



ESTI

ESTRONG[®]
The wear-resistant steel

Rolled profiles. High quality.



ESTRONG® is an alloy steel with a low Carbon content and high levels of Boron, Molybdenum and Nickel, which optimize the mechanical characteristics while making it easy to weld and to work.

The extreme hardness that is at the heart of the profiles is the result of an excellent chemical composition combined with deep hardening of the steel.

■ ITALIAN PRODUCTION ■

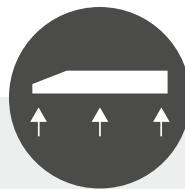
The advantages



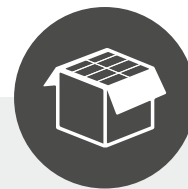
Complete production chain, from steel production to stock of finished product.



Rolled beveled profiles.



Constant characteristics over the entire section.



Large amount of stock always available.

Properties

ESTRONG 250

Untempered crude steel, easy to work, suitable for subsequent heat treatments and for applications where the wear is limited.

Hardness

HB 220 – 250

(natural rolled state).

Chemical composition

C	max 0,28 %
Si	max 0,35 %
Mn	max 1,40 %
P	max 0,03 %
S	max 0,03 %
Cr	max 0,50 %
Ni	max 0,30 %
Mo	max 0,25 %
B	max 0,004 %

Indicative mechanical features

- Tensile strength (R_m): 730 N/mm²
- Yield point (R_e): 510 N/mm²
- Elongation (A₅): 17%

ESTRONG 400

Hardened and tempered steel suitable for all applications where high toughness and wear resistance are required.

Hardness

HB 380 – 440

(after the heat treatment performed on the entire thickness of the profile).

Chemical composition

C	max 0,19 %
Si	max 0,35 %
Mn	max 1,40 %
P	max 0,03 %
S	max 0,03 %
Cr	max 0,50 %
Ni	max 0,30 %
Mo	max 0,25 %
B	max 0,004 %

Indicative mechanical features

- Tensile strength (R_m): 1470 N/mm²
- Yield point (R_e): 1100 N/mm²
- Elongation (A₅): 11%
- Resilience (-40°C): 35 J

ESTRONG 500

Hardened and tempered steel suitable for applications with extreme and particularly heavy wear.

Hardness

HB 470 – 530

(after the heat treatment performed on the entire thickness of the profile).

Chemical composition

C	max 0,28 %
Si	max 0,35 %
Mn	max 1,40 %
P	max 0,03 %
S	max 0,03 %
Cr	max 0,50 %
Ni	max 0,30 %
Mo	max 0,25 %
B	max 0,004 %

Indicative mechanical features

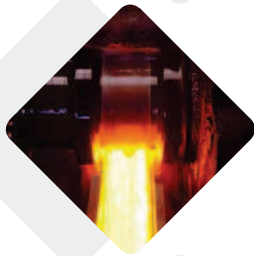
- Tensile strength (R_m): 1770 N/mm²
- Yield point (R_e): 1330 N/mm²
- Elongation (A₅): 9%
- Resilience (-40°C): 30 J

Complete production chain

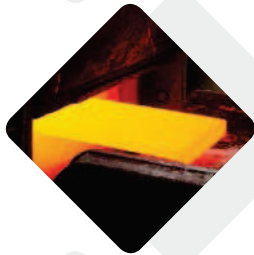
The merger of Esti and Acciaierie Venete has created a new organization, unique of its kind, which allows the creation of a **complete production chain**.



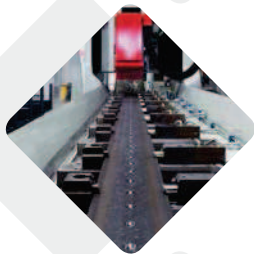
< Steel production



< Rolling



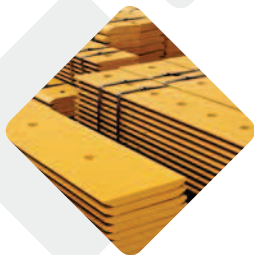
< Heat treatment



< Machining



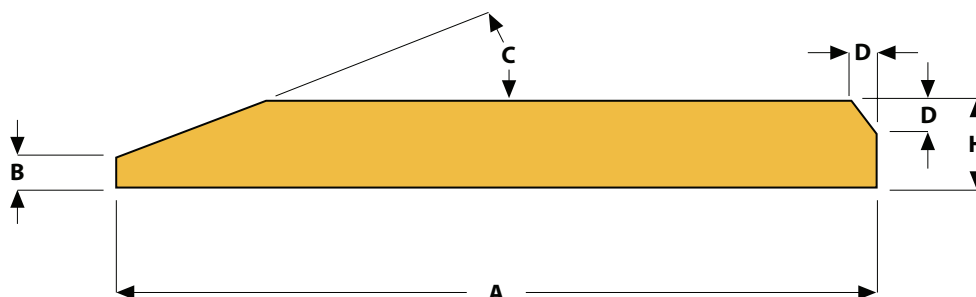
< Painting



< Stock

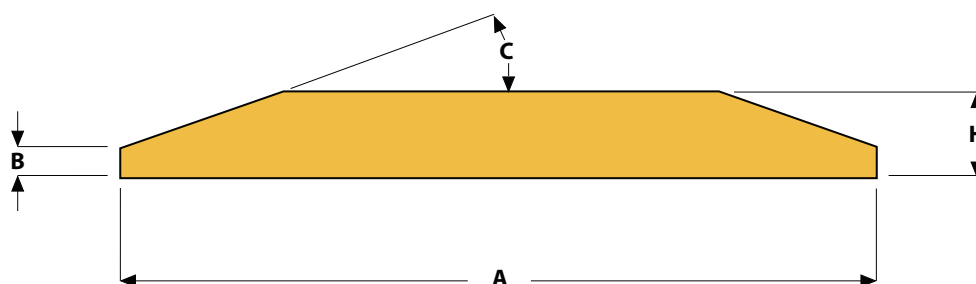


Single bevel rolled profiles



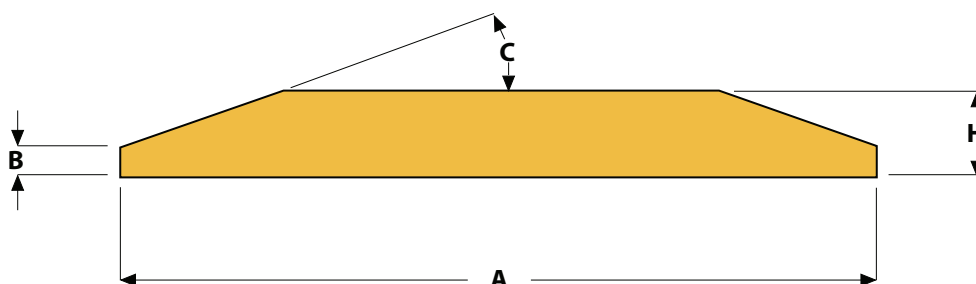
DIMENSIONS (mm)					LENGTH (mm)	WEIGHT (kg/m)
A	H	B	D	C		
80	12	5	-	20,2°	6300	7,1
110	12	3	R=3	23,9°	6000	9,7
110	16	7	R=3	23,9°	6000	13,1
150	16	7	5	24°	6000	18,0
150	20	5	5	22,6	6000	21,5
150	20	5	5	26,5	6000	21,7
200	20	6	8	23°	6000	29,5
200	25	11	8	23°	6000	37,4
245	25	8	10	22,6°	6000	44,9
250	25	6	10	22,6°	6000	45,6
250	30	11	10	22,6°	6000	55,3
270	32	10	10	23°	6000	63,1
270	35	13	10	23°	6000	69,1
300	30	8	10	23°	6100	66,1
300	35	13	10	23°	6100	77,7
300	40	18	10	23°	6100	89,4
300	50	28	10	23°	6100	112,9
400	40	15	12	24°	6100	119,5
400	45	20	12	24°	6100	135,2
400	50	25	12	24°	6100	150,9

Double bevel rolled profiles



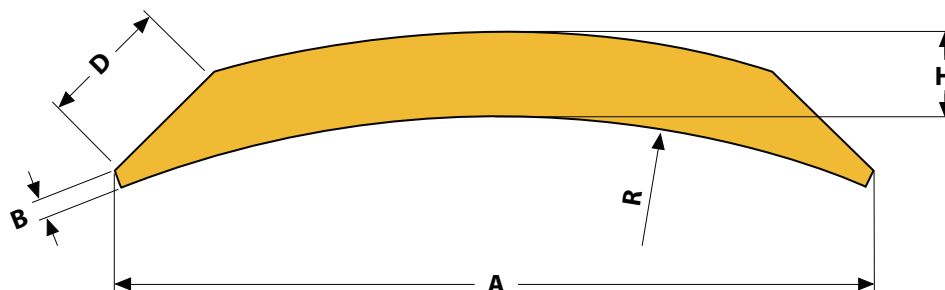
DIMENSIONS (mm)				LENGTH (mm)	WEIGHT (kg/m)
A	H	B	C		
120	15	5	25°	6500	12,2
152,4	15,9	5	25°	6500	17,4
152,4	19,1	8,1	25°	6500	21,0
203,2	15,9	5	25°	6500	23,7
203,2	19,1	8,1	25°	6500	28,5
203,2	25,4	14,4	25°	6500	38,5
254	19,1	7,1	25°	6500	36,0
254	25,4	13,4	25°	6500	48,5
254	30	18	25°	6500	57,7
254	32	20	25°	6500	61,4
254	35	23	25°	6500	67,4
254	41	29	25°	6500	79,3
280	25	7	22,5°	6500	48,9
304,8	25,4	9,5	22,5	6500	56,0
304,8	28,5	12,6	22,5°	6500	63,6
304,8	32	16,1	22,5°	6500	71,8
330	25	11	22,5°	6500	61,0
330	28,5	14,5	22,5°	6500	70,1

Double bevel rolled profiles



DIMENSIONS (mm)				LENGTH (mm)	WEIGHT (kg/m)
A	H	B	C		
330	30	16	22,5°	6500	74,0
330	32	18	22,5°	6500	79,2
330	35	21	22,5°	6500	87,0
330	38	24	22,5°	6500	94,7
330	41	27	22,5°	6500	102,5
330	50	36	22,5°	6500	126,1
360	30	8	22,5°	6500	75,6
360	35	13	22,5°	6500	89,9
360	40	18	22,5°	6500	103,9
406	25	9	22,5°	6500	74,8
406	28,5	12,5	22,5°	6500	86,0
406	32	16	22,5°	6500	97,1
406	35	19	22,5°	6500	106,7
406	38	22	22,5°	6500	116,0
406	41	25	22,5°	6500	125,8
406	45	29	22,5°	6500	138,6
406	50	34	22,5°	6500	154,5
406	60	44	22,5°	6100	186,2

Curved double bevel rolled profiles

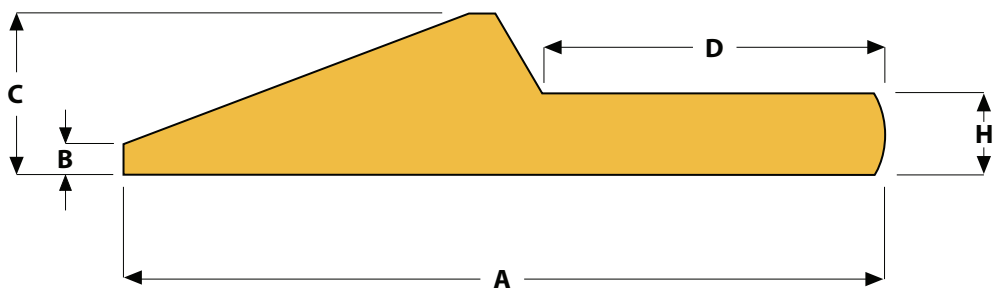


DIMENSIONS (mm)					LENGTH (mm)	WEIGHT (kg/m)
A	H	B	D	R		
152,4	12,7	2,5	33,3	273	12900	13,3
152,4	15,9	5,5	33,3	273	12900	17,2
152,4	19,1	8,6	33,3	273	12900	20,4
203,2	15,9	5,5	33,3	273	12900	23,3
203,2	19,1	8,6	33,3	273	12900	28,3
203,2	25,4	14,7	33,3	273	12900	38,7

These profiles can be produced in steel:

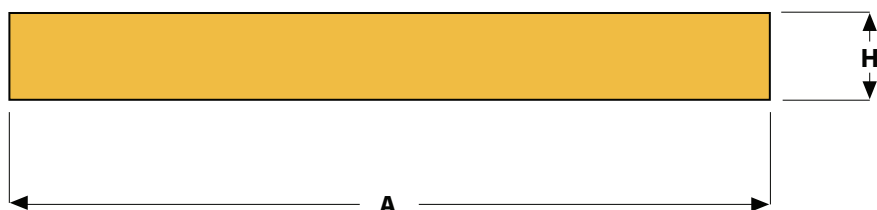
ESTRONG 250, ESTRONG 500, EC
270 (Carbon Steel C=0,75).

Half arrow rolled profiles



DIMENSIONS (mm)					LENGTH (mm)	WEIGHT (kg/m)
A	H	C	B	D		
101	11	21	3	46	6100	9,8
151	16	32	6	68	6100	21,3
203	19	32	5	127	6100	31,0
203	19	32	5	127	7400	31,0
254	29	58	10	130	7400	66,2
254	40	69	21	130	7400	88,5

Rectangular rolled profiles



DIMENSIONS (mm)		LENGTH (mm)	WEIGHT (kg/m)
A	H		
60	8	6000	3,8
60	10	6000	4,7
80	10	6000	6,3
80	15	6000	9,4
100	10	6000	7,8
100	12	6000	9,3
100	15	6000	11,7
120	12	6000	11,2
120	15	6000	14,1
120	20	6000	18,7
130	15	6000	15,2
150	15	6000	17,6
150	20	6000	23,4
160	15	6000	18,7
180	20	6000	28,1
200	15	6000	23,4
200	20	6000	31,2

RECTANGULAR PROFILES MADE WITH REQUESTED DIMENSIONS	
A = 60 (mm) → 400 (mm)	H = 8 (mm) → 50 (mm)

Cutting

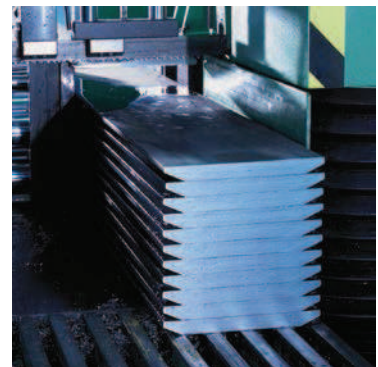
Hot cutting

- The method used is oxy cutting.
- This system adds a significant amount of heat that can cause a loss of hardness in the involved areas. For this reason it is necessary to cool the cutting area with water to minimize variations in hardness.
- It is a good idea to reduce the cutting speed of especially hard profiles to avoid cutting defects and cracking.
- It is advisable to preheat profiles with thicknesses exceeding 30 mm and at temperatures below +5°C. Preheating avoids cracking due to excessive heat shock.



Cold cutting

- Band saws are most commonly used.
- This type of cutting does not produce thermal alterations and also ensures high precision.
- It is necessary to use appropriate blades for the hardness of the steel to be cut.
- It is advisable to lubricate the blades with abundant emulsifying liquid (water + oil) or a nebulizing system (air + oil).
- The cutting parameters (speed and feed rate) should be adjusted based on the type of blade used and the hardness of the profile to be cut.
- There are blades that allow high cutting speeds. Due to their high cost and poor durability, their use is not always justified.





Drilling

Solid hard metal bits

- Diameters from 5 mm.
- Regrindable.
- Very fragile in the presence of vibrations.
- High drilling precision.

Drilling **ESTRONG®** steel profiles is not particularly difficult but it is important to use tools that are suitable for drilling extremely hard steels.

Bits with inserts

- Diameters from 13 mm.
- High productivity.
- Longer duration of solid bits.
- Less precise drilling compared to solid bits.

Bits with inserts are especially indicated for drilling **ESTRONG 400** - **ESTRONG 500** steels.



Welding

ESTRONG® profiles are easily welded and excellent for the construction of any type of bucket.

When welding, it is important to follow several general rules:

- Make sure that the surfaces to be welded are clean and dry.
- Use a welding material with low hydrogen content.
- Balance the welding sequence so as to minimize residual stresses. In fact, welding adds a significant amount of heat and can deform the profiles.
- Preheat when the profile to be welded is thicker than 30 mm, the ambient temperature is below +5°C or the air is very humid.
- Recommended preheating temperatures:
ESTRONG 400 = 80°C, **ESTRONG 500** = 180°C.
- **ESTRONG 250** steel does not require preheating.
Preheating is only recommended when the ambient temperature is 0°C.

The Carbon Equivalent Value (CEV) is a good indicator for assessing the weldability of the steel based on its alloys and determining the welding temperature.

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15} (\%)$$

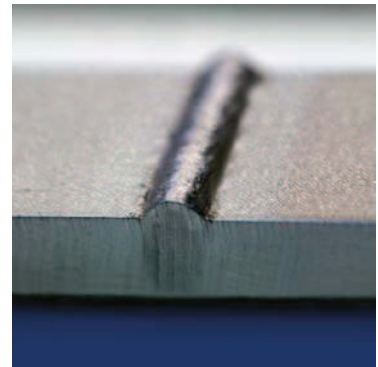
ESTRONG 400

CEV
0.49 (10 to 20 mm - 0.4 to 0.8 in thick)
0.52 (25 to 50 mm - 1 to 2 in thick)

ESTRONG 500

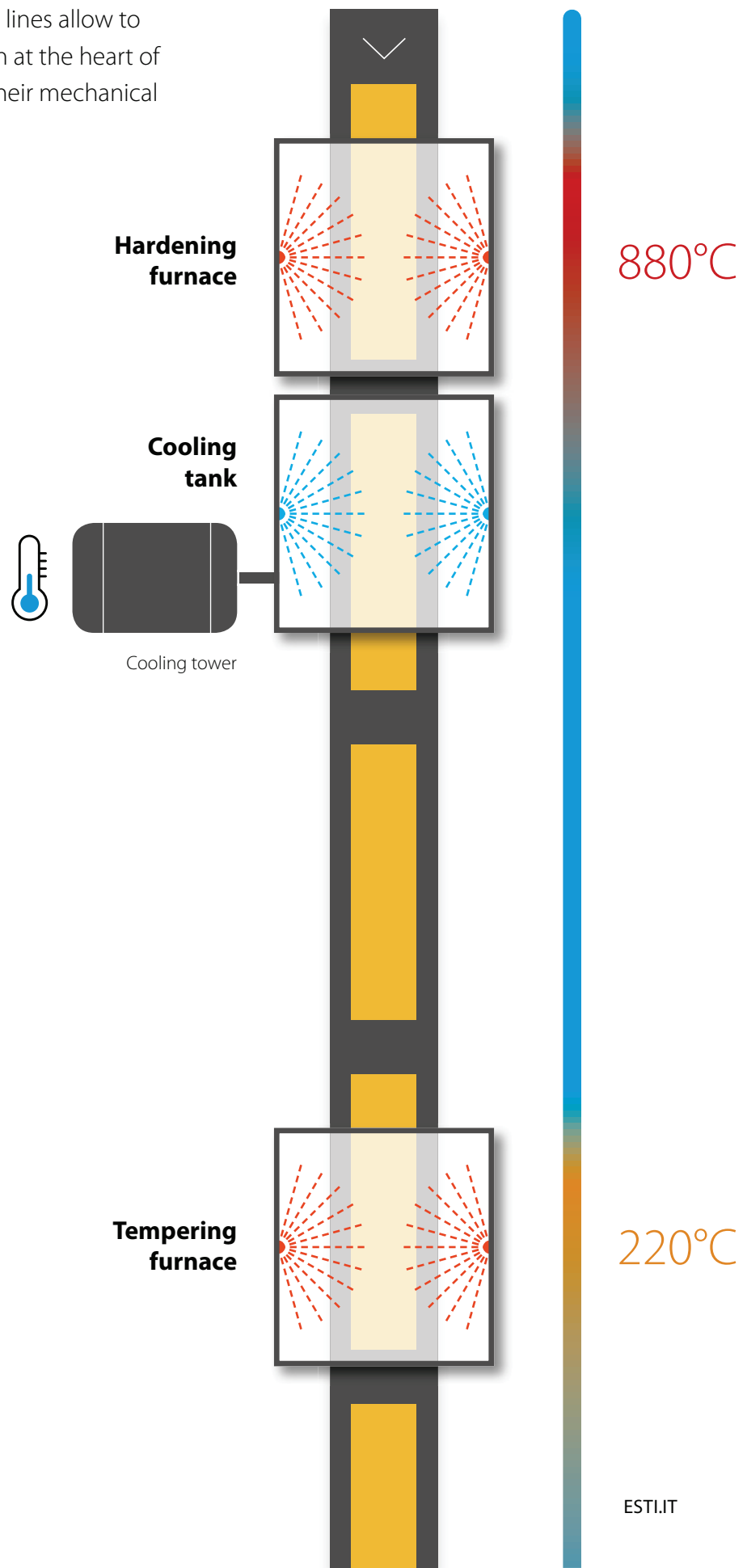
CEV
0.59 (10 to 20 mm - 0.4 to 0.8 in thick)
0.62 (25 to 50 mm - 1 to 2 in thick)

The low Carbon Equivalent Value of these steels can greatly reduce the risk of hydrogen cracking during welding.



Heat treatment process

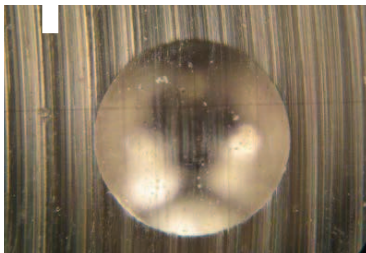
The efficient heat treatment lines allow to obtain a high hardness, even at the heart of the profiles, by optimizing their mechanical features.



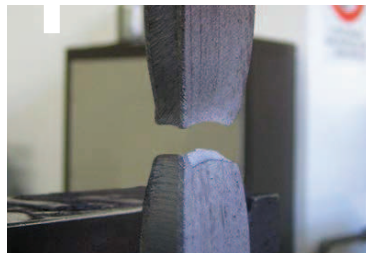


Quality control

Continuous checks are performed using sophisticated control instruments in order to ensure the absolute quality of the product.



Hardness.



Tensile strength, yield point and elongation.



Resilience.



ISO 9001:2015 ISO 14001:2015

ESTI s.r.l.
Via dei Baicc, 5
25074 Idro (Brescia)
Italy

Tel. +39 0365 82 33 27
Fax +39 0365 82 32 54
Email info@esti.it
esti.it