



RIVA ACCIAIO



Billets and Blooms from Continuous Casting

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Production Units:

Caronno Pertusella (VA), Italy

Lesegno (CN), Italy



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Billets and Blooms from Continuous Casting

Products

STRUCTURAL AND GENERAL USE NON-ALLOY QUALITY STEEL	EN 10025-04
CASE HARDENING SPECIAL CARBON STEEL	EN 10084/08
QUENCHED AND TEMPERED SPECIAL CARBON STEEL	UNI EN 10083-2/06
QUENCHED AND TEMPERED QUALITY CARBON STEEL	EN 10083-2/06
CARBON STEEL FOR PIPE FITTINGS	ASTM A105 ASTM A350-LF2
FREE CUTTING STEEL NOT SUITABLE FOR HEAT TREATMENT	UNI 4838 ASTM A29 EN 10087
CASE HARDENING AND QUENCHED AND TEMPERED FREE CUTTING STEEL	UNI 4838 ASTM A29 EN 10087
Mn, Mn-Cr, Mn-Cr-B QUENCHED AND TEMPERED STEEL	UPON CUSTOMER SPECIFICATIONS
MICRO-ALLOYED STEEL	UPON CUSTOMER SPECIFICATIONS
STEEL FOR CONCRETE	B450C DM 14/01/2008

DESCRIPTION AND APPLICATIONS

Semiproduct (mm)	Dimensions (mm)	Progression (mm)	Tolerance	Length (m)
BILLETTE C.C.	square	120 ÷ 140 ÷ 160	± 3%	3,50 ÷ 12
BLUMI C.C.	square	200 - 260	± 1,5%	3,50 ÷ 12

STANDARD DIMENSIONS

120 - 140 - 160 - 200 - 260 mm

LENGTH

3,50 ÷ 12 m

ENDS APPEARANCE

hot shearing up	Caronno Pertusella - diagonally (section: square 120 - 140 -160 mm) Verona - vertical (section: square 140 mm)
Oxygen lance cutting	Caronno Pertusella - section square 120 - 140 -160 mm Lesegno: section square 160 mm

SIZE TOLERANCES

EN 10031 as amended



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General Supply Conditions

PRODUCTION CAMPAIGN

Billets and blooms	160 - 200 - 260	30 gg
	120	90 gg
	140	40 ÷ 60 gg

LENGTH

COMMERCIAL	3,5 ÷ 12 m
FIXED	If agreed on order, 3m for max ≤ 15 % of the quantity.

MINIMUM QUANTITY PER ORDER

120 ÷ 160 mm c.c. in carbon and general use steel	5 ton
200 ÷ 260 mm by c.c.	30 ton
- other steel grades	80 ton

WEIGHT TOLERANCES ON THE ORDERED QUANTITY

for orders ≤ 5 ton	± 20%
for orders > 5 ÷ 25 ton	± 10 %
for orders > 25 ton	± 6%

PACKING

BUNDLE WEIGHT	C.C Billets: 120 - 140 - 160. In bundles: 2,5 ÷ 4,7 ton
WRAPPINGS	By wire rod Ø 7 mm; N° 4 wrapping per bundle. When billets are loaded and unloaded by means of an overhead travelling magnet crane, packing in bundles is not provided.
MARKING	Heat number painted on each bloom side; heat number and steel quality painted on one face of bloom in bundle.



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Quality Conditions

SURFACE DEFECTS

Defects are allowed up to a depth $\leq 1,2$ mm.

INTERNAL DEFECTS

Macrocleanliness ≤ 2 grade according S.E.P. 1584 standard

Microcleanliness $\leq 2,5$ grade according ASTM E 45 or by K method according to values foreseen by the EN 10083-1, App E

Macroetch \leq C3-R2-S2, ASTM E 381 standard.

NOTE: Above conditions may be significantly enhanced with vacuum-degassed steels as per special specifications and applications' requirements.

AUSTENITIC GRAIN SIZE FOR SPECIAL STEELS

By Al + Ti: grain size $5 \div 8$ or $6 \div 9$ conforming to EN ISO 643, UNI 3245 or ASTM E112

MANAGEMENT SYSTEM CERTIFICATION

ISO 9001 - Certification - Quality Management Systems

ISO 14001 - Certification - Environmental management system

ISO BH OHSAS 18001 - Certification - occupational health and safety management system

INSPECTION CERTIFICATES

- 3.1.B conforming to EN 10204 standard

- TÜV AD W0/TRD100 and 97/23/EC (PED) directive, steel products for pressure vessels equipment and applications

- Caterpillar qualification (1E1861)



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STRUCTURAL AND GENERAL USE NON-ALLOY QUALITY STEEL EN 10025-04

DESCRIPTION AND APPLICATIONS

Non alloy quality steel suitable for the manufacturing of structural elements, as welded, bolted and riveted structures for room temperature applications.

CORRESPONDENCE BETWEEN EN 10025-04 QUALITIES AND MAIN INTERNATIONAL STANDARDS

EN 10025-04	EN 10025-95	Italy UNI EN 10025-90	Germany DIN 17100	France AFNOR NF A 35.501	U.K. B.S. 4360	Spain UNE 36080	U.S.A. ASTM
S235JR	S235JR G2	Fe 360 B	RSt 37-2	-	40 B	AE 235 B-FN	-
S235J0	S235J0	Fe 360 C	St 37-3U	E 24-3	40 C	AE 235 C	-
S235J2	S235J2 G3	Fe 360 D	St 37-3N	E 24-4	40 D	AE 235 D	-
-	S235J2 G4	-	-	-	-	-	-
S275JR	S275JR	Fe 430 B	St 44-2	E 28-2	43 B	AE 275 B	A 36/A 283D
S275J0	S275J0	Fe 430 C	St 44-3U	E 28-3	43 C	AE 275 C	-
S275J2	S275J2 G3	Fe 430 D	St 44-3N	E 28-4	43 D	AE 275 D	A 633 GR. A
-	S275J2 G4	-	-	-	-	-	-
S355JR	S355JR	Fe 510 B	-	E 36-2	50 B	AE 355 B	A 572 GR.50/A 678 GR.A
S355J0	S355J0	Fe 510 C	St 52-3U	E 36-3	50 C	AE 355 C	-
S355J2	S355J2 G3	Fe 510 D	St 52-3N	-	50 D	AE 355 D	-
-	S355J2 G4	-	-	-	-	-	-
S355K2	S355K2 G3	Fe 510 DD1	-	E36-4	50 DD	-	-
-	S355K2 G4	-	-	-	-	-	-
E295	E295	Fe 490	St 50-2	A 50-2	-	A 490	-
E355	E355	Fe 590	St 60- 2	A 60-2	-	A 590	-
E360	E360	Fe 690	St 70-2	A 70-2	-	A 690	-
S450J0	-	-	-	-	55 C	-	-

IMPORTANT: Correspondance based on minimum strength value (Rm) and on impact test temperature.



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HEAT CHEMICAL COMPOSITION

Quality	n°	C % Max Nominal Thickness (mm)			Mn % Max	Si % Max	P % Max	S % Max	N % Max
		≤ 16	> 16 ≤ 40	> 40					
S235JR	1.0038	0,170	0,170	0,200	1,400	-	0,035	0,035	0,012
S235J0	1.0114	0,170	0,170	0,170	1,400	-	0,030	0,030	0,012
S235J2	1.0117	0,170	0,170	0,170	1,400	-	0,025	0,025	-
S275JR	1.0044	0,210	0,210	0,220	1,500	-	0,035	0,035	0,012
S275J0	1.0143	0,180	0,180	0,180	1,500	-	0,030	0,030	0,012
S275J2	1.0145	0,180	0,180	0,180	1,500	-	0,025	0,025	-
S355JR	1.0045	0,240	0,240	0,240	1,600	0,550	0,035	0,035	0,012
S355J0	1.0553	0,200	0,200	0,220	1,600	0,550	0,030	0,030	0,012
S355J2	1.0577	0,200	0,200	0,220	1,600	0,550	0,025	0,025	-
S355K2	1.0596	0,200	0,200	0,220	1,600	0,550	0,025	0,025	-
E295	1.0050	-	-	-	-	-	0,045	0,045	0,009
E335	1.0060	-	-	-	-	-	0,045	0,045	0,009
E360	1.0070	-	-	-	-	-	0,045	0,045	0,009
S450J0*	1.0590	0,200	0,200	0,220	1,700	0,550	0,090	0,090	0,025

(*) Microalloyed with Nb max 0,05%, V max 0,13% and Ti max 0,05%.

IMPORTANT: Limit on N content does not apply when minimum tot Al content is 0,20% or when other N binding elements are present.



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MECHANICAL PROPERTIES

Quality	ReH (N/mm ²) Min								Rm (N/mm ²) *			Impact Strength KVL (J) Min		
	Nominal Thickness (mm)								Nominal Thickness (mm)			Temp. °C	Nominal Thickness (mm)	
	≤ 16	> 16 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100	> 100 ≤ 150	> 150 ≤ 200	> 200 ≤ 250	≤ 100	> 100 ≤ 150	> 150 ≤ 250		> 10 ≤ 150	> 150 ≤ 250
S235JR	235	225	215	215	215	195	185	175	360 ÷ 510	350 ÷ 500	340 ÷ 490	20	27	27
S235J0	235	225	215	215	215	195	185	175	360 ÷ 510	350 ÷ 500	340 ÷ 490	0	27	27
S235J2	235	225	215	215	215	195	185	175	360 ÷ 510	350 ÷ 500	340 ÷ 490	- 20	27	27
S275JR	275	265	255	245	235	225	215	205	410 ÷ 560	400 ÷ 540	380 ÷ 540	20	27	27
S275J0	275	265	255	245	235	225	215	205	410 ÷ 560	400 ÷ 540	380 ÷ 540	0	27	27
S275J2	275	265	255	245	235	225	215	205	410 ÷ 560	400 ÷ 540	380 ÷ 540	- 20	27	27
S355JR	355	345	335	325	315	295	285	275	470 ÷ 630	450 ÷ 600	450 ÷ 600	20	27	27
S355J0	355	345	335	325	315	295	285	275	470 ÷ 630	450 ÷ 600	450 ÷ 600	0	27	27
S355J2	355	345	335	325	315	295	285	275	470 ÷ 630	450 ÷ 600	450 ÷ 600	- 20	27	27
S355K2	355	345	335	325	315	295	285	275	470 ÷ 630	450 ÷ 600	450 ÷ 600	- 20	40	33
E295	295	285	275	265	255	245	235	225	470 ÷ 610	450 ÷ 610	440 ÷ 610	-	-	-
E335	335	325	315	305	295	275	265	255	570 ÷ 710	550 ÷ 710	540 ÷ 710	-	-	-
E360	360	355	345	335	325	305	295	285	670 ÷ 830	650 ÷ 830	640 ÷ 830	-	-	-
S450J0	450	430	410	390	380	380	-	-	550 ÷ 720	530 ÷ 700	-	0	27	-

(*) The tensile tests values apply to longitudinal specimens (l).
However for flat products of 600 mm width transverse ones (t) are to be used.

Quality	A ₅ % Min				
	Nominal Thickness (mm)				
	≤ 40	> 40 ≤ 63	> 63 ≤ 100	> 100 ≤ 150	> 150 ≤ 250
S235JR S235J0 S235J2	26	25	24	22	21
S275JR S275J0 S275J2	23	22	21	19	18
S355JR S355J0 S355J2 S355K2	22	21	20	18	17
E295	20	19	18	16	15
E335	16	15	14	12	11
E360	11	10	9	8	7
S450J0	17	17	17	17	-



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CASE HARDENING CARBON SPECIAL STEELS EN 10084/08

DESCRIPTION AND APPLICATIONS

Other qualities conforming to the above standards have been omitted, being out of current use.

HEAT CHEMICAL COMPOSITION

Quality	N°	C %	Mn %	Si %	P %	S %	Cr %	Ni %	Mo %
C10E	1.1121	0,07±0,13	0,30±0,60	≤ 0,40	0,035	≤ 0,035	-	-	-
C10R	1.1207	0,07±0,13	0,30±0,60	≤ 0,40	0,035	0,020±0,040	-	-	-
C15E	1.1141	0,12±0,18	0,30±0,60	≤ 0,40	0,035	≤ 0,035	-	-	-
C15R	1.1140	0,12±0,18	0,30±0,60	≤ 0,40	0,035	0,020±0,040	-	-	-
C16E	1.1148	0,12±0,18	0,60±0,90	≤ 0,40	0,035	≤ 0,035	-	-	-
C16R	1.1208	0,12±0,18	0,60±0,90	≤ 0,40	0,035	0,020±0,040	-	-	-

IMPORTANT: Processing at austenitic grain 5 or finer, conforming to EN ISO 643 standard.
On request: grain 6 or finer



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Billets and Blooms from Continuous Casting

QUENCHED AND TEMPERED SPECIAL CARBON STEELS UNI EN 10083-2/06

DESCRIPTION AND APPLICATIONS

Other qualities conforming to the above standards have been omitted, being out of current use.
Qualities up to a max. alloy content of 3% may be produced.

HEAT CHEMICAL COMPOSITION

Quality	N°	C %	Mn %	Si % Max	P % Max	S %	Cr %	Mo %
C22E	1.1151	0,17 ÷ 0,24	0,40 ÷ 0,70	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C22R	1.1149	0,17 ÷ 0,24	0,40 ÷ 0,70	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
C35E	1.1181	0,32 ÷ 0,39	0,50 ÷ 0,80	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C35R	1.1180	0,32 ÷ 0,39	0,50 ÷ 0,80	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
C40E	1.1186	0,37 ÷ 0,44	0,50 ÷ 0,80	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C40R	1.1189	0,37 ÷ 0,44	0,50 ÷ 0,80	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
C45E	1.1191	0,42 ÷ 0,50	0,50 ÷ 0,80	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C45R	1.1201	0,42 ÷ 0,50	0,50 ÷ 0,80	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
C50E	1.1206	0,47 ÷ 0,55	0,60 ÷ 0,90	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C50R	1.1241	0,47 ÷ 0,55	0,60 ÷ 0,90	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
C55E	1.1203	0,52 ÷ 0,60	0,60 ÷ 0,90	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C55R	1.1209	0,52 ÷ 0,60	0,60 ÷ 0,90	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
C60E	1.1221	0,57 ÷ 0,65	0,60 ÷ 0,90	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010
C60R	1.1223	0,57 ÷ 0,65	0,60 ÷ 0,90	0,40	0,03	0,020 ÷ 0,040	≤ 0,040	≤ 0,010
28Mn6	1.1170	0,25 ÷ 0,32	1,30 ÷ 1,65	0,40	0,03	≤ 0,035	≤ 0,040	≤ 0,010

IMPORTANT: Processing at austenitic grain 5 or finer, conforming to EN ISO 943 standard.



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HARDNESS LIMITS AT JOMINY HARDENABILITY TEST (H TYPES)

Quality	HRc Hardness from Quenched End of Test Piece (mm)														
	1,5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
C35E C35R	48/58	33/55	22/49	≤ 34	≤ 28	≤ 26	≤ 25	≤ 24	-	-	-	-	-	-	-
C40E C40R	51/60	35/59	25/53	23/39	21/31	≤ 29	≤ 28	≤ 27	-	-	-	-	-	-	-
C45E C45R	55/62	37/61	28/57	26/44	24/34	22/32	21/31	20/30	-	-	-	-	-	-	-
C50E C50R	56/63	44/61	31/58	30/50	28/36	26/34	25/33	24/32	23/31	20/29	≤ 28	-	-	-	-
C55E C55R	58/65	47/63	33/60	31/52	29/37	27/35	26/34	25/33	24/32	22/30	20/29	-	-	-	-
C60E C60R	60/67	50/65	35/62	32/54	30/39	28/36	27/35	26/34	25/33	23/31	21/30	-	-	-	-
28Mn6	45/54	42/53	37/51	27/48	21/44	≤ 41	≤ 38	≤ 35	≤ 31	≤ 29	≤ 27	≤ 26	≤ 25	≤ 25	V24

IMPORTANT: On request all the qualities can be manufactured with restricted hardenability at 2/3 of standard H range, that is HL (2/3 inferior) and HH (2/3 superior) types. Reference for Jominy test: EN ISO 942 standard.

MECHANICAL PROPERTIES IN THE QUENCHED AND TEMPERED CONDITION (*)

Quality	Tensile Test				Impact Test	Heat Treatment	
	Rm	Re Min	A ₅ Min	Z Min	KV _{20°} Min	Quenching (1)	Tempering
	N/mm ²	N/mm ²	%	%	J	°C	°C
C22E	500 ÷ 650	340	20	50	50	880 ± 20	550 ± 660
C22R	500 ÷ 650	340	20	50	50	880 ± 20	550 ± 660
C35E	630 ÷ 780	430	17	40	35	860 ± 20	550 ± 660
C35R	630 ÷ 780	430	17	40	35	860 ± 20	550 ± 660
C40E	650 ÷ 800	460	16	35	30	850 ± 20	550 ± 660
C40R	650 ÷ 800	460	16	35	30	850 ± 20	550 ± 660
C45E	700 ÷ 850	490	14	35	25	840 ± 20	550 ± 660
C45R	700 ÷ 850	490	14	35	25	840 ± 20	550 ± 660
C50E	750 ÷ 900	520	13	30	-	830 ± 20	550 ± 660
C50R	750 ÷ 900	520	13	30	-	830 ± 20	550 ± 660
C55E	800 ÷ 950	550	12	30	-	830 ± 20	550 ± 660
C55R	800 ÷ 950	550	12	30	-	830 ± 20	550 ± 660
C60E	850 ÷ 1.000	580	11	25	-	830	550 ± 660
C60R	850 ÷ 1.000	580	11	25	-	830 ± 20	550 ± 660
28Mn6	800 ÷ 950	590	13	40	40	860 ± 20	340 ± 680

(*) The tensile test values apply to reference specimens Ø 16 mm.

IMPORTANT: (1) Quenching: in water for qualities C22 ÷ C45 and 28Mn6; in oil for qualities C50 ÷ C60.



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Billets and Blooms from Continuous Casting

MECHANICAL PROPERTIES IN THE NORMALIZED CONDITION

Quality	Tensile Test						Normalization
	On Reference Specimen Ø 16 mm			On Rolled Product			°C
	Ø or Thickness 16 ÷ 100 mm						
	Rm Min	Re Min	A ₅ Min	Rm Min	Re Min	A ₅ Min	
N/mm ²	N/mm ²	%	N/mm ²	N/mm ²	%		
C22E	430	240	24	410	210	25	880 ± 940
C22R	430	240	24	410	210	25	880 ± 940
C35E	550	300	18	520	270	19	860 ± 920
C35R	550	300	18	520	270	19	860 ± 520
C40E	580	320	16	550	290	17	850 ± 510
C40R	580	320	16	550	290	17	850 ± 910
C45E	620	340	14	580	305	16	840 ± 900
C45R	620	340	14	580	305	16	840 ± 900
C50E	650	355	13	610	320	14	830 ± 890
C50R	650	355	13	610	320	14	830 ± 890
C55E	680	370	11	640	330	12	825 ± 885
C55R	680	370	11	640	330	12	825 ± 885
C60E	710	380	10	670	340	11	820 ± 880
C60R	710	380	10	670	340	11	820 ± 880
28Mn6	630	345	17	600	310	18	850 ± 890

IMPORTANT: The normalization may be substituted by a "controlled rolling" (Reference: Table 1 EN 10083-2 standard).

Table values conform to the following standards: EN 100083 - 2 - UNI 7845.



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Billets and Blooms from Continuous Casting

QUENCHED AND TEMPERED QUALITY CARBON STEEL UNI 10083-2/06

DESCRIPTION AND APPLICATIONS

Other qualities conforming to the above standards have been omitted, being out of current use.

HEAT CHEMICAL COMPOSITION

Quality	N°	C %	Mn %	Si % Max	P % Max	S %
C35	1.0501	0,32 ÷ 0,39	0,50 ÷ 0,80	0,40	0,045	0,045
C40	1.0511	0,37 ÷ 0,44	0,50 ÷ 0,80	0,40	0,045	0,045
C45	1.0503	0,42 ÷ 0,50	0,50 ÷ 0,80	0,40	0,045	0,045
C55	1.0535	0,52 ÷ 0,60	0,60 ÷ 0,90	0,40	0,045	0,045
C60	1.0601	0,57 ÷ 0,65	0,60 ÷ 0,90	0,40	0,045	0,045

MECHANICAL PROPERTIES IN THE NORMALIZED CONDITION

Quality	Tensile Test						Heat Treatment
	On Rolled Product Ø o Thickness > 16 ÷ 100 mm			On Rolled Product Ø o Thickness > 16 ÷ 250 mm			°C
	Rm Min	Re Min	A ₅ Min	Rm Min	Re Min	A ₅ Min	
	N/mm ²	N/mm ²	%	N/mm ²	N/mm ²	%	
C35	520	270	19	500	245	19	860 ± 920
C40	550	290	17	530	260	17	850 ± 910
C45	580	305	16	560	275	16	840 ± 900
C55	640	330	12	620	300	12	825 ± 885
C60	670	340	11	650	310	11	820 ± 880

IMPORTANT: The normalization may be substituted by a "controlled rolling" (Reference Table 1 EN 10083-2 standard).

MECHANICAL PROPERTIES IN THE QUENCHED AND TEMPERED CONDITION (*)

Quality	Tensile Test					Heat Treatment
	Rm	Re Min	A ₅ Min	Z Min	Quenching (1)	Tempering
	N/mm ²	N/mm ²	%	N/mm ²	N/mm ²	
C35	630 ÷ 780	430	17	40	840 ± 880	550 ± 660
C40	650 ÷ 800	460	16	35	830 ± 870	550 ± 660
C45	700 ÷ 850	490	14	35	820 ± 860	550 ± 660
C55	800 ÷ 950	550	12	30	810 ± 850	550 ± 660
C60	850 ÷ 1.000	580	11	25	810 ± 850	550 ± 660

(*) The tensile test values apply to reference specimens Ø16 mm

IMPORTANT: (1) Quenching: in water for qualities C22÷C45; in oil for qualities C50÷C60



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Billets and Blooms from Continuous Casting

CARBON STEEL FOR PIPE FITTINGS
ASTM A105
ASTM A350 - LF2

DESCRIPTION AND APPLICATIONS

Other qualities conforming to the above standards have been omitted, being out of current use.

HEAT CHEMICAL COMPOSITION

Quality	C % Max	Mn %	Si %	P % Max	S % Max	Cu % Max	Ni % Max	Cr % Max	Mo % Max	V % Max	Cb % Max
A105	0,35	0,60÷1,05	0,10÷0,35	0,035	0,040	0,40	0,40	0,30	0,12	0,08	-
LF2	0,30	0,60÷1,35	0,15÷0,30	0,035	0,040	0,40	0,40	0,30	0,12	0,08	0,02

MECHANICAL PROPERTIES IN THE NORMALIZED CONDITION

Quality	Tensile Test				Impact Test	Hardness	Normalization
	Rm	Re Min	A ₅ Min	Z Min	KV-46° Min	HB Max	°C
	MPa	MPa	%	%	J		
A105	≥ 485	250	22	30	-	187	880 ± 920
LF2	485/655	250	22	30	27	-	880 ± 920



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Billets and Blooms from Continuous Casting

FREE CUTTING STEEL NOT SUITABLE FOR HEAT TREATMENT
UNI 4838
ASTM A29
EN 10087

DESCRIPTION AND APPLICATIONS

Other qualities conforming to the above standards have been omitted, being out of current use.

HEAT CHEMICAL COMPOSITION

Quality	C %	Mn %	Si % Max	P %	S %
CF9SMn28	0,06 ÷ 0,13	0,90 ÷ 1,30	0,050	0,040 ÷ 0,100	0,24 ÷ 0,30
115Mn30	≤ 0,14	0,90 ÷ 1,30	0,050	≤ 0,11	0,27 ÷ 0,33

MECHANICAL PROPERTIES IN THE NORMALIZED CONDITION*

Quality	Tensile Test			Hardness	Normalization
	Rm	Re Min	A ₅ Min	HB Max	°C
	N/mm ²	N/mm ²	%		
CF9SMn28	380 ÷ 490	230	23	146	880 ± 920
115Mn30	380 ÷ 570	-	-	-	880 ÷ 920

(*) The tensile test values apply to reference specimens Ø16 mm



RIVA ACCIAIO

Billets and Blooms from Continuous Casting

CASE HARDENING AND QUENCHED AND TEMPERED FREE CUTTING STEEL
 UNI 4838
 ASTM A29
 EN 10087

DESCRIPTION AND APPLICATIONS

Other qualities conforming to the above standards have been omitted, being out of current use.

HEAT CHEMICAL COMPOSITION

Quality	C %	Mn %	Si % Max	P %	S %
SAE 1117	0,14 ÷ 0,20	1,00 ÷ 1,30	0,15 ÷ 0,35	0,040	0,08 ÷ 0,13
SAE 1118	0,14 ÷ 0,20	1,30 ÷ 1,60	0,15 ÷ 0,35	0,040	0,08 ÷ 0,13
SAE 1137	0,32 ÷ 0,39	1,35 ÷ 1,65	0,15 ÷ 0,35	0,040	0,08 ÷ 0,13
CF35SMn10	0,32 ÷ 0,39	1,35 ÷ 1,65	≤ 0,30	0,040	0,08 ÷ 0,13
SAE 1141	0,37 ÷ 0,45	1,35 ÷ 1,65	0,15 ÷ 0,35	0,040	0,08 ÷ 0,13

MECHANICAL AND TECHNICAL PROPERTIES AT NORMALIZED CONDITION AFTER ROLLING OR FORGING

Quality	Tensile Test			Hardness	Normalization
	Rm	Re Min	A ₅ Min	HB Max	°C
	N/mm ²	N/mm ²	%		
SAE 1117	450 ÷ 550	280	26	155	900 ± 20
SAE 1118	480 ÷ 580	300	25	165	900 ± 20
SAE 1137	650 ÷ 760	380	16	230	880 ± 20
CF35SMn10	650 ÷ 760	380	16	230	880 ± 20
SAE 1141	680 ÷ 790	400	15	240	870 ± 20