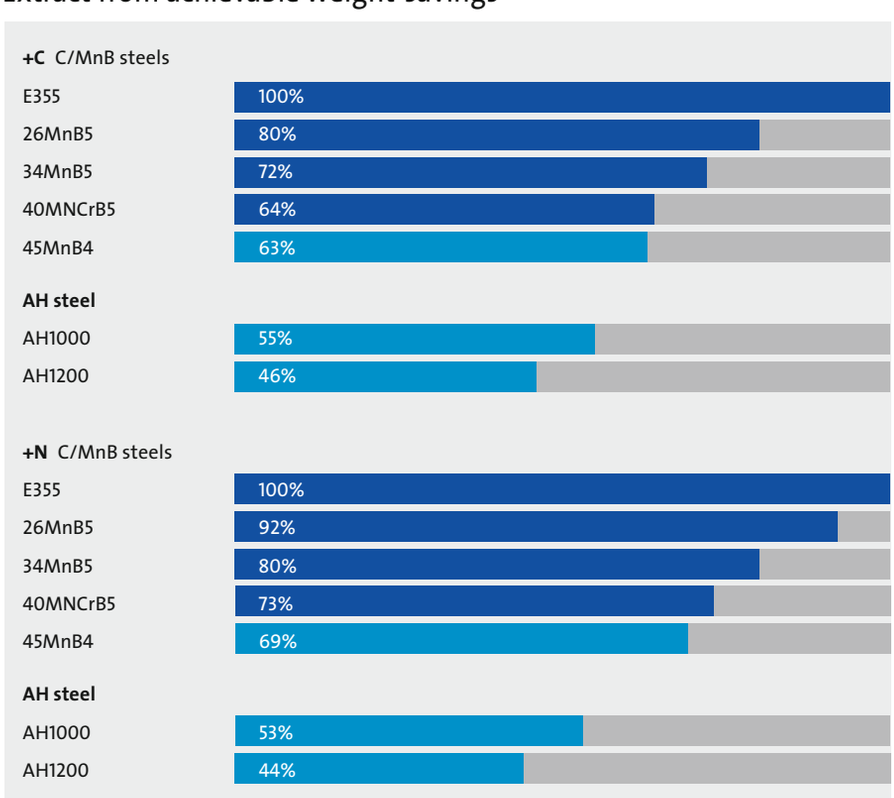
Surface

- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection
- Increase of compressive stresses through shot peening (outside/ inside diameter)

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Stabilisator	✔ EN 10305-2 ✔ EN 10305-3	✔ E355 ✔ 26MnB55 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4 ✱ AH1000 ✱ AH1200	✔ +C ✔ +N ✔ +QT	✔ OD 18 - 75 ✔ WT 2 - 7.0 also available as TDT tube with variable wall thickness

Extract from achievable weight-savings



✔ Series production
✱ in validation

AH: air hardening
TDT: Tailor Drawn Tube
OD: ø outside diameter
WT: wall thickness

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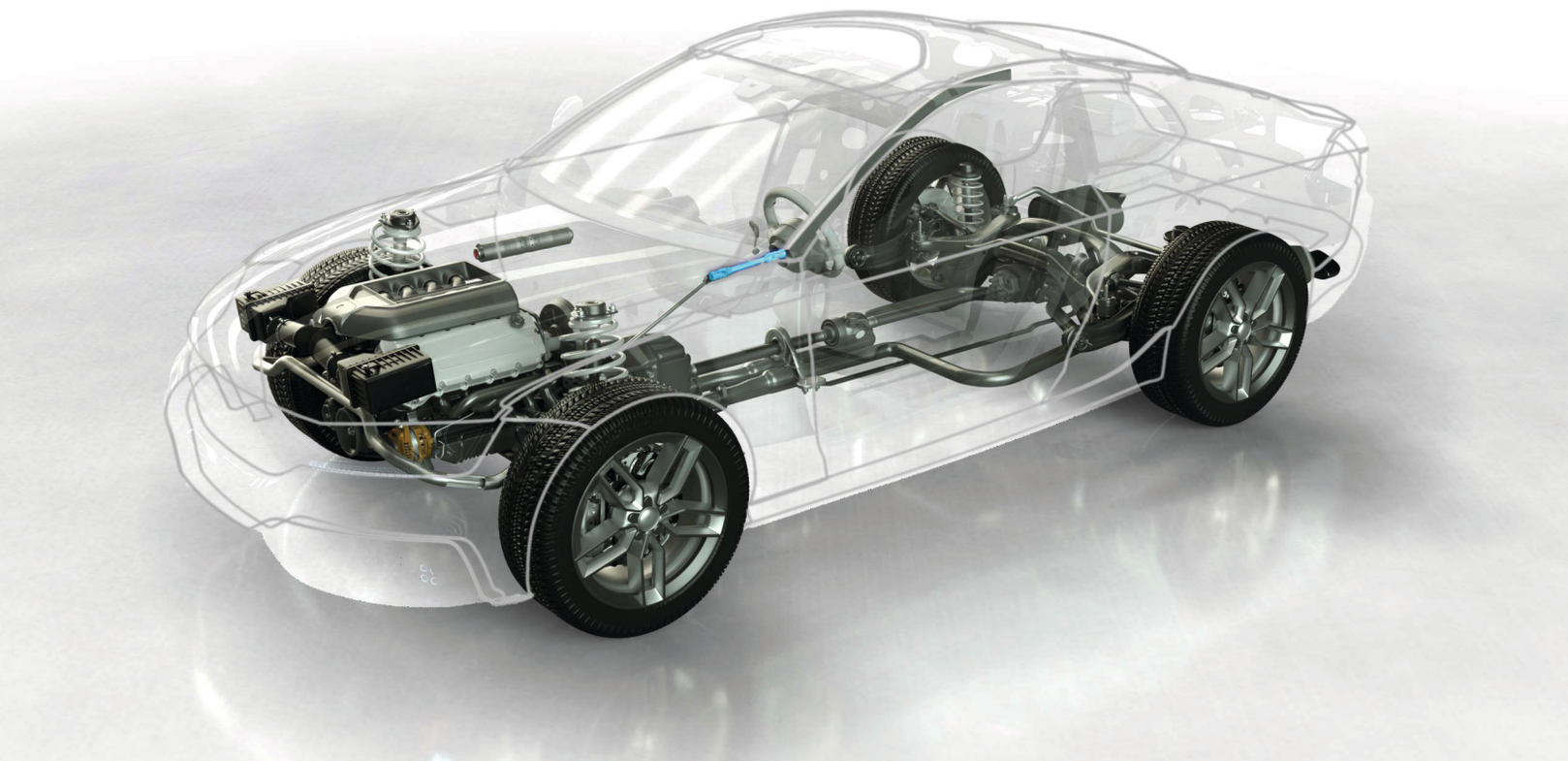
PRECISION STEEL TUBES



Steering

Product information | Technical data sheet

Mubea Precision Steel Tubes produce welded and welded-drawn precision steel tubes and profiles for steering systems made of standard materials as well as high-tensile materials.

Quality is paramount in steering applications and construction. Tight tolerances and very good reforming properties of the tubes ensure smooth component construction.

The use of modern high-tensile materials allows for weight savings by reducing the wall thickness while still maintaining the component's strength.

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Tube requirements

- Excellent formability
- High torsional strength and durability
- Excellent welding properties
- High geometrical accuracy
- Excellent surface condition

Material properties

- High torsional strength and fatigue strength
- Excellent reforming properties
- Homogeneous strength properties and ductility
- Excellently suitable for welding
- Potential to reduce wall thickness

Structure

- Homogeneous, fine-grain structure in weld seam and basic material
- Minimised surface decarburisation of inner and outer surfaces (< 50 µm)
- Very good weld seam quality
- Very good reforming properties

Geometry

- Minimised fluctuations in wall thickness and inner/outer diameter
- Minimised deviations in straightness
- Minimised deviations in concentricity and axial run-out
- Minimised eccentricity
- Specific tube end processing: sawn/brushed; chamfered, completely processed/chamfered

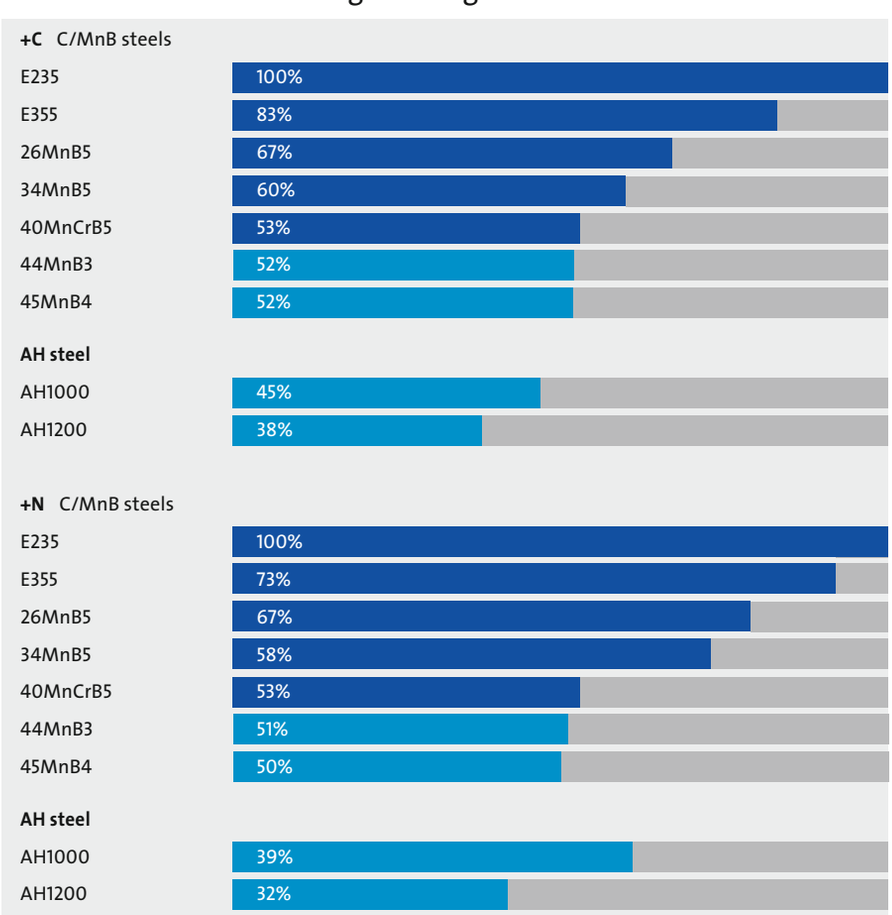
Surface

- Excellent surface condition
- Minimised surface flaws (adhesions, scratches, dents, etc.)
- Minimised corrosion protection, optionally specific corrosion protection

Materials & dimensions

Application	Tube standard	Steel grades	Delivery condition	Dimensions range mm
Steering shafts	✔ EN 10305-2	✔ E235 ✔ E355 ✔ 26MnB5 ✔ 34MnB5 ✔ 40MnCrB5 ✱ 44MnB3 ✱ 45MnB4	✔ +C ✔ +N	✔ OD 20 - 35 ✔ WT 1.5 - 3
Steering spindles		✱ AH1000 ✱ AH1200		✔ OD 25 - 40 ✔ WT 2 - 4

Extract from achievable weight-savings



✔ Series production
✱ In validation

AH: air hardening

OD: outside diameter
WT: wall thickness