

# SPECIAL PROFILES

## EN 10305-3

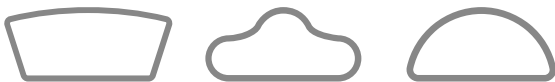
Special profiles are longitudinally welded, cold-formed tubes. They can be made into several geometric shapes, enabling countless applications, in a wide variety of areas, such as: construction, industry in general, infrastructures, transportation, logistics and storage, food and agriculture, etc.

They are manufactured using:

- Cold rolled steel (EN 10130)
- Hot rolled steel (EN 10025-2)
- Galvanized steel (EN 10346)

## DIMENSIONAL RANGE

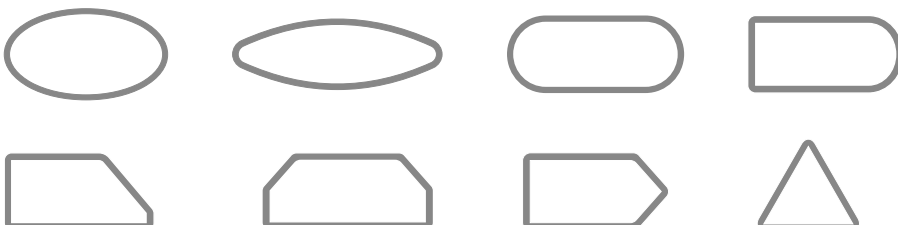
### Handrails



### Civil Engineering



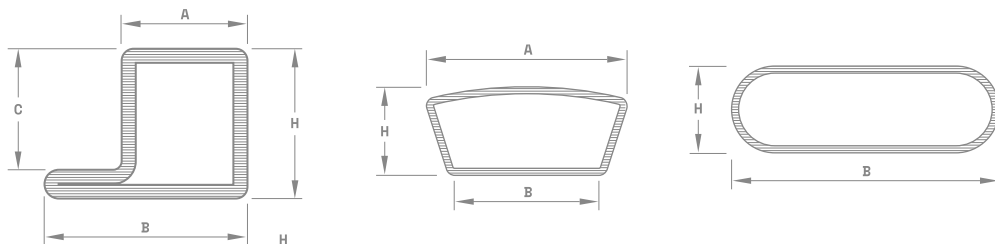
### Various



# DIMENSIONAL PROPERTIES

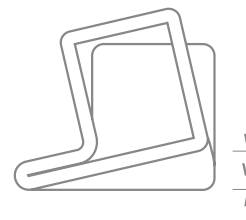
## Outside dimensions

(B/H)



## Torcion

(V)



## Tolerance

2 + 0,5mm/m comprimento

## Diameter Ø

D (mm)

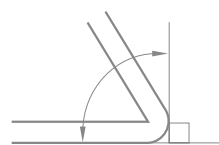
NOTE:

For intermediate dimensions, the tolerances of the next largest dimension apply.

Properties to be controlled	Tolerance
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6 a 19	± 0,12
20 a 30	± 0,15
32 a 42,4	± 0,20
44 a 51	± 0,25
55 a 63,5	± 0,30
70 a 76	± 0,35
80 a 90	± 0,40
100 a 101,6	± 0,50
108 a 120	± 0,60
127 a 139,7	± 0,80
≥ 159	± 1,00

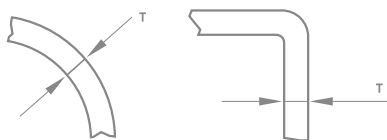
## Squareness



**Tolerance** 90° ± 1

## Wall thickness

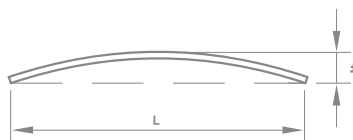
(T)



**Tolerância** +10% com um máximo de ± 0,35

## Straightness

(f)



**Tolerância**  $f \leq 0,002L$  e máx. 3mm/m

## Length

(L)



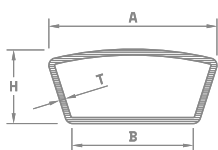
Length L (mm)	Tolerance (mm)
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500 < L ≤ 2000	+3 0
2000 < L ≤ 5000	+5 0
5000 < L ≤ 8000	+10 0
L > 8000	by agreement

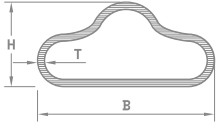
# TABLE OF DIMENSIONS

## Handrails

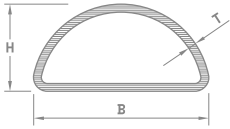
DX51D, E220, E235, S235JR, DC01



Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
	B	H	A	T			
223	48	26	60	1,5	1,81	100	1086
627	41	22	54	1,5	1,574	100	944
628	38	20	50	1,5	1,507	100	904
629	35	20	45	1,5	1,339	100	803



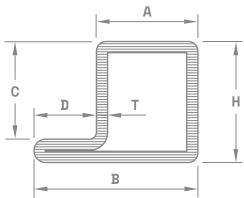
Ref	Dimensions				Linear mass	Sections/strapped	Weight/strapped
	mm						
	B	H	A	T			
626	50	30	-	1,5	1,519	100	911



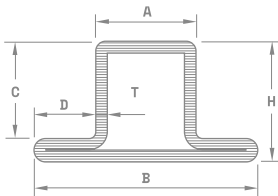
Ref	Dimensions				Linear mass	Sections/strapped	Weight/strapped
	mm						
	B	H	A	T			
Meia Cana	50	25	-	1,5	1,498	100	899

### Civil Engineering

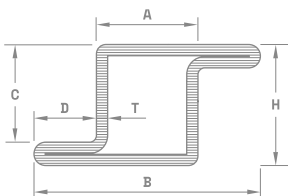
DX51D, E220, E235, S235JR, DC01



Ref	Dimensions						Linear mass	Sections/strapped	Weight/strapped
	mm								
	B	H	A	C	D	T			
FT 14	43	40	30	37	14	1,5	1,942	100	1165
FT 15	47	34	35	31	12	1,5	1,81	100	1086
FT 17	35	20	20	17	15	1,5	1,213	100	728
FT 18	30	35	15	32	15	1,5	1,484	100	890
FT 19	59	50	40	46	19	2	3,352	64	1287
FT 23	35	50	20	46	15	2	2,521	100	1516
FT 24	50	50	35	47	15	1,5	2,31	80	1109



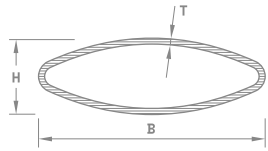
Ref	Dimensions						Linear mass	Sections/strapped	Weight/strapped
	mm								
	B	H	A	C	D	T			
FT 12	50	34	20	31	15	1,5	1,885	100	1131
FT 16	50	20	20	17	15	1,5	1,754	100	944
FT 20	45	35	15	32	15	1,5	1,81	100	1052
FT 21	50	50	20	46	15	2	3,008	78	1408
FT 22	54	40	30	37	12	1,5	2,079	100	1246
FT 25	80	50	40	46	20	2	4,00	60	1440
FT 26	50	80	35	77	15	1,5	3,03	50	909



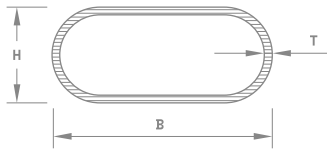
Ref	Dimensões						Massa Linear	Sections/strapped	Weight/strapped
	mm								
	B	H	A	C	D	T			
FT 27	80	50	40	46	20	2	4,00	60	1440

**Various**

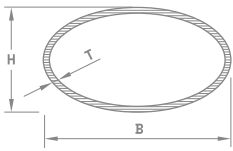
DX51D, E220, E235, S235JR, DC01



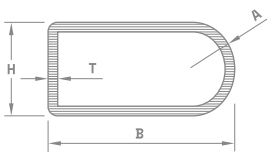
Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
	B	H	A	T			
ELLIPTICAL	50	13	-	1,0 Galva	0,856	200	1027
	52	12	-	1,0 Galva	0,864	200	1037



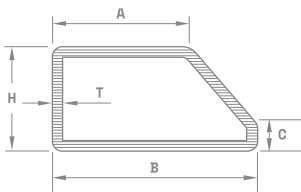
Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
	B	H	A	T			
FLATTENED	10	25	-	1	0,48	200	576
	10	25	-	1,25	0,60	200	720
	10	25	-	1,5	0,71	200	852
	15	60	-	1	1,09	130	850
	15	60	-	1,25	1,36	130	1061
	15	60	-	1,5	1,62	130	1264
	30	15	-	0,6	0,39	200	470
	30	15	-	0,8	0,48	200	572
	30	15	-	1	0,62	200	744
	30	15	-	1,25	0,77	200	924
	30	15	-	1,5	0,91	200	1092
	30	15	-	2	1,20	200	1440
	30	50	-	1,5	1,60	60	576
	30	50	-	2	2,11	60	759,6
	35	20	-	1	0,73	160	700,8
	35	20	-	1,25	0,92	160	883,2
	35	20	-	1,5	1,09	160	1046,4
	35	20	-	2	1,44	160	1382,4
	50	16	-	1,5	1,39	144	1200
	40	20	-	1,5	0,99	162	963
	40	20	-	2	1,53	162	1487,16
	42	21	-	1,5	1,27	162	1234,44
	42	21	-	2	1,67	161	1613,22
	50	15	-	1,5	1,36	144	1175,04
	60	20	-	1	1,09	108	703
	60	20	-	1,25	1,39	108	903
	60	20	-	1,5	1,57	108	1020
	64	26	-	2	2,47	98	1449
	84,6	44,6	-	2	3,43	60	1234,8
	60	30	-	1,5	1,38	98	1108
	60	30	-	2	2,49	98	1464,12



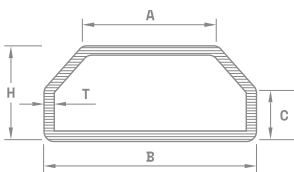
Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
OVAL	B	H	A	T			
	28	14	-	1	1,068	200	1282
	28	14	-	1,25	0,532	200	639
	28	14	-	1,5	0,812	200	974
	28	14	-	2	1,068	200	1282
	40	20	-	1,5	1,141	100	684
	30	15	-	1	0,59	200	708
	30	15	-	1,25	0,74	200	888
	30	15	-	1,5	0,88	200	1056
	30	15	-	2	1,16	200	1392



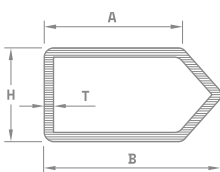
Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
SEMI FLAT	B	H	A	T			
	40	25	12,5	3	2,571	50	1071
	60	30	15	1,5	1,943	98	1142



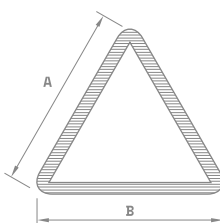
Ref	Dimensions mm					Linear mass kg/m	Sections/strapped	Weight/strapped kg
SEMI TRAPEZOIDAL	B	H	A	C	T			
	62	52	30	15	2	-	88	-
	95	40	65	10,5	2	3,95	50	1185
	95	40	65	10,5	2,3	3,956	50	1187
	95	40	65	10,5	2,6	4,775	50	1433
	95	40	65	10,5	3	5,86	50	1758



Ref	Dimensions mm					Linear mass kg/m	Sections/strapped	Weight/strapped kg
TRAPEZOIDAL	B	H	A	C	T			
	82	34	36	26	1,5	2,56	72	1106



Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
SEMI OBLIQUE	B	H	A	T			
	70	20	30	2	2,826	50	848



Ref	Dimensions mm				Linear mass kg/m	Sections/strapped	Weight/strapped kg
TRIANGULAR	B	H	A	T			
	30	-	30	2	1,42	100	852

# STEEL GRADES

## EN 10305-3/5

Steel grades are available in the following surface states:

Galvanized, cold rolled, hot rolled (rough rolled/pickled).

Steel grade	Chemical properties						Mechanical properties				
	Nominal thickness % by mass						+CR1		+CR2		
	C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	Al <sub>total</sub> % mín.	R <sub>m</sub> (MPa) mín.	A % mín.	R <sub>m</sub> (MPa) mín.	R <sub>eH</sub> (MPa) mín.	A % mín.
E155	0,11	0,35	0,70	0,025	0,025	0,015	290	15	-	-	-
E190	0,10						-	-	270	190	26
E195	0,15	0,35	0,70	0,025	0,025	0,015	330	8	-	-	-
E220	0,14						-	-	310	220	23
E235	0,17	0,35	1,20	0,025	0,025	0,015	390	7	-	-	-
E260	0,16						-	-	340	260	21
E275	0,21	0,35	1,40	0,025	0,025	0,015	440	6	-	-	-
E320	0,20						-	-	410	320	19
E355	0,22	0,55	1,60	0,025	0,025	0,020	540	5	-	-	-
E370	0,21						-	-	450	370	15
E420	0,16	0,55	1,70	0,025	0,025	0,020	-	-	490	420	12
E460	0,16						-	-	510	460	9
E500	0,16	0,55	1,70	0,025	0,025	0,020	-	-	540	500	8
E550	0,16	0,55	1,80	0,025	0,025	0,020	-	-	590	550	7
E600	0,16	0,60	1,80	0,025	0,025	0,020	-	-	640	600	6
E700	0,16	0,60	2,10	0,025	0,025	0,020	-	-	740	700	5

## EN 10111

Steel grades are available in the following surface states:

Hot rolled (rough rolled/pickled).

Steel grade	Chemical properties (% máx.)				Mechanical properties						
	Nominal thickness % by mass				R <sub>eL</sub> (MPa) Thickness (mm)		R <sub>m</sub> (MPa) Thickness (mm)	L <sub>0</sub> = 80mm Thickness (mm)		L <sub>0</sub> = 5,65 vS <sub>0</sub> Thickness (mm)	
	C % máx.	Mn % máx.	P % máx.	S % máx.	1 ≤ ≤ 2	2 ≤ ≤ 11	máx.	1 < 1,5	1,5 < 2	2 < 3	3 ≤ 11
DD11	0,12	0,60	0,045	0,045	170-360	170-340	440	22	23	24	28
DD12	0,10	0,45	0,035	0,035	170-340	170-320	420	24	25	26	30
DD13	0,08	0,40	0,030	0,030	170-330	170-310	400	27	28	29	33

## EN 10025-2

Steel grades are available in the following surface states:

Hot rolled (rough rolled/pickled).

Steel grade	Chemical properties									Mechanical properties								
	Nominal thickness < 16mm % by mass									R <sub>elt</sub> mín. Thickness (mm)	R <sub>m</sub> Thickness (mm)	L <sub>0</sub> = 80mm Thickness (mm)					L <sub>0</sub> = 5,65 Thickness (mm)	
	C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	N % máx.	Cu % máx.	CEV % máx.		< 3	≥ 3 ≤ 100	≤ 1	> 1 ≤ 1,5	> 1,5 ≤ 2	> 2 ≤ 2,5	> 2,5 ≤ 3	> 3 ≤ 40	
S185	-	-	-	-	-	-	-	-	185	310 a 540	290 a 510	l <sub>t</sub> 10 t 8	l <sub>t</sub> 11 t 9	l <sub>t</sub> 12 t 10	l <sub>t</sub> 13 t 11	l <sub>t</sub> 14 t 12	l <sub>t</sub> 18 t 16	
S235JR	0,19	-	1,50	0,045	0,045	0,014	0,60	0,35	235	360 a 510	360 a 510	17	18	19	20	21	26	
S235J0	0,19	-	1,50	0,040	0,040	0,014	0,60	0,35	235	360 a 510	360 a 510							
S235J2	0,19	-	1,50	0,035	0,035	-	0,60	0,35	235	360 a 510	360 a 510	15	16	17	18	19	24	
S275JR	0,24	-	1,60	0,045	0,045	0,014	0,60	0,40	275	430 a 580	410 a 560	15	16	17	18	19	23	
S275J0	0,21	-	1,60	0,040	0,040	0,014	0,60	0,40	275	430 a 580	410 a 560							
S275J2	0,21	-	1,60	0,035	0,035	-	0,60	0,40	275	430 a 580	410 a 560	13	14	15	16	17	21	
S355JR	0,27	0,60	1,70	0,045	0,045	0,014	0,60	0,45	355	510 a 680	470 a 630	14	15	16	17	18	22	
S355J0	0,23	0,60	1,70	0,040	0,040	0,014	0,60	0,45	355	510 a 680	470 a 630							
S355J2	0,23	0,60	1,70	0,035	0,035	-	0,60	0,45	355	510 a 680	470 a 630							
S355K2	0,23	0,60	1,70	0,035	0,035	-	0,60	0,45	355	510 a 680	470 a 630	12	13	14	15	16	20	

## EN 10130

Steel grades are available in the following surface states:

Cold rolled.

Steel grade	Chemical properties				Mechanical properties				
	Nominal thickness % by mass				R <sub>e</sub> (MPa) <sup>a)</sup> máx.	R <sub>m</sub> (MPa)	A <sub>80</sub> <sup>c)</sup> %	r <sub>90</sub> <sup>d) e)</sup> mín.	n <sub>90</sub> <sup>d)</sup> mín.
	C % máx.	Mn % máx.	P % máx.	S % máx.					
DC01	0,12	0,60	0,045	0,045	-/280 <sup>b)</sup>	270-410	28	-	-
DC03	0,10	0,45	0,035	0,035	-/240 <sup>b)</sup>	270-370	34	1,3	-

<sup>a)</sup> The yield strength values are the conventional 0.2% proportionality limit for products that do not have an elongation effect and the lower elongation limit (ReL) for others. In cases where the thickness is less than or equal to 0.7 mm, but greater than 0.5 mm, the maximum yield strength value is increased by 20 N/mm<sup>2</sup>. For thicknesses of 0.5 mm or less, the maximum yield strength value is increased by 40 MPa.

<sup>b)</sup> For calculation purposes, the lower Re limit for grades DC01, DC03, DC04 and DC05 can be equal to 140 MPa.

<sup>c)</sup> In cases where the thickness is less than or equal to 0.7 mm, but greater than 0.5 mm, the minimum value for elongation after breakage is decreased by 2 units. For thicknesses of 0.5 mm or less, the minimum value for elongation after breakage is decreased by 4 units.

<sup>d)</sup> The r<sub>90</sub> and n<sub>90</sub> values are only applicable for thicknesses greater than or equal to 0.5 mm.

<sup>e)</sup> In cases where the thickness is greater than 2 mm, the r<sub>90</sub> value is decreased by 0.2.

**EN 10346**

Steel grades are available in the following surface states:

Galvanized.

Steel grade	Coating type	Chemical properties								Coating symbols	Mechanical properties		
		Nominal thickness % by mass									R <sub>e</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>80</sub> min. %
		C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	Ti % máx. <sup>a)</sup>	Al <sub>total</sub> % mín.	Nb % máx.				
DX51D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,18	0,50	1,20	0,12	0,045	0,30	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	-	270-500	22
DX52D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	140-300	270-420	26
DX53D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	140-260	270-380	30
DX54D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZA +ZF;+ZM +AZ +AS	120-220 120-220 120-220 120-220	260-350 260-350 260-350 260-350	36 34 36 34
DX55D	+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+AS	140-240	270-370	30
DX56D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZA +ZF;+ZM AZ;+AS	120-180 120-180 120-180	260-350 260-350 260-350	39 37 39
DX57D	+Z;+ZF;+ZA;+ZM;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZA +ZF;+ZM +AS	120-170 120-170 120-170	260-350 260-350 260-350	41 39 41
											R <sub>p0,2</sub> min.	R <sub>m</sub> min.	A <sub>80</sub> min.
S220GD	+Z;+ZF;+ZA;+ZM;+AZ;	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;	220	300	20
S250GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	250	330	19
S280GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	280	360	18
S320GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	320	390	17
S350GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	350	420	16
S390GD	+Z;+ZF;+ZA;+ZM;+AZ;	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;	390	460	16
S420GD	+Z;+ZF;+ZA;+ZM;+AZ;	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;	420	480	15
S450GD	+Z;+ZF;+ZA;+ZM;+AZ;	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;	450	510	14
S550GD	+Z;+ZF;+ZA;+ZM;+AZ;	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;	550	560	-
											R <sub>p0,2</sub>	R <sub>m</sub>	A <sub>80</sub> min.
HX180YD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,01	0,30	0,70	0,06	0,025	0,12	0,01	0,09	+Z;+ZF;+ZA;+ZM;+AZ;+AS	180-240	330-390	34
HX220YD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,01	0,30	0,90	0,08	0,025	0,12	0,01	0,09		220-280	340-420	32
HX260YD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,01	0,30	1,60	0,10	0,025	0,12	0,01	0,09		260-320	380-440	30
HX260LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,11	0,50	1,00	0,03	0,025	0,15	0,015	0,09		260-330	350-430	26
HX300YD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,015	0,30	1,60	0,10	0,025	0,12	0,01	0,09		300-360	390-470	27
HX300LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	1,40	0,03	0,025	0,15	0,015	0,09		300-380	380-480	23
HX340LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	1,40	0,03	0,025	0,15	0,015	0,10		340-420	410-510	21
HX380LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	1,50	0,03	0,025	0,15	0,015	0,10		380-480	440-560	19
HX420LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	1,60	0,03	0,025	0,15	0,015	0,10		420-520	470-590	17
HX460LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,15	0,50	1,70	0,03	0,025	0,15	0,015	0,10		460-560	500-640	15
HX500LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,15	0,50	1,70	0,03	0,025	0,15	0,015	0,10		500-620	530-690	13

<sup>a)</sup> By agreement upon inquiry and ordering, the Ti content for the steel grades mentioned in this table may be reduced to <0.05%, meaning that the steel grade is unalloyed.



# SUPPLY OPTIONS

## DIP GALVANIZATION

Hot-dip galvanized tubes can be supplied, according to EN 10240 A.1/A.2 or ISO 1461, providing greater protection against corrosion.

## SURFACE PROTECTION

The tubes may be oiled for protection during their provisioning.

## SPECIAL TOLERANCES

Special tolerances must be requested when inquiring/ordering.

## WELDING

Possibility of removing the internal welding bead. When ordering and/or inquiring, a target value for the position of the weld bead plus its tolerance can be defined.

## LONGITUDINAL CUT

Capacity to produce and deliver tubes, with specific tolerances, determined during the technological operation of longitudinal cutting.

## PACKAGING AND LABELING

The material is available in geometric ties strapped with steel bands (hexagonal, square and/or rectangular shape), for greater optimization of space, easy handling and effective labeling, ensuring product identification and traceability.

# APPLICATION AREAS



INDUSTRY



CONSTRUCTION



FARMING



ENERGY



ENGINEERING  
AND ARCHITECTURE