

Table 1 — Delivery conditions

Designation	Symbol <sup>a</sup>	Description
Welded and cold sized	+CR1	Normally not heat treated, but suitable for final annealing. <sup>b</sup>
	+CR2	Not intended for heat treatment after the welding and sizing process. <sup>c</sup>
Soft annealed	+A	After welding and sizing the tubes are annealed in a controlled atmosphere.
Normalized	+N	After welding and sizing the tubes are normalized in a controlled atmosphere.

<sup>a</sup> In accordance with EN 10027-1.

<sup>b</sup> After annealing or normalizing, the resulting mechanical properties meet the requirements specified in Table 4 for the delivery condition +A or +N, respectively are normally obtained.

<sup>c</sup> If further heat treatment is applied, the resulting mechanical properties may be outside the specified requirements.

Table 4 — Mechanical properties at room temperature for the delivery conditions +CR1, +A and +N

Steel grade		Minimum values for the delivery condition <sup>a, b</sup>						
		+CR1		+A		+N		
Name	Number	$R_m^c$ MPa	$A$ %	$R_m$ MPa	$A$ %	$R_m$ MPa	$R_{eH}$ MPa	$A$ %
E155	1.0033	290	15	260	28	270 to 410	155	28
E195	1.0034	330	8	290	28	300 to 440	195	28
E235	1.0308	390	7	315	25	340 to 480	235	25
E275	1.0225	440	6	390	22	410 to 550	275	22
E355	1.0580	540	5	450	22	490 to 630	355	22

NOTE The mechanical properties and technological properties of the weld zone may, in the case of the delivery conditions +CR1 and +A, differ from those of the base material.

<sup>a</sup>  $R_m$ : tensile strength;  $R_{eH}$ : upper yield strength (but see 11.1);  $A$ : elongation after fracture. For symbols for the delivery condition see Table 1.

<sup>b</sup> 1 MPa = 1 N/mm<sup>2</sup>.

<sup>c</sup> Depending on the degree of cold forming the strip material and sizing the as welded tube, the yield strength may nearly be as high as the tensile strength. For calculation purposes yield strength values of  $R_{eH} \geq 0,7 R_m$  are recommended in the +CR1 condition.

Table 5 — Mechanical properties (minimum values) at room temperature for the delivery condition +CR 2<sup>a, b</sup>

Steel grade		Tensile strength $R_m$ MPa	Yield strength $R_{eH}$ MPa	Elongation after fracture $A$ %
Name	Number			
E190	1.0031	270	190	26
E220	1.0215	310	220	23
E260	1.0220	340	260	21
E320	1.0237	410	320	19
E370	1.0261	450	370	15
E420	1.0575	490	420	12

NOTE The mechanical and technological properties of the weld zone may differ from those of the base material.

<sup>a</sup> For the symbol for the delivery condition see Table 1.

<sup>b</sup> 1 MPa = 1 N/mm<sup>2</sup>.