

Dual-phase steels

The classical steel with tensile strengths of up to 1000 MPa and superb drawing properties

Dual-phase steels are part of the ahss classic product line of voestalpine in the field of ultralights and are characterized by excellent physical properties, including low yield strength, high work hardening, high tensile strength as well as high uniform and fracture elongation. The finely tuned microstructure achieves a balance between deep-drawing capacity and resistance to edge cracking. These steels are ideal for applications in complex structural components. Galvanized surfaces provide the best corrosion protection, and selected grades are also available for exposed applications. The balance between strength, formability and weldability of dual-phase steels leads to enormous potential in light-weight design while also achieving improved crash performance.

Convincing advantages

- » Customized levels of yield strength with minimum tensile strengths of 450, 490, 590, 780 and 980 MPa
- » Excellent cold workability with respect to ductility
- » Balanced relationship between drawing properties and resistance to edge cracking
- » Excellent crash behavior
- » Good weldability
- » Corrosion resistance based on ZE/EG, Z/GI, ZF/GA or ZM coatings
- » Selected grades also available in exposed-panel quality

Chemical composition

Heat analysis in % by mass

| Steel grade | C max. | Si max. | Mn max. | P max. | S max. | Al _{total} | Cr + Mo max. | Ti + Nb max. | V max. | B max. |
|--|--------|---------|---------|--------|--------|---------------------|--------------|--------------|--------|--------|
| Pursuant to EN 10346 and EN 10338 | | | | | | | | | | |
| HCT450X | 0.14 | 0.75 | 2.00 | 0.080 | 0.015 | 0.015 - 1.0 | 1.00 | 0.15 | 0.20 | 0.005 |
| HCT490X | 0.14 | 0.75 | 2.00 | 0.080 | 0.015 | 0.015 - 1.0 | 1.00 | 0.15 | 0.20 | 0.005 |
| HCT590X | 0.15 | 0.75 | 2.50 | 0.040 | 0.015 | 0.015 - 1.5 | 1.40 | 0.15 | 0.20 | 0.005 |
| HCT780X | 0.18 | 0.80 | 2.50 | 0.080 | 0.015 | 0.015 - 2.0 | 1.40 | 0.15 | 0.20 | 0.005 |
| HCT980X | 0.20 | 1.00 | 2.90 | 0.080 | 0.015 | 0.015 - 2.0 | 1.40 | 0.15 | 0.20 | 0.005 |

| Steel grade | Norm | C max. | Si max. | Mn max. | P max. | S max. | Al | Cr + Mo max. | Ti + Nb max. | B max. | Cu max. |
|---|-------------|--------|---------|---------|--------|--------|-------------|--------------|--------------|--------|---------|
| Pursuant to VDA 239-100 and voestalpine special grades | | | | | | | | | | | |
| CR260Y450T-DP | voestalpine | 0.14 | 0.50 | 1.80 | 0.050 | 0.010 | 0.015 - 1.0 | 1.00 | 0.15 | 0.005 | 0.20 |
| CR290Y490T-DP | VDA 239-100 | 0.14 | 0.50 | 1.80 | 0.050 | 0.010 | 0.015 - 1.0 | 1.00 | 0.15 | 0.005 | 0.20 |
| CR330Y590T-DP | VDA 239-100 | 0.15 | 0.80 | 2.50 | 0.050 | 0.010 | 0.015 - 1.5 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR360Y600T-DP | voestalpine | 0.15 | 0.80 | 2.50 | 0.050 | 0.010 | 0.015 - 1.5 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR440Y780T-DP | VDA 239-100 | 0.18 | 0.80 | 2.50 | 0.050 | 0.010 | 0.015 - 1.0 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR500Y780T-DP | voestalpine | 0.18 | 0.80 | 2.50 | 0.050 | 0.010 | 0.015 - 1.0 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR550Y980T-DP | voestalpine | 0.20 | 1.00 | 2.90 | 0.050 | 0.010 | 0.015 - 1.0 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR590Y980T-DP | VDA 239-100 | 0.20 | 1.00 | 2.90 | 0.050 | 0.010 | 0.015 - 1.0 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR660Y980T-DP | voestalpine | 0.23 | 1.00 | 2.90 | 0.050 | 0.010 | 0.015 - 1.0 | 1.40 | 0.15 | 0.005 | 0.20 |
| CR700Y980T-DP | VDA 239-100 | 0.23 | 1.00 | 2.90 | 0.050 | 0.010 | 0.015 - 1.0 | 1.40 | 0.15 | 0.005 | 0.20 |

Mechanical properties: Tensile test

| Steel grade | Test direction | 0.2 % yield strength $R_{p0.2}$ [MPa] | Tensile strength R_m min. [MPa] | Total elongation A_{80} min. ¹⁾ [%] | n-value n_{10-UE} min. | BH ₂ -value BH ₂ min. [MPa] |
|--|----------------|---|---|--|--------------------------------|---|
| Pursuant to EN 10346 and EN 10338 | | | | | | |
| HCT450X | Longitudinal | 260 – 340 | 450 | 27 | 0.16 | 30 |
| HCT490X | Longitudinal | 290 – 380 | 490 | 24 | 0.15 | 30 |
| HCT590X | Longitudinal | 330 – 430 | 590 | 20 | 0.14 | 30 |
| HCT780X | Longitudinal | 440 – 550 | 780 | 14 | - | 30 |
| HCT980X | Longitudinal | 590 – 740 | 980 | 10 | - | 30 |

| Steel grade | Standard | Test direction | 0.2 % yield strength $R_{p0.2}$ [MPa] | Tensile strength R_m [MPa] | Total elongation A_{80} min. ¹⁾ [%] | n-value $n_{10-20/UE}$ min. | BH ₂ -value BH ₂ min. [MPa] |
|---|-------------|----------------|---|------------------------------------|--|-----------------------------------|---|
| Pursuant to VDA 239-100 and voestalpine special grades | | | | | | | |
| CR260Y450T-DP | voestalpine | Longitudinal | 260 – 340 | 450 – 560 | 27 | 0.16 | 30 |
| CR290Y490T-DP | VDA 239-100 | Longitudinal | 290 – 380 | 490 – 600 | 24 | 0.15 | 30 |
| CR330Y590T-DP | VDA 239-100 | Longitudinal | 330 – 430 | 590 – 700 | 20 | 0.14 | 30 |
| CR360Y600T-DP | voestalpine | Longitudinal | 360 – 460 | 600 – 710 | 19 | 0.14 | 30 |
| CR440Y780T-DP | VDA 239-100 | Longitudinal | 440 – 550 | 780 – 900 | 14 | 0.11 | 30 |
| CR500Y780T-DP | voestalpine | Longitudinal | 500 – 620 | 780 – 900 | 13 | - | 30 |
| CR550Y980T-DP | voestalpine | Longitudinal | 550 – 730 | 980 – 1130 | 10 | - | 30 |
| CR590Y980T-DP | VDA 239-100 | Longitudinal | 590 – 740 | 980 – 1130 | 10 | - | 30 |
| CR660Y980T-DP | voestalpine | Transverse | 660 – 810 | 980 – 1130 | 10 | - | 30 |
| CR700Y980T-DP | VDA 239-100 | Longitudinal | 700 – 850 | 980 – 1130 | 8 | - | 30 |

¹⁾ Restrictions based on thicknesses and coatings pursuant to EN 10346, EN 10338, VDA 239-100 and special voestalpine grades

Coatings and available dimensions

Available thicknesses [mm] per coating

| Steel grade | Uncoated | ZE | Z | ZF | ZM |
|--|-----------|-----------|------------|-----------|--------------|
| Pursuant to EN 10346 and EN 10338 | | | | | |
| HCT450X | 0.6 – 1.8 | 0.6 – 1.8 | 0.5 – 2.25 | 0.5 – 2.1 | 0.5 – 2.0 |
| HCT490X | 0.6 – 1.8 | 0.6 – 1.8 | 0.5 – 2.25 | 0.5 – 2.1 | 0.5 – 2.0 |
| HCT590X | 0.7 – 1.8 | 0.7 – 1.8 | 0.5 – 2.25 | 0.5 – 2.1 | 0.5 – 2.0 |
| HCT780X | 0.7 – 1.6 | 0.7 – 1.6 | 0.7 – 2.10 | 0.7 – 2.1 | Upon request |
| HCT980X | 0.8 – 1.6 | 0.8 – 1.6 | 0.8 – 2.00 | 0.8 – 2.0 | Upon request |

| Steel grade | Standard | UC | EG | GI | GA | ZM |
|---|-------------|-----------|---------------|------------|--------------|--------------|
| Pursuant to VDA 239-100 and voestalpine special grades | | | | | | |
| CR260Y450T-DP | voestalpine | 0.6 – 1.8 | 0.6 – 1.8 | 0.5 – 2.25 | 0.5 – 2.1 | 0.5 – 2.0 |
| CR290Y490T-DP | VDA 239-100 | 0.6 – 1.8 | 0.6 – 1.8 | 0.6 – 2.25 | 0.6 – 2.1 | 0.6 – 2.0 |
| CR330Y590T-DP | VDA 239-100 | 0.7 – 1.8 | 0.7 – 1.8 | 0.7 – 2.25 | 0.7 – 2.1 | 0.7 – 2.0 |
| CR360Y600T-DP | voestalpine | 0.7 – 1.8 | 0.7 – 1.8 | 0.7 – 2.25 | 0.7 – 2.1 | 0.7 – 2.0 |
| CR440Y780T-DP | VDA 239-100 | 0.7 – 1.6 | 0.7 – 1.6 | 0.7 – 2.10 | 0.7 – 2.1 | Upon request |
| CR500Y780T-DP | voestalpine | 0.7 – 1.6 | 0.7 – 1.6 | 0.7 – 2.10 | 0.7 – 2.1 | Upon request |
| CR550Y980T-DP | voestalpine | 0.9 – 1.2 | Not available | 0.9 – 1.80 | Upon request | Upon request |
| CR590Y980T-DP | VDA 239-100 | 0.8 – 1.6 | 0.8 – 1.6 | 0.8 – 2.00 | 0.8 – 2.0 | Upon request |
| CR660Y980T-DP | voestalpine | 0.8 – 1.6 | 0.8 – 1.6 | 0.8 – 2.00 | 0.8 – 2.0 | Upon request |
| CR700Y980T-DP | VDA 239-100 | 0.8 – 1.6 | 0.8 – 1.6 | 0.8 – 2.00 | 0.8 – 2.0 | Upon request |

The above named ahss steel grades are not available with MA, NA or RA surface finishes.

Please find available dimensions at www.voestalpine.com/Produktinformationsportal or contact us directly.

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