

FLAT STEEL PRODUCT QUALITIES & USING AREAS			
Using Areas of Steel Qualities	Std.	Std. Quality	Colakoglu Quality ID
HOT ROLLED COILS FOR COLD ROLLING AND GALVANIZING	DIN 1614-Part 1	St 22	20122
		St 22-low Cu	25122
		RRSt 23	20123
		St 24	20124
		RRSt 23-with B	30623
		St 24-with B	30624
HOT ROLLED LOW CARBON STEELS FOR COLD FORMING	DIN EN 10111-2008	DD11-low Cu	30111
		DD12	30112
		DD13	30113
		DD11	35111
		DD11-High strength	34111
		DD12 with B	30612
		DD13 with B	30613
HOT ROLLED STEELS SUITABLE FOR COLD ROLLING AND GALVANIZING	SAE J403-2009	SAE 1006	21006
		SAE 1006-low Mn	21106
		SAE 1008	21008
		SAE 1010	21010
		SAE 1010-high Mn	21110
		SAE 1012-high Mn	21112
SPECIAL MICROALLOYED STEELS SUITABLE FOR COLD FORMING AND GALVANIZING	USS Posco/UPI	726	37726
		743	37743
UNALLOYED GENERAL STRUCTURAL STEEL SUITABLE FOR GALVANIZING	ASTM A 36-2005	A36	56036
UNALLOYED GENERAL STRUCTURAL STEEL SUITABLE FOR GALVANIZING	ASTM A 36-2005	A 36-low Si	56436
UNALLOYED PIPE AND PROFILE STEELS	ASTM A53-2006	Grade A	56053
UNALLOYED PIPE AND PROFILE STEELS SUITABLE FOR GALVANIZING	ASTM A53-2006	Grade A-low Si	56453
PIPE AND PROFILE STEELS	ASTM A53-2006	Grade B	56052
UNALLOYED PIPE AND PROFILE STEELS SUITABLE FOR GALVANIZING	ASTM A53-2006	Grade B-low Si	56452
UNALLOYED GENERAL STRUCTURAL STEEL	ASTM A 283-2003	Grade C	56380
UNALLOYED PIPE AND PROFILE STEELS SUITABLE FOR GALVANIZING	ASTM A 500-2007	Grade B	56542
		Grade C	56546
CARBON STEEL SUITABLE FOR USING WITH A PRESSURE AT MIDDLE AND HIGH TEMPERATURES	ASTM A 516-2010	Grade 60	56660
HIGH STRENGTH LOW ALLOY STRUCTURAL STEELS	ASTM A572 -2007	Grade 50 Type 1	56350
		Grade 50 Type 2	56550
		Grade 55 Type 1	56355
		Grade 55 Type 2	56555
		Grade 60 Type 1	56560
		Grade 65 Type 1	56565

FLAT STEEL PRODUCT QUALITIES & USING AREAS			
Using Areas of Steel Qualities	Std.	Std. Quality	Çolakoglu Quality ID
STRUCTURAL STEELS SUITABLE FOR COLD FORMING AND BENDING	ASTM A 1011 A 1011M-2007	CS Type B	56340
		SS Grade 33	56360
		SS 36 Type 1	56365
		SS 36 Type 2	56400
		SS Grade 50-low Si	56454
		SS Grade 50	56450
		SS Grade 55-low Si	56484
		SS Grade 55	56480
MICROALLOYED STRUCTURAL STEELS SUITABLE FOR COLD FORMING AND BENDING	ASTM A 1011 A 1011M-07	HSLAS Grade 45 Class 2	56245
		HSLAS Grade 50 Class 1-low Si	56150
		HSLAS Grade 50 Class 1	56151
		HSLAS Grade 50 Class 2	56250
		HSLAS Grade 55 Class 1 -low Si	56155
		HSLAS Grade 55 Class 1	56156
		HSLAS Grade 55 Class 2	56255
		HSLAS Grade 60 Class 1	56160
		HSLAS Grade 60 Class 2	56260
		HSLAS Grade 70 Class 2	56270
		HSLAS Grade 50 Class 1-with Cu	56152
		HSLAS Grade 60 Class 1-with Cu	56162
STRUCTURAL STEELS SUITABLE FOR COLD FORMING AND BENDING	ASTM A 1018 A 1018M-07	CS Type B	56830
		SS Grade 33	56833
		SS 36 Type 1	56836
		SS 36 Type 2-low Si	56837
		SS 36 Type 2	56838
		SS Grade 40	56840
MICRO ALLOYED STEELS SUITABLE FOR COLD FORMING AND BENDING	ASTM A 1018 A 1018M-07	HSLAS Grade 45 Class 1	56845
		HSLAS Grade 45 Class 2	56945
		HSLAS Grade 50 Class 1	56850
		HSLAS Grade 50 Class 1-with Cu	55850
		HSLAS Grade 50 Class 1-with Si	56851
		HSLAS Grade 50 Class 1-with Cu+Si	55851
		HSLAS Grade 55 Class 1	56855
		HSLAS Grade 55 Class 1-with Si	56856
		HSLAS Grade 50 Class 2	56950
		HSLAS Grade 55 Class 2	56955
		HSLAS Grade 60 Class 1	56860
		HSLAS Grade 60 Class 2	56960
HSLAS Grade 65 Class 2	56965		
HSLAS Grade 70 Class 2	56970		

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Using Areas of Steel Qualities	Std.	Std. Quality	Colakoglu Quality ID
UNALLOYED GENERAL STRUCTURAL STEELS	DIN EN 10025 Part 2 -2004	S235JR	51235
		S235JR+N	51236
		S235JR+Cu	55235
		S235J2+N	52235
		S275JR	51275
		S275J2+N	52275
UNALLOYED GENERAL STRUCTURAL STEELS	DIN EN 10025 Part 2-2004	E335	51335
		S355J0	50355
		S355JR	51355
		S355J2	53355
		S355J2+N	52355
		S355J2+N-with Cu	55355
UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING AND BENDING	DIN EN 10025 Part 2-2004	S235JR	54235
		S235JR (Cu+Cr+Ni≤0.35)	50236
		S235J0 (Cu+Cr+Ni≤0.35)	50237
		S235J0 (Cu+Cr+Ni≤0.35)	50238
		S235J0	50235
		S235J2	53235
		S275JR	54275
		S275J0	50275
		S275J2	53275
UNALLOYED GENERAL STRUCTURAL STEELS (SUITABLE FOR CLASS 1 TYPE GALVANIZING STD.)	DIN EN 10025 Part 2-2004	S355JR+N-low Si	54354
		S355JR-low Si	54355
		S355J0-low Si	54356
		S355J2+N-low Si	54357
		S355J2-low Si	54358
GENERAL STRUCTURAL STEELS SUITABLE FOR COLD FORMING, BENDING AND SPINNING	DIN EN 10025 Part 2 -2004	S235JRC	40234
		S235J2C	40235
		S235JRC+N	44235
		S275JRC	43275
		S275J2C	40275
		S275JRC+N-Special	44276
		S275J2C+N	44275
GENERAL STRUCTURAL STEELS SUITABLE FOR COLD FORMING, BENDING AND SPINNING	DIN EN 10025 Part 2-2004	S355JRC-low Si	42355
		S355J0C-low Si	41355
		S355J2C-low Si	43355
		S355J2C	40355
		S355J2C+N	44355
		S355JRC	40356
		S355J2C+N-Special	44356

FLAT STEEL PRODUCT QUALITIES & USING AREAS

Using Areas of Steel Qualities	Std.	Std. Quality	Çolakoğlu Quality ID
HIGH STRENGTH NORMALISED STRUCTURAL STEELS SUITABLE FOR HOT FORMING	DIN EN 10025 Part 3 -2004	S420N-Special (SAH540)	52420
		S460N	52460
ATMOSPHERE CORROSION RESISTANT STEELS	DIN EN 10025 Part 5-2004	S235J0W	58235
		S235J2W	58236
		S355J0W	58355
		S355J2W	58356
		S355J0WP	58357
		S355J2WP	58358
WHEEL STEELS SUITABLE FOR COLD FORMING, BENDING AND SPINNING	DIN EN 10025 Part 2-2004	S235JRC Special	82235
		S235J2C+N	81235
		S275JRC	82280
		S275JRC Special (S275J2C+N)	82290
		S355JRC Special (S355J2C+N)	82330
		S355J2C+N Special	82355
		S355JRC Special	81330
		S235JR-Titan SS092 Rev 27	80235
		S235JR-Titan SS095 Rev 4	80236
		S275JO-Titan SIRMAC	80280
		S275J2+N-Titan	80290
S355JO-Titan SIRMAC	80355		
WHEEL STEELS SUITABLE FOR COLD FORMING, BENDING AND SPINNING	DIN EN 10111 2008-06	DD11	81222
		DD 11-Titan SIRIA	80122
		DD 11-Titan SIRMAC	80222
HIGH STRENGTH WHEEL STEELS SUITABLE FOR COLD FORMING AND SPINNING	DIN EN 10149 Part 2-1995	S355MC	83355
		S355MC-Titan SS088 Rev 10	84355
		S420MC (HL-2242-01)	83420
		S460MC (HL-6000-02)	83460
HIGH STRENGTH DUAL PHASE WHEEL STEELS SUITABLE FOR COLD FORMING AND SPINNING	DIN EN 10338-2010	HDT580X (DP 600)	83600
HOT ROLLED HIGH STRENGTH DUAL PHASE STEEL SUITABLE FOR COLD FORMING	DIN EN 10338-2010	HCT600X (DP 600)	83610
		HCT780X (DP 780)	83780
BOILER STEELS	DIN EN 10028 Part 2-2008	P235GH	86235
		P265GH	86265
		P295GH	86295
		P355GH	86355
BOILER STEELS	DIN EN 10028 Part 3-2008	P355NL1	87355
STEELS SUITABLE TO USE UNDER LOW PRESSURE	DIN EN 10207-2005	P275SL	86275
BOILER PIPE STEELS	DIN EN 10217-2-2005	P235GH-low Si	86435
BOILER PIPE STEELS	DIN EN 10217-3-2005	P275NL1-low Si	86475
LPG TUBE STEELS	DIN EN 10120-2008	P245NB	85245
		P265NB	85265
		P310NB	85310
		P355NB	85355

FLAT STEEL PRODUCT QUALITIES & USING AREAS

Using Areas of Steel Qualities	Std.	Std. Quality	Çolakoglu Quality ID
GENERAL STRUCTURAL STEELS SUITABLE FOR HEAT TREATMENT	DIN EN 10083 Part 2 -2006	28Mn6	98628
		C35E	98035
		C45E-Special	98145
		C60E	98060
		C60E-Special	98160
		C60E-1-Cr	98260
GENERAL STRUCTURAL STEELS SUITABLE FOR HEAT TREATMENT	DIN EN 10083 Part 3 -2006	30MnB5	98530
		34MnB5	98534
		27MnCrB5-2	98527
		26MnB5	98526
		22MnB5	98522
HIGH STRENGTH STEELS SUITABLE FOR COLD FORMING AND BENDING	DIN EN 10149 Part 2-1995	S315MC	36315
		S355MC	36355
		S355MC-Special	36356
		S420MC	36420
		S420MC-with Si	36421
		S460MC	36460
		S460MC-with Si	36461
		S500MC	36500
		S500MC-with Si	36501
		S550MC	36550
		S550MC-with Si	36551
S600MC	36600		
S700MC	36700		
MICRO ALLOYED STEELS SUITABLE FOR COLD FORMING AND GALVANIZING	DIN EN 10149 Part 2-1995	S280MC-Special	37280
		S315MC	37315
		S355MC	37355
		S420MC	37420
		S420MC-HX420LAD	37421
S460MC	37460		
PRESSURE PIPE STEELS	DIN EN 10217 Part 1-2005	P235TR1	94235
		P235TR2	94236
		P235TR1-low Si	94035
		P235TR2-low Si	94036
LOW ALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR COLD DRAWING AND NORMALIZING (SUITABLE FOR CLASS 1 GALVANIZING STD.)	DIN EN 10025 Part 2-2004	S355JR+N-low Si (FeS10DTCL)	54510
LOW ALLOYED GENERAL STRUCTURAL AND TUBE STEELS SUITABLE FOR NORMALISING	DIN EN 10025 Part 2 -2004	S355JR+N (FeS20DTCL)	51520
		S355JR+N (FeS10DTCL1)	51530

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Using Areas of Steel Qualities	Std.	Std. Quality	Çolakoglu Quality ID
UNALLOYED STRUCTURAL STEELS SUATABLE FOR HOT FORMING (SRM PIPE PRODUCTION), COLD ROLLING, NORMALIZING AND GALVANIZING	DIN EN 10025 Part 2-2004	S235JR+N-low Si	41235
		S235JR+N	42235
		S275JR+N-low Si	41275
		S275J2+N-low Si	42275
UNALLOYED STRAP STEELS FOR COLD ROLLING AND GALVANIZING	DIN EN 10025 Part 2-2004	S235JR Strap Steel	51238
		S235JR Strap Steel with low Si	54238
STRUCTURAL STEELS FOR SHIP BUILDING	ABS-Part 2-2013	ABS Grade A	57701
		ABS Grade B	57702
UNALLOYED GENERAL STRUCTURAL STEEL	JIS G 3101-2005	SS400	93400
CHROME ADDED GENERAL STRUCTURAL STEELS	JIS G 3101-2005	SS400-with Cr	93430
BORON ADDED GENERAL STRUCTURAL STEELS	JIS G 3101-2005	SS400-with B	93420
HOT ROLLED LOW CARBON COMMERCIAL QUALITY STEELS SUITABLE FOR COLD FORMING	JIS G 3131-2005	SPHC	93111
LOW CARBON STEELS WITH BORON SUITABLE FOR COLD FORMING	JIS G 3131: 2005	SPHC-with B	93211
HOT ROLLED LOW CARBON PIPE AND PROFILE STEELS SUITABLE FOR COLD FORMING AND GALVANIZING	JIS G 3132-2005	SPHT-1	93270
		SPHT-2	93340
ATMOSPHERE CORROSION RESISTANT STEELS	JIS G 3125-2005	SPA-H	93125
UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING AND BENDING	AS NZS 1594-2002	HA250-low Si	94250
UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING AND BENDING	AS NZS 1594-2002	HA350-low Si	94350
UNALLOYED GENERAL STRUCTURAL STEELS	CSAG40	350 WT	96350
HIGH STRENGTH STEELS SUITABLE FOR COLD FORMING AND BENDING	SAE J2340-1999-10	340XF	38340
		420XF	38420
HOT ROLLED CARBON STEELS	SAE J403-2009	SAE 1006	91006
		SAE 1008	91008
		SAE 1008-Modified	91108
		SAE 1010	91010
		SAE 1010-Modified	91110
		SAE 1012	91012
		SAE 1012-High Mn	91112
		SAE 1015	91015
		SAE 1017	91017
		SAE 1018	91018
		SAE 1018-Modified	91118
		SAE 1020	91020
		SAE 1020-low Si	91121
		SAE 1022-Modified	91022
		SAE 1022-high Mn	91222
		SAE 1022-low Si	91122
		SAE 1025	91025
		SAE 1026	91026
SAE 1030	91030		

FLAT STEEL PRODUCT QUALITIES & USING AREAS			
Using Areas of Steel Qualities	Std.	Std. Quality	Colakoglu Quality ID
HOT ROLLED MEDIUM AND HIGH CARBON STEELS	SAE J403-2001	SAE 1040	91040
		SAE 1045	91045
		SAE 1045-Special	91145
		SAE 1050	91050
		SAE 1055	91055
		SAE 1060	91060
HOT ROLLED MEDIUM AND HIGH CARBON STEELS	SAE J404-2000	SAE 4130	92130
STEELS FOR PIPE LINES	API 5L 45th Edition-2012/ISO 3183-2012	A PSL1 / L210 PSL1	95130
		B PSL1 / L245 PSL1	95135
		X42 PSL1 L290 PSL1	95142
		X46 PSL1 L320 PSL1	95146
		X52 PSL1 L360 PSL1	95152
		X56 PSL1 L390 PSL1	95156
		X60 PSL1 L415 PSL1	95160
		X65 PSL1 L450 PSL1	95165
		X70 PSL1 L485 PSL1	95170
STEELS FOR PIPE LINES	API 5L 45th Edition-2012/ISO 3183-2012	BM PSL2 / L245M PSL2	95035
		X42M PSL2 / L290M PSL2	95042
		X46M PSL2 / L320M PSL2	95046
		X52M PSL2 / L360M PSL2	95052
		X56M PSL2 / L390M PSL2	95056
		X60M PSL2 / L415M PSL2	95060
		X65M PSL2 / L450M PSL2	95065
		X70M PSL2 / L485M PSL2	95070
STEELS FOR CASING AND/OR TUBING	API 5CT-2011	J55 Upgradeable (Tubing)	95254
		J55 Upgradeable (Casing)	95255
		J55 Upgradeable	95256
		J55 Upgradeable	95257
		J55 regular	95355
		J55 regular	95356
		5CT J55 Upgradeable	95455
UNALLOYED GENERAL STRUCTURAL STEELS (FLOOR PLATE)	ASTM A 36-2005 ASTM A786	ASTM A786 (ASTM A36)	56435
UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING (FLOOR PLATE)	ASTM A 36-2005 ASTM A787	ASTM A786 (ASTM A36)	56437

REINFORCING STEEL BAR QUALITIES	
Std.	Qualities
ABNT NBR 7480	CA 50
ACHM 7-93	A 500C
ASTM A 615	GR 40
ASTM A 615	GR 60
ASTM A 615	GR 75
ASTM A 706	GR 60
BDS 9252:2007	B 500B
BS 4449:1997	GR 460 B
BS 4449:2005	B 500 B
BS 4449:2005	B 500 C
CAN/CSA G30.18-09	GR 400R
CAN/CSA G30.18-09	GR 400W
CAN/CSA G30.18-09	GR 500R
CAN/CSA G30.18-09	GR 500W
DIN 488:2009	B 500 B
DM. 14/01/2008	B 450 C
E 449 : 2010	A 400 NR
E 450 : 2010	A 500 NR
IS 6935-2:2007	B 500 BWR
IS 4466-3:2013	S 400
IS 4466-3:2013	S 400W

REINFORCING STEEL BAR QUALITIES	
Std.	Qualities
JS 33 : 2013	GR 300
JS 33 : 2013	GR 400
MS 146 : 2006	GR 500 B
NCh 204:2006	A 630- 420H
NCh 204:2006	A 440- 280H
NEN 6008:2008	B 500 B
NF A35-080-1:2013	B 500 B
NFA 35-016:1986	FEE 400
NFA 35-016:1996	FEE 500
NFA 35-080:2013	B 500B
NTC 2289:2012	GR 60
SR 438-1:2012	OB 37
SR 438-1:2012	PC 52
TS 708 : 2016	B 420 B
TS 708 : 2016	B 420C
TS 708 : 2016	B 500 B
TS 708 : 2016	B 500 C
TS 708 : 2016	S 420
INTE 06-09-01	GR 40
INTE 06-09-01	GR 60
INTE 06-09-02	GR 60

HELICAL ROD QUALITIES	
Std.	Qualities
NCh 204 : 2006	A 630- 420H
NCh 204 : 2006	A 440- 280H
DIN Material No 1.1165	St 450/700

BILLET QUALITIES & USING AREA		
Using Area	Std.	Qualities
REINFORCING STEEL BAR	ABNT NBR 7480 : 2017	CA 50
REINFORCING STEEL BAR	ACHM 7-93	A 500C
REINFORCING STEEL BAR	ASTM A 615	GR 40
REINFORCING STEEL BAR	ASTM A 615	GR 60
REINFORCING STEEL BAR	ASTM A 615	GR 75
REINFORCING STEEL BAR	ASTM A 706	GR 60
REINFORCING STEEL BAR	BDS 9252 : 2007	B 500B
REINFORCING STEEL BAR	BS 4449:1997	GR 460 B
REINFORCING STEEL BAR	BS 4449:2005	B 500 B
REINFORCING STEEL BAR	BS 4449:2005	B 500 C
REINFORCING STEEL BAR	CAN/CSA.G30.18-09	GR 400R
REINFORCING STEEL BAR	CAN/CSA.G30.18-09	GR 400W
REINFORCING STEEL BAR	CAN/CSA.G30.18-09	GR 500R
REINFORCING STEEL BAR	CAN/CSA.G30.18-09	GR 500W
REINFORCING STEEL BAR	DIN 17100	St 50
REINFORCING STEEL BAR	DIN 17100	St 60
REINFORCING STEEL BAR	DIN 17100	St 37-2
REINFORCING STEEL BAR	DIN 488: 2009	B 500 B
REINFORCING STEEL BAR	DM 14.01.2008	B 450 C
REINFORCING STEEL BAR	E 449 : 2010	A 400 NR
REINFORCING STEEL BAR	E 450 : 2010	A 500 NR
REINFORCING STEEL BAR	GOST 380	3SP
REINFORCING STEEL BAR	GOST 380	5SP
REINFORCING STEEL BAR	IS 6935-2 : 2007	B 500 BWR
REINFORCING STEEL BAR	IS 4466-3 : 2013	S 400
REINFORCING STEEL BAR	IS 4466-3 : 2013	S 400 W
REINFORCING STEEL BAR	JS 33: 2013	GR 300
REINFORCING STEEL BAR	JS 33: 2013	GR 400
REINFORCING STEEL BAR	MS 146 : 2006	B 500 B
REINFORCING STEEL BAR	NCh 206 : 2006	A 630- 420H
REINFORCING STEEL BAR	NCh 206 : 2006	A 440- 280H
REINFORCING STEEL BAR	NEN 6008:2008	B 500 B
REINFORCING STEEL BAR	NF A 35-016:1986	FEE 400
REINFORCING STEEL BAR	NF A 35-016:1996	FEE 500
REINFORCING STEEL BAR	NF A 35- 080-1:2013	B 500 B
REINFORCING STEEL BAR	NTC 2289:2012	GR 60
REINFORCING STEEL BAR	SR 438-1:2012	OB 37
REINFORCING STEEL BAR	SR 438-1:2012	PC 52
REINFORCING STEEL BAR	TS 708 : 2016	B 420 B
REINFORCING STEEL BAR	TS 708 : 2016	B 420C
REINFORCING STEEL BAR	TS 708 : 2016	B 500 B
REINFORCING STEEL BAR	TS 708 : 2016	B 500 C
REINFORCING STEEL BAR	TS 708 : 2016	S 420
REINFORCING STEEL BAR	INTE 06-09-01	GR 40
REINFORCING STEEL BAR	INTE 06-09-01	GR 60
REINFORCING STEEL BAR	INTE 06-09-02	GR 60

BILLET QUALITIES & USING AREA		
Using Area	Std.	Qualities
CARBON STEEL	SAE J 403	SAE 1005
CARBON STEEL	SAE J 403	SAE 1006
CARBON STEEL	SAE J 403	SAE 1008
CARBON STEEL	SAE J 403	SAE 1010
CARBON STEEL	SAE J 403	SAE 1012
CARBON STEEL	SAE J 403	SAE 1015
CARBON STEEL	SAE J 403	SAE 1018
CARBON STEEL	SAE J 403	SAE 1020
CARBON STEEL	SAE J 403	SAE 1030
CARBON STEEL	SAE J 403	SAE 1035
CARBON STEEL	SAE J 403	SAE 1040
CARBON STEEL	SAE J 403	SAE 1045
CARBON STEEL	SAE J 403	SAE 1050
CARBON STEEL	SAE J 403	SAE 1055
CARBON STEEL	SAE J 403	SAE 1060





FLAT STEEL PRODUCTS

CHEMICAL &
MECHANICAL PROPERTIES

Slab	
Thickness :	200-250 mm
Width :	800 -1.1650 mm.
Length :	6 -16 m.

*Slab qualities are the same as
Hot Rolled Steel Products.*

Hot Rolled Steel Coil (HRC)	
Thickness :	1,1 - 25,4 mm
Width :	800 - 1650 mm
Coil Weight :	10-39 ton
Mandrel Diameter :	762 mm

HOT ROLLED COILS FOR COLD ROLLING & GALVANIZING

Standard: DIN 1614-Part1-1986

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	N ⁽¹⁾	Al
				max.	max.	max.	max.	max.	min.
20122	DIN 1614-1	St 22	Std.	0.10	0.45	0.035	0.035	0.007	—
25122	DIN 1614-1	St 22-low Cu	Std.	0.10	0.45	0.035	0.035	0.007	—
20123	DIN 1614-1	RRSt 23	Std.	0.10	0.45	0.030	0.030	—	0.020
20124	DIN 1614-1	St 24	Std.	0.08	0.40	0.025	0.025	—	0.020
30623	DIN 1614-1	RRSt 23-with B	Std.	0.10	0.45	0.035	0.035	—	0.020
30624	DIN 1614-1	St 24-with B	Std.	0.08	0.40	0.030	0.030	—	0.020

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Mechanical test is not applied.

HOT ROLLED LOW CARBON STEELS FOR COLD FORMING									
Standard: DIN EN 10111-2008									
Chemical Composition (%)									
Colakoglu Quality ID	Std.	Quality ⁽¹⁾		C	Mn	P	S	N	Al
				max.	max.	max.	max.	max.	min.
30111 ⁽³⁾	DIN EN 10111	DD11-low Cu	Std.	0.12	0.60	0.045	0.045	0.007	—
30112 ⁽⁴⁾	DIN EN 10111	DD12	Std.	0.10	0.45	0.035	0.035	—	0.020
30113 ⁽⁴⁾	DIN EN 10111	DD13	Std.	0.08	0.40	0.030	0.030	—	0.020
35111	DIN EN 10111	DD11	Std.	0.12	0.60	0.045	0.045	—	—
34111	DIN EN 10111	DD11 High strength	Std.	0.12	0.60	0.045	0.045	0.007	—
30612	DIN EN 10111	DD12 with B	Std.	0.10	0.45	0.035	0.035	—	0.020
30613	DIN EN 10111	DD13 with B	Std.	0.08	0.40	0.030	0.030	—	0.020

Explanations

- 1) All grades are produced as fully killed steel (Al ≥ % 0.02)
- 2) Cu = % 0.20 - 0.40
- 3) Guarantee period in usage is one month in Std. (When Al ≥ % 0.02, Guarantee period is 6 months.)
- 4) Guarantee period in usage is 6 months.

Mechanical Properties									
Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽¹⁾	A(%)			Bending
			N/mm ²			A80		A5	(tran.; 180°)
			1.5 ≤ d < 2	2 ≤ d ≤ 8		1.5 ≤ d < 2	2 ≤ d < 3	3 ≤ d < 8	mrb
					max.	min.	min.	min.	d: thickness
30111	DIN EN 10111	DD11-low Cu	170 - 360	170 - 340	440	23	24	28	1 d
30112	DIN EN 10111	DD12	170 - 340	170 - 320	420	25	26	30	0
30113	DIN EN 10111	DD13	170 - 330	170 - 310	400	28	29	33	0
35111	DIN EN 10111	DD11	170 - 360	170 - 340	440	23	24	28	1 d
34111	DIN EN 10111	DD11 High strength	170 - 360	170 - 340	440	23	24	28	1 d
30612	DIN EN 10111	DD12 with B	170 - 340	170 - 320	420	25	26	30	0
30613	DIN EN 10111	DD13 with B	170 - 330	170 - 310	400	28	29	33	0

Explanations

- 1) Tensile tests are applied to "Transverse" test samples.

HOT ROLLED STEELS SUITABLE FOR COLD ROLLING & GALVANISING

Std. : SAE J403-2009

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Cu	Ni	Cr	Mo
						max.	max.	max.	min.	max.	max.
21006	SAE J 403	SAE 1006	Std.	0.08	0.25-0.40	0.030	0.050	0.20	0.20	0.15	0.06
21106	SAE J 403	SAE 1006-low Mn	Std.	0.03-0.06	0.15-0.25	0.020	0.015	0.08	0.06	0.05	0.015
21008	SAE J 403	SAE 1008	Std.	0.10	0.30-0.50	0.030	0.050	0.20	0.20	0.15	0.06
21010	SAE J 403	SAE 1010	Std.	0.08-0.13	0.30-0.60	0.030	0.050	0.20	0.20	0.15	0.06
21110	SAE J 403	SAE 1010-high Mn	Std.	0.08-0.13	0.80-1.00	0.030	0.050	0.20	0.20	0.15	0.06
21112	SAE J 403	SAE 1012-high Mn	Std.	0.10-0.15	0.30-0.60	0.030	0.050	0.20	0.20	0.15	0.06

SPECIAL MICROALLOYED STEELS SUITABLE FOR COLD FORMING & GALVANIZING

Standard: USS Posco/UPI

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Al	Cr	Ni	Sn	Cu	Mo	N	Nb
				max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.	ppm	max.
37726	USS Posco/UPI	726	Std.	0.07-0.09	0.30-0.45	0.03	0.04-0.06	0.02	0.02-0.06	0.1	0.1	0.015	0.12	0.015	70	0.02-0.03
37743	USS Posco/UPI	743	Std.	0.05-0.09	1.0-1.2	0.16-0.24	0.015-0.025	0.015	0.02-0.06	0.1	0.1	0.015	0.12	0.015	70	0.02-0.03

UNALLOYED GENERAL STRUCTURAL STEEL

Standard: ASTM A 36-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn ⁽²⁾	P	S	Si
				max.	max.	max.	max.	max.
56036	ASTM A 36	A 36	Std.	0.25	0.80 - 1.20	0.040	0.050	0.40

Explanations

- 1) If the thickness is 20 mm and thinner, Mn % limit is not required.
- 2) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.35 %.
- 3) Optionally, 0.2 % Cu is permitted.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)		Impact ⁽²⁾⁽³⁾	
			N/mm ²		A50	A200	Temp.	KVc
			(min.)	(min.)	min.	min.	C	J
56036	ASTM A 36	A 36	250	400 - 550	21	18	-20	40

Explanations

- 1) Tensile tests are applied to "Transverse" test samples.
- 2) Impact tests are not required if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

UNALLOYED GENERAL STRUCTURAL STEEL SUITABLE FOR GALVANIZING

Standard: ASTM A 36-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Cu
				max.	max.	max.	max.	min.
56436	ASTM A 36	A 36-low Si	Std.	0.25	0.80 - 1.20	0.040	0.050	0.40

Explanations

- 1) If the thickness is 20 mm and thinner, Mn % limit is not required.
- 2) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.35 %.
- 3) Optionally, 0.2 % Cu is permitted.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)		Impact ⁽²⁾⁽³⁾	
			N/mm ²		A50	A200	Temp.	KVc
			(min.)	(min.)	min.	min.	C	J
56436	ASTM A 36	A 36-low Si	250	400 - 550	23	20	-20	40

Explanations

- 1) Tensile tests are applied to "Transverse" test samples.
- 2) Impact tests are not required if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

UNALLOYED PIPE AND PROFILE STEELS

Standard: ASTM A53 Grade A

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Si	Cu ⁽¹⁾	Ni ⁽¹⁾	Cr ⁽¹⁾	Mo ⁽¹⁾	V ⁽¹⁾
			Std.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
56053	ASTM A 53	Grade A	Std.	0.25	0.95	0.050	0.045	0.35	0.40	0.40	0.40	0.15	0.08

Explanations

1) Total weight of these elements are max. % 1.00 for ASTM A 53 Grade A.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A 50 (%)
			N/mm ²		
			min.	min.	min.
56053	ASTM A 53	Grade A	205	330	"2"

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

2) A50 (%) = 1940 S0 0.2 / U0.9 (S0 : Cross sectional area, mm2; U : Tensile stress, N/mm2)

UNALLOYED PIPE AND PROFILE STEELS SUITABLE FOR GALVANIZING

Standard: ASTM A53 Grade A

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Si	Cu ⁽¹⁾	Ni ⁽¹⁾	Cr ⁽¹⁾	Mo ⁽¹⁾	V ⁽¹⁾
			Std.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
56453 ⁽²⁾	ASTM A 53	Grade A-low Si	Std.	0.25	0.95	0.050	0.045	—	0.40	0.40	0.40	0.15	0.08

Explanations

1) Total weight of these elements are max. % 1.00 for ASTM A 53 Grade A.

2) 56453 with %Si ≤ 0.04 is suitable for galvanizing and cold forming.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A (%)
			N/mm ²		
			min.	min.	min.
56453	ASTM A 53	Grade A-low Si	205	330	"2"

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

2) A50 (%) = 1940 S0 0.2 / U0.9 (S0 : Cross sectional area, mm2; U : Tensile stress, N/mm2)

PIPE AND PROFILE STEELS

Standard: ASTM A53 Grade B

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	P	S	Cu ⁽¹⁾	Ni ⁽¹⁾	Cr ⁽¹⁾	Mo ⁽¹⁾	V ⁽¹⁾
				max.	max.	max.	max.	max.	max.	max.	max.	
56052	ASTM A 53	Grade B-with Si	Std.	0.30	1.20	0.050	0.045	0.50	0.40	0.40	0.15	0.08

Explanations

1) Total weight of these elements are max. % 1.00 for ASTM A 53 Grade B.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A 50 (%)
			N/mm ²		
			min.	min.	min.
56052	ASTM A 53	Grade B-with Si	240	415	"2"

Explanations

- Tensile tests are applied to "Longitudinal" test samples.
- A50 (%) = 1940 S0 0.2 / U0.9 (S0 : Cross sectional area, mm² ; U : Tensile stress, N/mm²)

UNALLOYED PIPE AND PROFILE STEELS SUITABLE FOR GALVANIZING

Standard: ASTM A53 Grade B

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	P	S	Si	Cu ⁽¹⁾	Ni ⁽¹⁾	Cr ⁽¹⁾	Mo ⁽¹⁾	V ⁽¹⁾
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
56452	ASTM A 53	Grade B-low Si	Std.	0.30	1.20	0.050	0.045	—	0.40	0.40	0.40	0.15	0.08

Explanations

1) Total weight of these elements are max. % 1.00 for ASTM A 53 Grade B.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A 50 (%)
			N/mm ²		
			min.	min.	min.
56452	ASTM A 53	Grade B-low Si	240	415	"2"

Explanations

- Tensile tests are applied to "Longitudinal" test samples.
- A50 (%) = 1940 S0 0.2 / U0.9 (S0 : Cross sectional area, mm² ; U : Tensile stress, N/mm²)

UNALLOYED GENERAL STRUCTURAL STEEL								
Standard: ASTM A 283-2003								
Chemical Composition (%)								
Çolakoğlu Quality ID	Std.	Quality		C	Mn ⁽²⁾	P	S	Si
				max.	max.	max.	max.	max.
56380	ASTM A 283	Grade C	Std.	0.24	0.90	0.035	0.040	0.40

Mechanical Properties						
Çolakoğlu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A (%)	
			N/mm ²		A 50	A 200
			min.	min.	min.	min.
56380	ASTM A 283	Grade C	205	380 - 515	23	20

Explanations

1) Tensile tests are applied to "Transverse" test samples.

UNALLOYED PIPE AND PROFILE STEELS SUITABLE FOR GALVANIZING								
Standard: ASTM A 500-2007								
Chemical Composition (%)								
Çolakoğlu Quality ID	Std.	Quality		C	Mn	P	S	Cu
				max.	max.	max.	max.	max.
56542	ASTM A 500	Grade B	Std.	0.26	1.35	0.035	0.035	0.20
56546	ASTM A 500	Grade C	Std.	0.23	1.35	0.035	0.035	0.20

Explanations

1) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum 1.50 %.

Mechanical Properties					
Çolakoğlu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A (%)
			N/mm ²		A 50
			min.	min.	min.
56542	ASTM A 500	Grade B	290	400	23 ²
56546	ASTM A 500	Grade C	315	425	21 ³

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
- 2) Given elongation values are valid for 4.7 mm and thicker samples. % elongation = 2.40 d+12 formula is applied for the products with lower thickness than 4.7 mm.
- 3) Given elongation values are applied for 3.05 mm and thicker samples.

**CARBON STEEL SUITABLE FOR USING WITH A PRESSURE
AT MIDDLE & HIGH TEMPERATURES**

Standard: ASTM A 516-2010

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Si
			Std.	max.	max.	max.	max.	max.
56660	ASTM A 516-2010	ASTM A 516 Grade 60	Std.	0.23	1.2	0.035	0.035	0.40

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm	Rm ⁽¹⁾	A 50 (%)
			N/mm ²		
			min.	min.	min.
56660	ASTM A 516-2010	ASTM A 516 Grade 60	220	415	25

HIGH STRENGTH LOW ALLOY STRUCTURAL STEELS

Standard: ASTM A572-2007

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C ⁽¹⁾	Mn ⁽³⁾	P	S	Si	Cu ⁽²⁾	V	Nb
				max.	max.	max.	max.	max.	min.		max.
56350	ASTM A 572	Grade 50 Type 1	Std.	0.23	0.8-1.35	0.04	0.05	0.40	0.20	-	0.005-0.05
56550	ASTM A 572	Grade 50 Type 2	Std.	0.23	0.8-1.35	0.04	0.05	0.40	0.20	0.01-0.15	0.005
56355	ASTM A 572	Grade 55 Type 1	Std.	0.25	0.8-1.35	0.04	0.05	0.40	0.20	-	0.005-0.05
56555	ASTM A 572	Grade 55 Type 2	Std.	0.25	0.8-1.35	0.04	0.05	0.40	0.20	0.01-0.15	-
56560	ASTM A 572	Grade 60 Type 1	Std.	0.26	0.8-1.35	0.04	0.05	0.40	0.20	-	0.005-0.05
56565	ASTM A 572	Grade 65 Type 1	Std.	0.23	0.80-1.65	0.04	0.05	0.40	0.20	-	0.005-0.05

Explanations

- 1) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.60.
- 2) When copper is specified, a minimum of 0.20 % is required.
- 3) %Mn will be min %0.80 if the coil thickness bigger than 10 mm and will be min %0.50 if the coil thickness is equal or less than 10 mm.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)		Impact (long. ²)	
			N/mm ²		A50	A200	Temp.	KVc
			(min.)	(min.)	min.	min.	°C	J
								min.
56350	ASTM A 572	Grade 50 Type 1	345	450	21	18	+20	27
56550	ASTM A 572	Grade 50 Type 2	345	450	21	18	+20	27
56355	ASTM A 572	Grade 55 Type 1	380	485	20	17	+20	27
56555	ASTM A 572	Grade 55 Type 2	380	485	20	17	+20	27
56560	ASTM A 572	Grade 60 Type 1	415	520	18	16	+20	27
56565	ASTM A 572	Grade 65 Type 1	450	550	17	15	+20	27

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are carried out if it is customer's request in order.

STRUCTURAL STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: ASTM A 1011/A 1011M-07

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	Ti ³⁾	Ca
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
56340	ASTM A 1011	CS Type B	Std.	0.15	0.60	0.030	0.035	-	0.20	0.20	0.15	0.06	0.008	-	0.025	0.0080
56360	ASTM A 1011	SS Grade 33	Std.	0.25	0.90	0.035	0.04	-	0.20	0.20	0.15	0.06	0.008	-	0.025	0.0080
56365	ASTM A 1011	SS 36 Type 1	Std.	0.25	0.90	0.035	0.040	-	0.20	0.20	0.15	0.06	0.008	-	0.025	0.0080
56400(1)	ASTM A 1011	SS 36 Type 2	Std.	0.25	1.35	0.035	0.040	-	0.20	0.20	0.15	0.06	0.008	0.008	0.025	-
56454	ASTM A 1011	SS Grade 50-low Si	Std.	0.25	1.35	0.035	0.04	-	0.20	0.20	0.15	0.06	0.008	-	0.025	-
56450	ASTM A 1011	SS Grade 50	Std.	0.25	1.35	0.035	0.04	-	0.20	0.20	0.15	0.06	0.008	-	0.025	-
56484	ASTM A 1011	SS Grade 55-low Si	Std.	0.25	1.35	0.035	0.04	-	0.20	0.20	0.15	0.06	0.008	-	0.025	-
56480	ASTM A 1011	SS Grade 55	Std.	0.25	1.35	0.035	0.04	-	0.20	0.20	0.15	0.06	0.008	-	0.025	-

Explanations

- 1) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.50 %.
- 2) When copper is specified, a minimum of 0.20 % is required.
- 3) Ti/ N is max. 3.4.

STRUCTURAL STEELS SUITABLE FOR COLD FORMING & BENDING								
Standard: ASTM A 1011/A 1011M-07								
Mechanical Properties								
Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)			Bending
			N/mm ²		A 50		A200	(tran.; 90°)
					2.5≤T≤6.0	1.6≤T≤2.5	T≤6.0	mrb
			min.	min.	min.	min.	min.	d: thickness
56340	ASTM A 1011	CS Type B	205-340	-	-	-	-	-
56360	ASTM A 1011	SS Grade 33	230	360	23	22	18	1d
56365	ASTM A 1011	SS 36 Type 1	250	365	22	21	17	1.5d
56400	ASTM A 1011	SS 36 Type 2	250	400 - 550	21	20	16	2d
56454	ASTM A 1011	SS Grade 50-low Si	340	450	17	16	12	2.5d
56450	ASTM A 1011	SS Grade 50	340	450	17	16	12	2.5d
56484	ASTM A 1011	SS Grade 55-low Si	380	480	15	14	10	3d
56480	ASTM A 1011	SS Grade 55	380	480	15	14	10	3d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
- 2) Bending tests are carried out if it is customer's request in order.

MICROALLOYED STRUCTURAL STEELS SUITABLE FOR COLD FORMING & BENDING																	
Standard: ASTM A 1011/A 1011M-07																	
Chemical Composition (%)																	
Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Cu	Al	Mo	V	Ti	N ppm	Nb
				max.	max.	max.	max.	max.	max.	max.	max.	max.	min.	max.	min.	min.	max.
56245 ¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 45 Class 2	Std.	0.15	1.35	-	0.04	0.04	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56150 ¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 1-low Si	Std.	0.23	1.35	-	0.04	0.04	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56151 ¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 1	Std.	0.23	1.35	0.14-0.25	0.04	0.04	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56250	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 2	Std.	0.15	1.50		0.04	0.04	0.15	0.20	0.20		0.06	0.005	0.005		0.005
56155 ¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 55 Class 1-low Si	Std.	0.25	1.35	-	0.04	0.04	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56156 ¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 55 Class 1	Std.	0.25	1.35	0.14-0.25	0.04	0.04	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56255	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 55 Class 2	Std.	0.15	1.35		0.04	4	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56160	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 60 Class 1	Std.	0.26	1.50	-	0.04	0.04	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56260	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 60 Class 2	Std.	0.15	1.50	-	0.040	0.040	0.15	0.20	0.20	-	0.06	0.005	0.005	-	0.005
56270	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 70 Class 2	Std.	0.15	1.65	-	0.040	0.040	0.15	0.20	0.20	-	0.16	0.005	0.005	-	0.005
56152	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 1-with Cu	Std.	0.23	1.35	-	0.040	0.040	0.15	0.20	0.20-0.30	-	0.06	0.005	0.005	-	0.005
56162	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 60 Class 1-with Cu	Std.	0.26	1.50	-	0.040	0.040	0.15	0.20	0.20		0.06	0.005	0.005		0.005

Explanations

- 1) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.50 %.
- 2) ASTM A1011/A 1011M-2007 Std. is valid for strip thickness $t \leq 6$ mm coils.

MICROALLOYED STRUCTURAL STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: ASTM A 1011/A 1011M-07

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)		Bending
			N/mm ²		A 50		(tran.; 90°)
					T<2.5	2.5<T	mr _b
			min.	min.	min.	min.	d: thickness
56245 ⁽¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 45 Class 2	310	380	23	25	1.5d
56150 ⁽¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 1-low Si	340	450	20	22	2d
56151 ⁽¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 1	340	450	20	22	2d
56250	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 2	340	410	20	22	1.5d
56155 ⁽¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 55 Class 1-low Si	380	480	18	20	2d
56156 ⁽¹⁾	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 55 Class 1	380	480	18	20	2d
56255	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 55 Class 2	380	450	18	20	2d
56160	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 60 Class 1	410	520	16	18	2.5d
56260	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 60 Class 2	410	480	16	18	2d
56270	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 70 Class 2	480	550	12	14	3d
56152	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 50 Class 1-with Cu	340	450	20	22	2d
56162	ASTM A 1011 / ASTM A 1011M	HSLAS Grade 60 Class 1-with Cu	410	520	16	18	2.5d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
- 2) Bending tests are carried out if it is customer's request in order.

STRUCTURAL STEELS SUITABLE FOR COLD FORMING & BENDING															
Standard: ASTM A1018/A 1018M-07															
Chemical Composition (%)															
Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Cu ⁽²⁾	Ni	Cr	Mo	V	Nb	Ti ⁽³⁾	N
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
56830	ASTM A 1018	CS Type B	Std.	0.02-0.15	0.60	0.030	0.035	0.20	0.20	0.15	0.06	0.008	0.008	0.025	-
56833	ASTM A 1018	SS Grade 33	Std.	0.25	1.50	0.035	0.040	0.20	0.12	0.10	0.02	0.008	0.008	0.025	0.014
56836	ASTM A 1018	SS 36 Type 1	Std.	0.25	1.50	0.035	0.040	0.20	0.20	0.15	0.06	0.008	0.008	0.025	0.014
56837 ⁽¹⁾	ASTM A 1018	SS 36 Type 2-low Si	Std.	0.25	1.35	0.035	0.040	0.20	0.20	0.15	0.06	0.008	0.008	0.025	0.014
56838	ASTM A 1018	SS 36 Type 2	Std.	0.25	1.35	0.035	0.040	0.20	0.20	0.15	0.06	0.008	0.008	0.025	0.014
56840	ASTM A 1018	SS Grade 40	Std.	0.25	1.50	0.035	0.04	0.20	0.12	0.10	0.02	0.008	0.008	0.025	0.014

Explanations

- 1) Mn % is 0.80-1.20 for 20 mm and thicker strips. For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.35.
- 2) When copper is specified, a minimum of 0.20 % is required.
- 3) Ti/ N is max. 3.4.

STRUCTURAL STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: ASTM A1018/A 1018M-07

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)		Impact (long.) ²		Bending
			N/mm ²		A 50	A200	Temp.	KVc	(tran.; 90°)
			min.	min.	T≤25	4.5≤T≤25		min.	mrb
					min.	min.	°C	J	d: thickness
56830	ASTM A 1018	CS Type B	-	-	-	-	-	-	-
56833	ASTM A 1018	SS Grade 33	230	360	22	16	+20	40	1d
56836	ASTM A 1018	SS 36 Type 1	250	365	21	15	+20	40	1.5d
56837	ASTM A 1018	SS 36 Type 2-low Si	250	400-550	21	18	+20	40	2d
56838	ASTM A 1018	SS 36 Type 2	250	400-550	21	18	+20	40	2d
56840	ASTM A 1018	SS Grade 40	275	380	19	14	+20	40	2d

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact and Bending tests are carried out if it is customer's request in order.

MICRO ALLOYED STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: ASTM A1018/A 1018M-07

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Ti	Si
				max.	max.	max.	max.	max.	max.	max.	min.	min.	min.	max.	
56845	ASTM A 1018 ASTM A 1018M	HSLAS Grade 45 Class 1	Std.	0.22	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56945	ASTM A 1018 ASTM A 1018M	HSLAS Grade 45 Class 2	Std.	0.15	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56850	ASTM A 1018 ASTM A 1018M	HSLAS Grade 50 Class 1	Std.	0.23	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
55850	ASTM A 1018 ASTM A 1018M	HSLAS Grade 50 Class 1-with Cu	Std.	0.23	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56851	ASTM A 1018 ASTM A 1018M	HSLAS Grade 50 Class 1-with Si	Std.	0.23	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	0.14-0.25
55851	ASTM A 1018 ASTM A 1018M	HSLAS Grade 50 Class 1-with Cu+Si	Std.	0.23	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	0.14-0.25
56855	ASTM A 1018 ASTM A 1018M	HSLAS Grade 55 Class 1	Std.	0.25	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56856	ASTM A 1018 ASTM A 1018M	HSLAS Grade 55 Class 1-with Si	Std.	0.25	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	0.14-0.25
56950	ASTM A 1018 ASTM A 1018M	HSLAS Grade 50 Class 2	Std.	0.15	1.50	0.040	0.040	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56955	ASTM A 1018 ASTM A 1018M	HSLAS Grade 55 Class 2	Std.	0.15	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56860	ASTM A 1018 ASTM A 1018M	HSLAS Grade 60 Class 1	Std.	0.26	1.5	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56960	ASTM A 1018 ASTM A 1018M	HSLAS Grade 60 Class 2	Std.	0.15	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56965	ASTM A 1018 ASTM A 1018M	HSLAS Grade 65 Class 2	Std.	0.15	1.50	0.04	0.04	0.20	0.20	0.15	0.06	0.005	0.005	0.005	
56970	ASTM A 1018 ASTM A 1018M	HSLAS Grade 70 Class 2	Std.	0.15	1.65	0.04	0.040	0.20	0.20	0.15	0.16	0.005	0.005	0.005	

MICRO ALLOYED STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: ASTM A1018/A 1018M-07

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)		Bending
			N/mm ²		A 50	A 200	(tran.; 90°)
					T≤25	4.5≤T≤25	mrb
			min.	min.	min.	min.	d: thickness
56845	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 45 Class 1	310	410	22	17	1.5d
56945	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 45 Class 2	310	380	22	17	1.5d
56850	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 50 Class 1	340	450	20	16	2d
55850	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 50 Class 1-with Cu	340	450	20	16	2d
56851	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 50 Class 1-with Si	340	450	20	16	2d
55851	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 50 Class 1-with Cu+Si	340	450	20	16	2d
56855	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 55 Class 1	380	480	18	15	2d
56856	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 55 Class 1-with Si	380	480	18	15	2d
56950	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 50 Class 2	340	410	20	16	1.5d
56955	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 55 Class 2	380	450	18	15	2d
56860	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 60 Class 1	410	520	16	14	2.5d
56960	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 60 Class 2	410	480	16	14	2d
56965	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 65 Class 2	450	520	14	12	2.5d
56970	ASTM A 1018 /ASTM A 1018M	HSLAS Grade 70 Class 2	480	550	12	10	3d

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Bending tests are carried out if it is customer's request in order.

UNALLOYED GENERAL STRUCTURAL STEELS

Standard: DIN EN 10025-Part 2-2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	Std.	C (max.)		Mn	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾
				d≤16	16<d≤40							
51235	DIN EN 10025-2	S235JR	Std.	0.17	0.17	1.4	0.035	0.035	0.55	—	0.012	0.35
51236	DIN EN 10025-2	S235JR+N	Std.	0.17	0.17	1.4	0.025	0.025	0.55	0.200	—	0.35
55235	DIN EN 10025-2	S235JR+Cu	Std.	0.17	0.17	1.4	0.035	0.035	0.55	—	0.012	0.35
52235	DIN EN 10025-2	S235J2+N	Std.	0.17	0.17	1.4	0.025	0.025	0.55	0.020	—	
51275	DIN EN 10025-2	S275JR	Std.	0.21	0.21	1.5	0.035	0.035	0.55	—	0.012	0.40
52275	DIN EN 10025-2	S275J2+N	Std.	0.18	0.18	1.5	0.025	0.025	0.55	0.020	—	0.40

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽⁴⁾		A(%), min.					Impact (long.) ⁽²⁾	
			N/mm ²		N/mm ²		A80			A5	Temp.	KVC	
			min.	min.	d : thickness, mm					min.			
			≤16	16<d≤40	<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5		2.5<d≤3	3≤d≤40	°C
51235	DIN EN 10025-2	S235JR	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽³⁾
51236	DIN EN 10025-2	S235JR+N	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27
55235	DIN EN 10025-2	S235JR+Cu	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27
52235	DIN EN 10025-2	S235J2+N	235	225	360 - 510	360 - 510	16	17	18	19	24	-20	27
51275	DIN EN 10025-2	S275JR	275	265	430 - 580	410 - 560	14	15	16	17	21	+20	27 ⁽³⁾
52275	DIN EN 10025-2	S275J2+N	275	265	430 - 580	410 - 560	14	15	16	17	21	-20	27

Explanations

- 1) Grades with N code can be normalized and/or hot formed by customers.
- 2) Impact tests are not required if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.
- 4) Tensile tests are applied to "Transversal" test samples.

UNALLOYED GENERAL STRUCTURAL STEELS

Standard: DIN EN 10025-Part 2-2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		P	S	Cu	N ⁽¹⁾
				max.	max.	max.	max.
51335	DIN EN 10025-2	E335	Std.	.045	.045	.55	120

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽²⁾		A (%), min						Impact (long.) ³⁾	
			N/mm ²		N/mm ²		A 80			A 5			Temp.	KVc
			min.	min.	d : thickness, mm				d : thickness, mm					
			d : thickness, mm											
			≤16	16<d≤40	<3	3≤d<100	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	J	
51235	DIN EN 10025-2	S235JR	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽³⁾	

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

UNALLOYED GENERAL STRUCTURAL STEELS													
Standard: DIN EN 10025-Part 2-2004													
Chemical Composition (%)													
Colakoglu Quality ID	Std.	Quality		C (max.)		Si	Mn	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾
				d≤16	16<d≤40	max.	max.	max.	max.	max	min.	max.	max.
50355	DIN EN 10025-2	S355J0	Std.	0.20	0.20	0.55	1.6	0.030	0.030	0.55	—	0.012	0.45
51355	DIN EN 10025-2	S355JR	Std.	0.24	0.24	0.55	1.6	0.035	0.035	0.55	—	0.012	0.45
53355	DIN EN 10025-2	S355J2	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	—	—	0.45
52355	DIN EN 10025-2	S355J2+N	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	0.020	—	0.45
55355	DIN EN 10025-2	S355J2+N-with Cu	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	—	—	0.45

Explanations

1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.

2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

UNALLOYED GENERAL STRUCTURAL STEELS

Standard: DIN EN 10025-Part 2-2004

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽²⁾		A(%), min.					Impact (long.) ⁽³⁾	
			N/mm ²		N/mm ²		A80			A5	Temp.	KVc	
			min.	min.	d : thickness, mm		d : thickness, mm					min.	
			d : thickness, mm										
			≤16	16<d≤40	<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	J
50355	DIN EN 10025-2	S355J0	355	345	510 - 680	470 - 630	13	14	15	16	20	0	27 ⁽⁴⁾
51355	DIN EN 10025-2	S355JR	355	345	510 - 680	470 - 630	13	14	15	16	20	+20	27
53355	DIN EN 10025-2	S355J2	355	345	510 - 680	470 - 630	13	14	15	16	20	-20	27 ⁽⁴⁾
52355	DIN EN 10025-2	S355J2+N	355	345	510 - 680	470 - 630	13	14	15	16	20	-20	27
55355	DIN EN 10025-2	S355J2+N+Cu ⁽¹⁾	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁴⁾

Explanations

- 1) Grades with N code can be normalized and/or hot formed by customers.
- 2) Tensile tests are applied to "Transversal" test samples.
- 3) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 4) Impact tests are carried out if it is customer's request in order.

UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING & BENDING
Standard: DIN EN 10025 Part 2-2004
Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C (max.)		Mn	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾
				d≤16	16<d≤40							
54235	DIN EN 10025-2	S235JR	Std.	0.17	0.17	1.40	0.035	0.035	0.55	—	0.012	0.35
50236	DIN EN 10025-2	S235JR (Cu+Cr+Ni≤0.35)	Std.	0.17	0.17	1.4	0.035	0.035	0.55	—	0.012	0.35
50237	DIN EN 10025-2	S235J0 (Cu+Cr+Ni≤0.35)	Std.	0.17	0.17	1.4	0.030	0.030	0.55	—	0.012	0.35
50238	DIN EN 10025-2	S235J0 (Cu+Cr+Ni≤0.35)	Std.	0.17	0.17	1.4	0.035	0.035	0.55	—	0.012	0.35
50235	DIN EN 10025-2	S235J0	Std.	0.17	0.17	1.4	0.030	0.030	0.55	—	0.012	0.35
53235	DIN EN 10025-2	S235J2	Std.	0.17	0.17	1.4	0.025	0.025	0.55	—	0.012	0.35
54275	DIN EN 10025-2	S275JR	Std.	0.21	0.21	1.5	0.035	0.035	0.55	—	0.012	0.40
50275	DIN EN 10025-2	S275J0	Std.	0.18	0.18	1.5	0.030	0.030	0.55	—	0.012	0.40
53275	DIN EN 10025-2	S275J2	Std.	0.18	0.18	1.5	0.025	0.025	0.55	—	0.012	0.40

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

UN ALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING & BENDIN

Standard: DIN EN 10025 Part 2-2004

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽¹⁾		A(%), min.					Impact (long.) ⁽³⁾	
			N/mm ²		N/mm ²		A80			A5	Temp.	KVc	
			min.	min.			d : thickness, mm					min.	
			d : thickness, mm		d : thickness, mm		1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40		°C
54235	DIN EN 10025-2	S235JR	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽³⁾
50236	DIN EN 10025-2	S235JR (Cu+Cr+Ni≤0.35)	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽³⁾
50237	DIN EN 10025-2	S235J0 (Cu+Cr+Ni≤0.35)	235	225	360 - 510	360 - 510	16	17	18	19	24	0	27 ⁽³⁾
50238	DIN EN 10025-2	S235J0 (Cu+Cr+Ni≤0.35)	235	225	360 - 510	360 - 510	16	17	18	19	24	0	27(3)
50235	DIN EN 10025-2	S235J0	235	225	360 - 510	360 - 510	16	17	18	19	24	0	27 ⁽³⁾
53235	DIN EN 10025-2	S235J2	235	225	360 - 510	360 - 510	16	17	18	19	24	-20	27 ⁽³⁾
54275	DIN EN 10025-2	S275JR	275	265	430 - 580	410 - 560	14	15	16	17	21	+20	27 ⁽³⁾
50275	DIN EN 10025-2	S275J0	275	265	430-580	410-560	14	15	16	17	21	0	27
53275	DIN EN 10025-2	S275J2	275	265	430-580	410-560	14	15	16	17	21	-20	27

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

UNALLOYED GENERAL STRUCTURAL STEELS (SUITABLE TO CLASS 1 TYPE GALVANIZING STANDARD)

Standard: DIN EN 10025 Part 2-2004

Chemical Composition (%)

Çolakoglu Quality ID	Std.	Quality		C (max.)		Si	Mn	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾
				d≤16	16<d≤40	max.	max.	max.	max.	max.	min.	max.	max.
54354	DIN EN 10025-2	S355JR+N-low Si	Std.	0.24	0.24	0.55	1.6	0.035	0.035	0.55	—	0.012	0.45
54355	DIN EN 10025-2	S355JR-low Si	Std.	0.24	0.24	0.55	1.6	0.035	0.035	0.55	—	0.012	0.45
54356	DIN EN 10025-2	S355J0-low Si	Std.	0.20	0.20	0.55	1.6	0.030	0.030	0.55	—	0.012	0.45
54357	DIN EN 10025-2	S355J2+N-low Si	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	—	—	0.45
54358	DIN EN 10025-2	S355J2-low Si	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	—	—	0.45

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

UNALLOYED GENERAL STRUCTURAL STEELS (SUITABLE TO CLASS 1 TYPE GALVANIZING STANDARD)

Standard: DIN EN 10025 Part 2-2004

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽²⁾		A(%), min.					Impact (long.) ³⁾	
			N/mm ²				A80			A5	Temp.	KVc	
			min.	min.			d : thickness, mm					min.	
			d : thickness, mm		d : thickness, mm		1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40		°C
54354	DIN EN 10025-2	S355JR+N-low Si	355	345	510-680	470-630	13	14	15	16	20	+20	27 ⁽⁴⁾
54355	DIN EN 10025-2	S355JR-low Si	355	345	510-680	470-630	13	14	15	16	20	+20	27 ⁽⁴⁾
54356	DIN EN 10025-2	S355J0-low Si	355	345	510-680	470-630	13	14	15	16	20	0	27 ⁽⁴⁾
54357	DIN EN 10025-2	S355J2+N-low Si	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁴⁾
54358	DIN EN 10025-2	S355J2-low Si	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁴⁾

Explanations

- 1) Grades with N code can be normalized and/or hot formed by customers.
- 2) Tensile tests are applied to "Transversal" test samples.
- 3) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 4) Impact tests are carried out if it is customer's request in order.

GENERAL STRUCTURAL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING
Standard: DIN EN 10025-Part 2-2004
Chemical Composition (%)

Çolakoglu Quality ID	Std.	Quality	Std.	C (max.)		Mn max.	P max.	S max.	Ca ppm	Al ⁽¹⁾ min.	Ceq ⁽²⁾ max.
				d≤16	16<d≤40						
40234	DIN EN 10025-2	S235JRC	Std.	0.17	0.17	1.4	0.035	0.035	20	0.020	0.35
40235	DIN EN 10025-2	S235J2C	Std.	0.17	0.17	1.4	0.025	0.025	20	0.020	0.35
44235	DIN EN 10025-2	S235JRC+N	Std.	0.17	0.17	1.4	0.035	0.035	20	0.020	0.35
43275	DIN EN 10025-2	S275JRC	Std.	0.21	0.21	1.5	0.035	0.035	0.55	0.020	0.40
40275	DIN EN 10025-2	S275J2C	Std.	0.18	0.18	1.5	0.025	0.025	20	0.020	0.40
44276	DIN EN 10025-2	S275JRC+N-Special	Std.	0.21	0.21	1.5	0.035	0.035	0.55	0.020	0.40
44275	DIN EN 10025-2	S275J2C+N	Std.	0.18	0.18	1.5	0.025	0.025	20	0.020	0.40

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

GENERAL STRUCTURAL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING

Standard: DIN EN 10025-Part 2-2004

Mechanical Properties													
Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽¹⁾		A(%)					Impact (long.) ⁽⁴⁾	
			N/mm ²				A80			A5	Temp.	KVc	
			min.	min.	d : thickness, mm		d : thickness, mm						
			d : thickness, mm		d : thickness, mm		d : thickness, mm						
			≤16	16<d≤40	<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	J
40234	DIN EN 10025-2	S235JRC	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽⁵⁾
40235	DIN EN 10025-2	S235J2C	235	225	360 - 510	360 - 510	16	17	18	19	24	-20	27 ⁽⁵⁾
44235	DIN EN 10025-2	S235JRC+N	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽⁵⁾
43275	DIN EN 10025-2	S275JRC	275	265	430-580	410-560	14	15	16	17	21	+20	27 ⁽⁵⁾
40275	DIN EN 10025-2	S275J2C	275	265	430 - 580	410 - 560	14	15	16	17	21	-20	27 ⁽⁵⁾
44276	DIN EN 10025-2	S275JRC+N-Special	275	265	430-580	410-560	14	15	16	17	21	+20	27 ⁽⁵⁾
44275	DIN EN 10025-2	S275J2C+N	275	265	430 - 580	410 - 560	14	15	16	17	21	-20	27 ⁽⁵⁾

Explanations

- 1) Grades with N code can be normalized and/or hot formed by customers.
- 2) Grades with C code can be cold formed and/or cold flanged by customers.
- 3) Tensile tests are applied to "Transversal" test samples.
- 4) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 5) Impact tests are carried out if it is customer's request in order.

Mechanical Properties										
Colakoglu Quality ID	Std.	Quality	Bending ⁽¹⁾ (tran., ≤90°, mrb)							
			thickness, d (mm)							
			6<d≤7	7<d≤8	8<d≤10	10<d≤12	12<d≤14	14<d≤16	16<d≤18	18<d≤20
40234	DIN EN 10025-2	S235JRC	10	12	16	20	25	28	36	40
40235	DIN EN 10025-2	S235J2C	10	12	16	20	25	28	35	40
44235	DIN EN 10025-2	S235JRC+N	10	12	16	20	25	28	36	40
43275	DIN EN 10025-2	S275JRC	12	16	20	25	28	32	40	45
40275	DIN EN 10025-2	S275J2C	12	16	20	25	28	32	40	45
44275	DIN EN 10025-2	S275JRC+N	12	16	20	25	28	32	40	45

GENERAL STRUCTURAL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING													
Standard: DIN EN 10025-Part 2-2004													
Chemical Composition (%)													
Çolakoglu Quality ID	Std.	Quality	Std.	C (max.)		Si	Mn	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾
				d≤16	16<d≤40	max.	max.	max.	max.	max.	min.	max.	max.
42355	DIN EN 10025-2	S355JRC-low Si	Std.	0.24	0.24	0.55	1.6	0.035	0.035	0.55	—	0.012	0.45
41355	DIN EN 10025-2	S355J0C-low Si	Std.	0.24	0.24	0.55	1.6	0.035	0.035	0.55	—	0.012	0.45
43355	DIN EN 10025-2	S355J2C-low Si	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	—	—	0.45
40355	DIN EN 10025-2	S355J2C	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	0.020	—	0.45
44355	DIN EN 10025-2	S355J2C+N	Std.	0.20	0.20	0.55	1.6	0.025	0.025	0.55	0.020	—	0.45
40356	DIN EN 10025-2	S355JRC	Std.	0.24	0.24	0.55	1.6	0.035	0.035	0.55	—	0.012	0.45
44356	DIN EN 10025-2	S355J2C+N-Special	Std.	0.20	0.20	0.55	1.7	0.025	0.025	0.55	0.020	—	0.45

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(+Mo+V)/5+(Ni+Cr)/15 formula.

GENERAL STRUCTURAL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING

Standard: DIN EN 10025-Part 2-2004

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽³⁾		A(%)					Impact (long.) ⁽⁴⁾	
			N/mm ²				A80					Temp.	KVc min.
			min.	min.	d : thickness, mm		d : thickness, mm						
			d : thickness, mm		<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	J
42355	DIN EN 10025-2	S355JRC-low Si	355	345	510-680	470-630	13	14	15	16	20	+20	27 ⁽⁵⁾
41355	DIN EN 10025-2	S355J0C-low Si	355	345	510-680	470-630	13	14	15	16	20	0	27 ⁽⁵⁾
43355	DIN EN 10025-2	S355J2C-low Si	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁵⁾
40355	DIN EN 10025-2	S355J2C	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁵⁾
44355	DIN EN 10025-2	S355J2C+N	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁵⁾
40356	DIN EN 10025-2	S355JRC	355	345	510-680	470-630	13	14	15	16	20	+20	27 ⁽⁵⁾
44356	DIN EN 10025-2	S355J2C+N-Special	355	345	510-680	470-630	13	14	15	16	20	-20	27 ⁽⁵⁾

Explanations

- 1) Grades with N code can be normalized and/or hot formed by customers.
- 2) Grades with C code can be cold formed and/or cold flanged by customers.
- 3) Tensile tests are applied to "Transversal" test samples.
- 4) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 5) Impact tests are carried out if it is customer's request in order.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Bending ⁽¹⁾ (tran., ≤90°, mrb)									
			thickness, d (mm)									
			6<d≤7	7<d≤8	8<d≤10	10<d≤12	12<d≤14	14<d≤16	16<d≤18	18<d≤20		
42355	DIN EN 10025-2	S355JRC-low Si	—	—	—	—	—	—	—	—	—	—
43355	DIN EN 10025-2	S355J2C-low Si	12	16	20	25	32	36	45	50		
40355	DIN EN 10025-2	S355J2C	12	16	20	25	32	36	45	50		
44355	DIN EN 10025-2	S355J2C+N	12	16	20	25	32	36	45	50		
40356	DIN EN 10025-2	S355JRC	-	-	-	-	-	-	-	-	-	-
44356	DIN EN 10025-2	S355J2C+N-Special	12	16	20	25	32	36	45	50		

Explanations

- 1) The values for bending tests are applied to 90° and acute angles.

HIGH STRENGTH NORMALISED STRUCTURAL STEELS SUITABLE FOR HOT FORMING

Standard: DIN EN 10025 Part 3 -2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Cu	Al	N ppm
				max.	max.	max.	max.	max.	max.	max.	max.	min	max.
52420	DIN EN 10025-3	S420N-Special (SAH540)	Std.	0.20	1.00-1.70	0.60	0.030	0.025	0.30	0.80	0.55	0.02	0.025
52460	DIN EN 10025-3	S460N	Std.	0.20	1.00-1.70	0.60	0.030	0.025	0.30	0.80	0.55	0.02	0.025

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽¹⁾	A(%)	Impact (long.) ²		Bending (tran.; ≤180°)
			N/mm ²		N/mm ²	A5	Temp.	KVc	mrb
			min.	min.		d : thickness, mm		min.	
			d : thickness, mm				°C	J	thickness, d (mm)
52420	DIN EN 10025-3	S420N-Special (SAH540)	420	400	520-680	19	-20	40	4d
52460	DIN EN 10025-3	S460N	460	440	540-720	17	-20	40	4d

ATMOSPHERE CORROSION RESISTANT STEELS

Standard: DIN EN 10025 Part 5 - 2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Cu	Al	N ppm
				max.	max.	max.	max.	max.	max.	max.	max.	min.	max.
58235	DIN EN 10025-5	S235J0W	Std.	0.16	0.15-0.70	0.45	0.040	0.040	0.35-0.85	—	0.20-0.60	—	0.01
58236	DIN EN 10025-5	S235J2W	Std.	0.16	0.15-0.70	0.45	0.040	0.035	0.35-0.85	—	0.20-0.60	—	0.01
58355	DIN EN 10025-5	S355J0W	Std.	0.19	0.45-1.60	0.55	0.040	0.040	0.35-0.85	—	0.20-0.60	—	0.01
58356	DIN EN 10025-5	S355J2W	Std.	0.19	0.45-1.60	0.55	0.035	0.035	0.35-0.85	—	0.20-0.60	—	0.01
58357	DIN EN 10025-5	S355J0WP	Std.	0.15	1.1	0.80	0.05-0.16	0.040	0.25-1.35	—	0.20-0.60	—	0.01
58358	DIN EN 10025-5	S355J2WP	Std.	0.15	1.1	0.80	0.05-0.16	0.035	0.25-1.35	—	0.20-0.60	—	0.01

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ¹⁾		A (%)			Impact (long.) ²⁾	
			N/mm ²				A80			Temp.	KVC
			min.	min.	d : thickness, mm		d : thickness, mm				
			d : thickness, mm		<3	3≤d<100	1.5<d≤2	2<d≤2.5	2.5<d≤3	°C	J
58235	DIN EN 10025-5	S235J0W	235	225	360-510	360-510	19	20	21	0	27 ³⁾
58236	DIN EN 10025-5	S235J2W	235	225	360-510	360-510	17	18	19	-20	27 ³⁾
58355	DIN EN 10025-5	S355J0W	355	345	510-680	470-630	16	17	18	0	27 ³⁾
58356	DIN EN 10025-5	S355J2W	355	345	510-680	470-630	14	15	16	-20	27 ³⁾
58357	DIN EN 10025-5	S355J0WP	355	345	510-680	470-630	16	17	18	0	27 ³⁾
58358	DIN EN 10025-5	S355J2WP	355	345	510-680	470-630	14	15	16	-20	27 ³⁾

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are applied to "Longitudinal" test samples.
- 3) Impact tests are carried out if it is customer's request in order.

WHEEL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING
Standard: DIN EN 10025-Part 2-2004
Chemical Composition (%)

Çolakoglu Quality ID	Std.	Quality	Std.	C	Mn	Si	P	S	Cu	Cu+Cr+Ni	Al	N	Ca
				max.	max.	max.	max.	max.	max.	max.	min.	max.	ppm
82235	DIN EN 10025-2	S235JRC Special	Std.	0.14	0.7	0.15	0.02	0.01	"1"	0.30	0.02-0.045	0.001	—
81235	DIN EN 10025-2	S235J2C+N	Std.	0.14	0.7	0.1	0.02	0.015	"1"	0.30	0.02-0.07	0.009	—
82280	DIN EN 10025-2	S275JRC	Std.	0.10	0.8	0.05	0.02	0.015	"1"	0.30	0.015-0.07	0.009	—
82290	DIN EN 10025-2	S275JRC Special (S275J2C+N)	Std.	0.18	1.25	0.1	0.020	0.015	"1"	0.30	0.02-0.07	0.009	—
82330 ²⁾	DIN EN 10025-2	S355JRC Special (S355J2C+N)	Std.	0.15-0.18	1.3-1.4	0.1	0.02	0.01	0.15	—	0.02-0.06	0.001	20-50
82355	DIN EN 10025-2	S355J2C+N Special	Std.	0.24	1.6	0.55	0.035	0.035	0.55	—	—	0.012	—
81330	DIN EN 10025-2	S355JRC Special	Std.	0.19	1.6	0.3	0.025	0.02	"2"	0.30	0.02-0.07	0.009	—
80235	DIN EN 10025-2	S235JR-Titan S5092 Rev 27	Std.	0.06-0.16	0.40-0.90	0.015-0.1	0.025	0.015	—	—	0.020-0.06	—	—
80236	DIN EN 10025-2	S235JR-Titan S5095 Rev 4	Std.	0.06-0.16	0.40-0.90	0.015-0.1	0.025	0.015	—	—	0.020-0.06	—	—
80280	DIN EN 10025-2	S275J0-Titan SIRMAL	Std.	0.21	1.6	—	0.05	0.05	—	—	—	—	—
80290	DIN EN 10025-2	S275J2+N-Titan	Std.	0.21	1.6	—	0.05	0.05	—	—	—	—	—
80355	DIN EN 10025-2	S355J0-Titan SIRMAL	Std.	0.23	1.7	0.6	0.05	0.05	—	—	—	—	—

Explanations

- 1) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.
- 2) Cu+Cr+Ni is permitted up to a maximum 0.3 %.
- 3) Cr max. 0.05 %, Mo max. 0.015 %, V max. 0.005 %, Ni max. 0.1 %, Nb max. 0.005 %.

WHEEL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING

Standard: DIN EN 10025-Part 2-2004

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)	Impact (long.) ⁽²⁾	
			N/mm ²		A5	Temp.	KVc
			min.	min.	min.		
82235	DIN EN 10025-2	S235JRC Special	235	360-440	30	+20	27 ⁽³⁾
81235	DIN EN 10025-2	S235J2C+N	235-320	350-430	35	-20	27 ⁽³⁾
82280	DIN EN 10025-2	S275JRC	280-350	390-460	28	+20	27 ⁽³⁾
82290	DIN EN 10025-2	S275JRC Special (S275J2C+N)	280-420	420-500	29	+20	27 ⁽³⁾
82330	DIN EN 10025-2	S355JRC Special(S355J2C+N)	330-450	480-590	25	+20	27 ⁽³⁾
82355	DIN EN 10025-2	S355J2C+N Special	330-540	480-600	24	-20	27 ⁽³⁾
81330	DIN EN 10025-2	S355JRC Special	330-540	480-600	24	+20	27 ⁽³⁾
80235	DIN EN 10025-2	S235JR-TitanS5092 Rev 27	230	370-450	30	-	-
80236	DIN EN 10025-2	S235JR-TitanS5095 Rev 4	230	370-450	30	-	-
80280	DIN EN 10025-2	S275J0-Titan SIRMAL	410-560	275	24	0	27
80290	DIN EN 10025-2	S275J2+N-Titan	410-560	275	24	0	27
80355	DIN EN 10025-2	S355J0-Titan SIRMAL	470-630	355	24	0	27

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Bending ⁽¹⁾ (tran., ≤90°, mrb)								Bending ⁽¹⁾ (tran., ≤90°, mrb)							
			thickness, d (mm)								thickness, d (mm)							
			1<d≤1,5	1,5<d≤2,5	2,5<d≤3	3<d≤4	4<d≤5	5<d≤6	6<d≤7	7<d≤8	8<d≤10	10<d≤12	12<d≤14	14<d≤16	16<d≤18	18<d≤20	20<d≤25	25<d≤30
82235	DIN EN 10025-2	S235JRC Special	1.6	2.5	3	5	6	8	10	12	16	20	25	28	36	40	50	60
82280	DIN EN 10025-2	S275JRC	2	3	4	5	8	10	12	16	20	25	28	32	40	45	55	70
82290	DIN EN 10025-2	S275JRC Special (S275J2C+N)	2	3	4	5	8	10	12	16	20	25	28	32	40	45	55	70

WHEEL STEELS SUITABLE FOR COLD FORMING, BENDING & SPINNING

Standard: DIN EN 10111:2008-06

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	Si	P	S	Cu	Al
				max.	max.	max.	max.	max.	max.	min.
81222	DIN EN 10111:2008-06	DD11	Std.	0.10	0.45	-	0.035	0.035	—	—
80122	DIN EN 10111:2008-06	DD 11-Titan SIRIA	Std.	0.10	0.50	0.20	0.035	0.030	0.20	0.010
80222	DIN EN 10111:2008-06	DD 11-Titan SIRMAC	Std.	0.14	0.65	-	0.050	0.050	—	—

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)
			N/mm ²		A5
			min.	min.	min.
80122	DIN EN 10111:2008-06	DD 11-Titan SIRIA	300-440	215	35
80222	DIN EN 10111:2008-06	DD 11-Titan SIRMAC	440	340	28

HIGH STRENGTH WHEEL STEELS SUITABLE FOR COLD FORMING & SPINNING

Standard: DIN EN 10149-Part2-1995

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	Si	P	S	Al	Nb ⁽¹⁾	V ⁽¹⁾	Ti ⁽¹⁾
				max.	max.	max.	max.	max.	min.	max.	max.	max.
83355	DIN EN 10149-2	S355MC	Std.	0.12	1.50	0.50	0.025	0.020	0.015	0.09	0.20	0.15
84355	DIN EN 10149-2	S355MC-Titan S5088 Rev 10	Std.	0.12	1.50	0.50	0.025	0.010	0.020	0.09	0.20	0.15
83420	DIN EN 10149-2	S420MC (HL-2242-01)	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.09	0.20	0.15
83460	DIN EN 10149-2	S460MC (HL-6000-02)	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.09	0.20	0.15

Explanations

1) Nb+V+Ti = % 0.22 max.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾	Rm ⁽¹⁾	A(%)		Impact (long.) ⁽²⁾		Bending ⁽³⁾
			N/mm ²		A80	A5	Temp.	KVc	(tran.;180°)
					d<3	d≤T		min.	mdb
			min.	min.	min.	min.	°C	J	(d=thickness)
83355	DIN EN 10149-2	S355MC	355	430-550	19	23	-20	40	0.5d
84355	DIN EN 10149-2	S355MC-Titan S5088 Rev 10	340-430	470-560	25	-	-40	27	0.5d
83420	DIN EN 10149-2	S420MC (HL-2242-01)	420	480-620	16	19	-20	40	0.5d
83460	DIN EN 10149-2	S460MC (HL-6000-02)	450-550	550-650	"	22	-	-	1d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
- 2) Impact tests are carried out if it is customer's request in order. Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Bending test values are applied to "Transversal" test samples.

**HIGH STRENGTH DUAL PHASE WHEEL STEELS SUITABLE FOR
COLD FORMING & SPINNING**

Standard: DIN EN 10338-2010

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Al
				max.	max.	max.	max.	max.	min.
83600	DIN EN 10338-2010	HDT580X (DP 600)	Std.	0.17	2.20	0.80	0.080	0.015	2.0

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		Mo+Cr	V	Nb+Ti	B ppm	Cu	Cr
				max.	max.	max.	max.	max.	max.
83600	DIN EN 10338-2010	HDT580X (DP 600)	Std.	1.00	0.20	0.15	50	-	-

Explanations

1) The values are applied to strips with thickness $T \leq 6$ mm

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾	Rm ⁽¹⁾	A(%)	Strain hardening exponent
			N/mm ²		A80	n
			min.	min.	min.	min.
83600	DIN EN 10338-2010	HDT580X (DP 600)	330-480	580	19	0.13

Explanations

1) Tensile tests are applied to "Transversal" test samples.

**HOT ROLLED HIGH STRENGTH DUAL PHASE STEEL SUITABLE
FOR COLD FORMING**

Std. : DIN EN 10338-2010

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Al
				max.	max.	max.	max.	max.	min.
83610	DIN EN 10338-2010	HCT600X (DP 600)	Std.	0.07-0.1	1.30-1.45	0.20-0.30	0.020	0.008	0.025-0.06
83780	DIN EN 10338-2010	HCT780X (DP 780)	Std.	0.09-0.11	1.70-1.90	0.20-0.30	0.020	0.005	0.03-0.06

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		Mo+Cr	V	Nb+Ti	B ppm	Cu	Cr
				max.	max.	max.	max.	max.	max.
83610	DIN EN 10338-2010	HCT600X (DP 600)	Std.	0.75	0.01	0.020	100	0.15-0.20	0.50-0.70
83780	DIN EN 10338-2010	HCT780X (DP 780)	Std.	-	-	-	5	0.10-0.20	0.20-0.30

Explanations

1) The values are applied to strips with thickness $T \leq 6$ mm

BOILER STEELS														
Standard: DIN EN 10028 - Part 2 - 2008														
Chemical Composition (%)														
Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S	Al	Nb	Cr ⁽¹⁾	Cu ⁽¹⁾	Mo ⁽¹⁾	Ni ⁽¹⁾
				max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.
86235 ⁽²⁾	DIN EN 10028-2	P235GH	Std.	0.16	0.35	0.60 - 1.20	0.025	0.020	0.020	0.020	0.30	0.30	0.08	0.30
86265 ⁽²⁾	DIN EN 10028-2	P265GH	Std.	0.20	0.40	0.80 - 1.20	0.025	0.020	0.020	0.020	0.30	0.30	0.08	0.30
86295 ⁽²⁾	DIN EN 10028-2	P295GH	Std.	0.08 - 0.20	0.40	0.90 - 1.50	0.025	0.015	0.020	0.020	0.30	0.30	0.08	0.30
86355	DIN EN 10028-2	P355GH	Std.	0.10 - 0.22	0.60	1.10 - 1.70	0.025	0.015	0.020	0.020	0.30	0.30	0.08	0.30

Explanations

- 1) Cr+Cu+Mo+Ni ≤ % 0,70
- 2) Mn content can be decreased as 0,20 % if the thickness is under 6 mm.

Mechanical Properties										
Colakoglu Quality ID	Std.	Quality	Re (min.)		Rm ⁽¹⁾	A5 (%)	Impact ⁽²⁾ (tran.)		Rp 0.02 ⁽¹⁾ (min.) T: 300°C	
			N/mm ²		N/mm ²	min.	Temp.	KVc (min.)	N/mm ² (kg / mm ²)	
			d ≤ 16	16 < d ≤ 40			° C	J	d ≤ 16	16 < d ≤ 40
86235	DIN EN 10028	P235GH	235	225	360 - 480	24	-20	27	153	147
86265	DIN EN 10028	P265GH	265	255	410 - 530	22	-20	27	173	166
86295	DIN EN 10028	P295GH	295	290	460 - 580	22	-20	27	192	189
86355	DIN EN 10028	P355GH	355	345	510 - 650	20	-20	27	232	225

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.

BOILER STEELS																
Standard: DIN EN 10028 - Part 3 - 2008																
Chemical Composition (%)																
Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S	Al	Cr	Ni	Cu	Mo	V	Ti	Nb
				max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.	max.	max.
87355	DIN EN 10028 Part 3-2008	P355NL1	Std.	0.18	0.50	1.10-1.70	0.025	0.010	0.02	0.30	0.50	0.30	0.08	0.1	0.03	0.05

Explanations

- 1) Mn content could be 0.60 % if the thickness is less than 6 mm.

Mechanical Properties										
Colakoglu Quality ID	Std.	Quality	Re (min.)		Rm ⁽¹⁾	A5 (%)	Impact ⁽²⁾ (tran.)		Rp 0.02 ⁽¹⁾ (min.) T: 300°C	
			N/mm ²		N/mm ²	min.	Temp.	KVc (min.)	N/mm ² (kg / mm ²)	
			d ≤ 16				° C	J	d ≤ 16	
87355	DIN EN 10028-Part 3-2008	P355NL1	355		490-630	22	-40	27	232	

STEELS SUITABLE TO USE UNDER LOW PRESSURE

Standard: DIN EN 10207-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S	Al
				max.	max.	max.	max.	max.	min.
86275	DIN EN 10207-2005	P275SL	Std.	0.16	0.40	0.50-1.50	0.025	0.020	0.02

Explanations

1) If the chemical composition includes Nb, V, Ti, %Al min. value does not valid.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾			Rm ⁽¹⁾	A (%)		Impact (long.) ²	
			N/mm ²			N/mm ²	l	t	Temp.	KVc min.
			min.	min.	min.					
			d ≤ 16	16 < d ≤ 40	40 < d ≤ 60					
86275	DIN EN 10207-2005	P275SL	275	265	255	390-510	17	18	-50	28

BOILER PIPE STEELS

Standard: DIN EN 10217-2-2002

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S	Al	Cr ⁽¹⁾	Cu ⁽¹⁾	Mo ⁽¹⁾	Nb ⁽¹⁾	V	Ti
				max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.	max.
86435	DIN EN 10217-2	P235GH-low Si	Std.	0.16	0.35	1.20	0.025	0.020	0.020	0.30	0.30	0.08	0.010	0.020	0.030

Explanations

1) Cr+Cu+Mo+Ni ≤ % 0.70.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾	Rm ⁽¹⁾	A (%)		Impact (long.) ²		Impact (tran.) ³	
			N/mm ²	N/mm ²	l	t	Temp.	KVc min.	Temp.	KVc min.
			d ≤ 16	16 < d ≤ 40	40 < d ≤ 60					
86435	DIN EN 10217-2	P235GH-low Si	235	360-500	25	23	0	40	0	27

Explanations

1) Tensile tests are applied to "Transversal" test samples.

2) Impact test values are valid upto ≤16 mm in thickness. Impact tests can be carried out in transversal and longitudinal directions of coils.

3) l: longitudinal, t: transversal.

BOILER PIPE STEELS

Standard : DIN EN 10217-3-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S	Al	Cr	Cu	Mo	Nb	V	Ti
			max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.	max.	
86475	DIN EN 10217-3-2005	P275NL1-low Si	Std.	0.16	0.40	0.50-1.50	0.025	0.020	0.02	0.30	0.30	0.08	0.05	0.05	0.03

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾	Rm ⁽¹⁾	A (%)		Impact (long.) ²		Impact (tran.) ²	
			N/mm ²	N/mm ²	l	t	Temp.	KVc	Temp.	KVc
			min.	min.	min.	min.	°C	J	°C	J
86475	DIN EN 10217-3-2005	P275NL1-low Si	275	390-530	24	22	-40	40	-40	27

LPG TUBE STEELS

Standard: DIN EN 10120-2008

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S	Al	N ⁽¹⁾	Nb	Ti
			max.	max.	min.	max.	max.	min.	max.	max.	max.	
85245	DIN EN 10120	P245NB	Std.	0.16	0.25	0.30	0.025	0.015	0.020	0.009	0.050	0.03
85265	DIN EN 10120	P265NB	Std.	0.19	0.25	0.40	0.025	0.015	0.020	0.009	0.050	0.03
85310	DIN EN 10120	P310NB	Std.	0.20	0.50	0.70	0.025	0.015	0.020	0.009	0.050	0.03
85355	DIN EN 10120	P355NB	Std.	0.20	0.50	0.70	0.025	0.015	0.020	0.009	0.050	0.03

Explanations

1) N content can be % 0.012 if (Al/N) ≥ 2.2 or steel includes Nb and Ti additions.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)	
			N/mm ²	N/mm ²	A80 (min.)	A5 (min.)
			(min.)		d<3	3 ≤ d ≤ 5
85245	DIN EN 10120	P245NB	245	360 - 450	26	34
85265	DIN EN 10120	P265NB	265	410 - 500	24	32
85310	DIN EN 10120	P310NB	310	460 - 550	21	28
85355	DIN EN 10120	P355NB	355	510 - 620	19	24

Explanations

1) Tensile tests are applied to "Transversal" test samples.

GENERAL STRUCTURAL STEELS SUITABLE FOR HEAT TREATMENT

Std. : DIN EN 10083 - Part 2 -2006

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Mo	Cr+Mo+Ni
				max.	max.	max.	max.	max.	max.	max.	max.	
98628	DIN EN 10083-2	28Mn6	Std.	0.25-0.32	1.30-1.65	0.40	0.030	0.010	0.40	0.40	0.10	0.63
98035	DIN EN 10083-2	C35E	Std.	0.32-0.39	0.5-0.8	0.40	0.030	0.030	0.40	0.40	0.10	0.63
98145	DIN EN 10083-2	C45E-Special	Std.	0.42-0.50	0.5-0.8	0.40	0.030	0.030	0.40	0.40	0.10	0.63
98060	DIN EN 10083-2	C60E	Std.	0.57-0.65	0.6-0.9	0.40	0.030	0.030	0.40	0.40	0.10	0.63
98160	DIN EN 10083-2	C60E-Special	Std.	0.57-0.65	0.6-0.9	0.40	0.030	0.030	0.40	0.40	0.10	0.63
98260	DIN EN 10083-2	C60E-1-Cr	Std.	0.57-0.65	0.6-0.9	0.40	0.030	0.030	0.20-0.40	0.40	0.10	0.63

Explanations

1) There is no mechanical test guarantee for heat treatment steels.

GENERAL STRUCTURAL STEELS SUITABLE FOR HEAT TREATMENT

Standard: DIN EN 10083 - Part 3 -2006

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	B	Cr
				max.	max.	max.	max.	max.	ppm	max.
98530	DIN EN 10083-3	30MnB5	Std.	0.27-0.33	1.15-1.45	0.40	0.035	0.040	8-50	-
98534	DIN EN 10083-3	34MnB5	Std.	0.33-0.37	1.15-1.45	0.40	0.035	0.040	8-50	-
98527	DIN EN 10083-3	27MnCrB5-2	Std.	0.24-0.30	1.10-1.40	0.40	0.035	0.040	8-50	0.30-0.60
98526	DIN EN 10083-3	26MnB5	Std.	0.27-0.33	1.15-1.45	0.40	0.035	0.040	8-50	-
98522	DIN EN 10083-3	22MnB5	Std.	0.18-0.23	1.15-1.45	0.40	0.035	0.040	8-50	-

Explanations

1) There is no mechanical test guarantee for heat treatment steels.

HIGH STRENGTH STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: DIN EN 10149 - Part2 - 1995

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	Si	P	S	Al	V ⁽²⁾	Ti ⁽²⁾	Nb ⁽²⁾	Mo	B
				max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.
36315	DIN EN 10149-2	S315MC	Std.	0.12	1.30	0.50	0.025	0.020	0.015	0.20	0.15	0.09	-	-
36355	DIN EN 10149-2	S355MC	Std.	0.12	1.50	0.50	0.025	0.020	0.015	0.20	0.15	0.09	-	-
36356	DIN EN 10149-2	S355MC-Special	Std.	0.12	1.50	0.50	0.025	0.020	0.015	0.20	0.15	0.09	-	-
36420	DIN EN 10149-2	S420MC	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36421	DIN EN 10149-3	S420MC-with Si	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36460	DIN EN 10149-2	S460MC	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36461	DIN EN 10149-5	S460MC-with Si	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36500	DIN EN 10149-2	S500MC	Std.	0.12	1.70	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36501	DIN EN 10149-2	S500MC-with Si	Std.	0.12	1.70	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36550	DIN EN 10149-2	S550MC	Std.	0.12	1.80	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36551	DIN EN 10149-2	S550MC-with Si	Std.	0.12	1.80	0.50	0.025	0.015	0.015	0.20	0.15	0.09	-	-
36600	DIN EN 10149-2	S600MC	Std.	0.12	1.90	0.50	0.025	0.015	0.015	0.20	0.15	0.09	0.5	50
36700	DIN EN 10149-2	S700MC	Std.	0.12	2.10	0.60	0.025	0.015	0.015	0.20	0.22	0.09	0.5	50

Explanations

- 1) All grades are produced by thermo mechanical rolling method.
 2) Nb+Ti+V ≤ % 0,22

Mechanical Properties

Colakoglu Quality ID	Std.	Quality			A(%)		Impact ⁽²⁾	Bending
			Re	Rm ⁽¹⁾	d<3	d≥ 3	KVc (long.)	(tran.,180°)
			N/mm ²		A80	A5	Temp. =20°C	mdb
			min.	min.	min.	min.	min.	d: thickness
36315	DIN EN 10149-2	S315MC	315	390 - 510	20	24	40 J	0
36355	DIN EN 10149-2	S355MC	355	430 - 550	19	23	40 J	0.5 d
36356	DIN EN 10149-2	S355MC-Special	355	430 - 550	19	23	40 J	0.5 d
36420	DIN EN 10149-2	S420MC	420	480 - 620	16	19	40 J	0.5 d
36421	DIN EN 10149-3	S420MC-with Si	420	480 - 620	16	19	40 J	0.5 d
36460	DIN EN 10149-2	S460MC	460	520 - 670	14	17	40 J	1 d
36461	DIN EN 10149-5	S460MC-with Si	460	520 - 670	14	17	40 J	1 d
36500	DIN EN 10149-2	S500MC	500	550 - 700	12	14	40 J	1 d
36501	DIN EN 10149-2	S500MC-with Si	500	550 - 700	12	14	40 J	1 d
36550	DIN EN 10149-2	S550MC	550	600 - 760	12	14	40 J	1.5 d
36551	DIN EN 10149-2	S550MC-with Si	550	600 - 760	12	14	40 J	1.5 d
36600	DIN EN 10149-2	S600MC	600	650-820	11	13	40 J	1.5 d
36700	DIN EN 10149-2	S700MC	700	750-950	10	12	40 J	2d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.

MICRO ALLOYED STEELS SUITABLE FOR COLD FORMING & GALVANIZING

Standard: DIN EN 10149-Part2-1995

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality ⁽¹⁾		C	Mn	Si	P	S	Al	V ⁽²⁾	Ti ⁽²⁾	Nb ⁽²⁾
				max.	max.	max.	max.	max.	min.	max.	max.	max.
37280	DIN EN 10149	S280MC-Special	Std.	0.12	1.30	0.50	0.025	0.020	0.015	0.2	0.15	0.09
37315	DIN EN 10149	S315MC	Std.	0.12	1.30	0.50	0.025	0.020	0.015	0.20	0.15	0.09
37355	DIN EN 10149	S355MC	Std.	0.12	1.50	0.50	0.025	0.020	0.015	0.20	0.15	0.09
37420	DIN EN 10149	S420MC	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09
37421	DIN EN 10149	S420MC-HX420LAD	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09
37460	DIN EN 10149	S460MC	Std.	0.12	1.60	0.50	0.025	0.015	0.015	0.20	0.15	0.09

Explanations

- 1) All grades are produced by thermo mechanical rolling method.
2) Nb+Ti+V ≤ % 0,22

Mechanical Properties

Colakoglu Quality ID	Std.	Quality			A(%)		Impact ⁽²⁾	Bending
			Re	Rm ⁽¹⁾	d<3	d≥ 3	KVc (long.)	(tran.,180°)
			N/mm ²		A80	A5	Temp. =-20°C	mdb
			min.	min.	min.	min.	min.	d: thickness
37315	DIN EN 10149	S315MC	315	390 - 510	20	24	40 J	0
37355	DIN EN 10149	S355MC	355	430 - 550	19	23	40 J	0.5 d
37420	DIN EN 10149	S420MC	420	480 - 620	16	19	40 J	0.5 d
37421	DIN EN 10149	S420MC-HX420LAD	420	480 - 620	16	19	40 J	0.5 d
37460	DIN EN 10149	S460MC	420	480 - 620	16	19	40 J	1 d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.

PRESSURE PIPE STEELS													
Standard: DIN EN 10217 Part 1-2005													
Chemical Composition (%)													
Çolakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Al	Cu	Mo
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
94235	DIN EN 10217-1	P235TR1	Std.	0.16	1.20	0.35	0.025	0.020	0.30	0.30	-	0.30	0.08
94236	DIN EN 10217-1	P235TR2	Std.	0.16	1.20	0.35	0.025	0.020	0.30	0.30	0.02	0.30	0.08
94035	DIN EN 10217-1	P235TR1-low Si	Std.	0.16	1.20	0.35	0.025	0.020	0.30	0.30	-	0.30	0.08
94036	DIN EN 10217-1	P235TR2-low Si	Std.	0.16	1.20	0.35	0.025	0.020	0.30	0.30	0.02	0.30	0.08

Explanations

1) Cu+Cr+Mo+Ni = 0.70 max

Mechanical Properties															
Çolakoglu Quality ID	Std.	Quality	Re ⁽¹⁾		Rm ⁽¹⁾	A(%)		Impact (long.) ⁽²⁾ min.							
			N/mm ²					Temp.		KVc		Temp.		KVc	
			d≤16	16<d≤40		l	t	°C	J	°C	J	°C	J	°C	J
			min.	min.	min.	min.	min.								
94235	DIN EN 10217-1	P235TR1	235	225	360-500	25	23	0	-	-10	-	0	-		
94236	DIN EN 10217-1	P235TR2	235	225	360-500	25	23	0	40	-10	28	0	27		
94035	DIN EN 10217-1	P235TR1-low Si	235	225	360-500	25	23	0	-	-10	-	0	-		
94036	DIN EN 10217-1	P235TR2-low Si	235	225	360-500	25	23	0	40	-10	28	0	27		

Explanations

1) Tensile tests are applied to "Transversal" test samples.

2) Impact tests are applied to "Transversal" and "Longitudinal" test samples.

**LOW ALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR COLD DRAWING & NORMALIZING
(SUITABLE FOR CLASS 1 GALVANIZING Std.)**

Standard: DIN EN 10025 Part 2-2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cu	Ti	N ppm	Nb	Ceq
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
54510	DIN EN 10025-2	S355JR+N-low Si (Fe510DTCL)	Std.	0.24	1.60	0.55	0.035	0.035	0.55	0.01-0.03	120	0.005-0.03	0.45

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽²⁾		A(%), min.					Impact (long.) ⁽³⁾	
			N/mm ²		N/mm ²		A80			A5		Temp.	KVc
			min.	min.	d : thickness, mm		d : thickness, mm						
			d : thickness, mm		d : thickness, mm		d : thickness, mm		d : thickness, mm				
			≤16	16<d≤40	<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	J
54510	DIN EN 10025-2	S355JR+N ⁽¹⁾ low Si Fe510DTCL	355	345	510-680	470-630	13	14	15	16	20	+20	27 ⁽⁴⁾

Explanationsq

- 1) Grades with N code can be normalized and/or hot formed by customers.
- 2) Tensile tests are applied to "Transversal" test samples.
- 3) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 4) Impact tests are carried out if it is customer's request in order.

LOW ALLOYED GENERAL STRUCTURAL AND TUBE STEELS SUITABLE FOR NORMALISING

Standard: DIN EN 10025 Part 2-2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cu	Ti	N ppm	Nb	Ceq
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.
51520	DIN EN 10025-2	S355JR+N (Fe520DTCL)	Std.	0.24	1.60	0.55	0.035	0.01	0.55	0.01-0.03	120	0.005-0.03	0.45
51530	DIN EN 10025-2	S355JR+N (Fe510DTCL1)	Std.	0.19-0.22	1.30-1.60	0.18-0.25	0.02	0.003	0.55	0.01-0.03	120	0.02-0.035	0.45

Explanations

- 1) Mechanical test is not applied.

**UNALLOYED STRUCTURAL STEELS SUITABLE FOR HOT FORMING (SRM PIPE PRODUCTION)
 COLD ROLLING, NORMALIZING & GALVANIZING**
Standard: DIN EN 10025-Part 2-2004
Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C (max.)		Mn	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾
				d≤16	16<d≤40							
41235	DIN EN 10025-2	S235JR+N-low Si	Std.	0.17	0.17	1.4	0.035	0.035	0.55	—	0.012	0.35
42235	DIN EN 10025-2	S235JR+N	Std.	0.17	0.17	1.4	0.025	0.025	0.55	0.020	—	0.35
41275	DIN EN 10025-2	S275JR+N-low Si	Std.	0.21	0.21	1.5	0.035	0.035	0.55	—	0.012	0.40
42275	DIN EN 10025-2	S275J2+N-low Si	Std.	0.18	0.18	1.5	0.025	0.025	0.55	—	0.012	0.40

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
 2) Ceq is calculated by %CE (IIW) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽²⁾		A(%), min.					Impact (long.) ⁽³⁾	
			N/mm ²		d : thickness, mm		A80				A5	Temp.	KVc
			min.	min.	d : thickness, mm		d : thickness, mm						min.
			≤16	16<d≤40	<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	
41235	DIN EN 10025-2	S235JR+N-low Si	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽⁴⁾
42235	DIN EN 10025-2	S235JR+N	235	225	360 - 510	360 - 510	16	17	18	19	24	-20	27
41275	DIN EN 10025-2	S275JR+N-low Si	275	265	430-580	410-560	14	15	16	17	21	+20	27 ⁽⁴⁾
42275	DIN EN 10025-2	S275J2+N-low Si	275	265	430-580	410-560	14	15	16	17	21	-20	27

Explanations

- 1) Grades with N code can be normalized and/or hot formed by customers.
 2) Tensile tests are applied to "Transversal" test samples.
 3) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
 4) Impact tests are carried out if it is customer's request in order.

UNALLOYED STRAP STEELS FOR COLD ROLLING & GALVANIZING

Standard: DIN EN 10025-Part 2-2004

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	C (max.)		Mn	Si	P	S	Cu	Al ⁽¹⁾	N ⁽¹⁾	Ceq ⁽²⁾	
			d≤16	16<d≤40									max.
51238	DIN EN 10025-2	S235JR Strap Steel	Std.	0.17	0.17	1.4	—	0.035	0.035	0.55	—	0.012	0.35
54238	DIN EN 10025-2	S235JR Strap Steel with low Si	Std.	0.21	0.21	1.5	—	0.035	0.035	0.55	—	0.012	0.35

Explanations

- 1) The maximum value for nitrogen does not apply if the chemical composition shows a minimum aluminium content of 0.020 %.
- 2) Ceq is calculated by %CE (IIV) = C+Mn/6+(C+Mo+V)/5+(Ni+Cr)/15 formula.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re		Rm ⁽¹⁾		A(%), min.					Impact (long.) ⁽²⁾	
			N/mm ²		N/mm ²		A80			A5		Temp.	KJc
			min.	min.	d : thickness, mm		d : thickness, mm						
			≤16	16<d≤40	<3	3≤d<40	1<d≤1.5	1.5<d≤2	2<d≤2.5	2.5<d≤3	3≤d≤40	°C	J
51238	DIN EN 10025-2	S235JR Strap Steel	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽³⁾
54238	DIN EN 10025-2	S235JR Strap Steel with low Si	235	225	360 - 510	360 - 510	16	17	18	19	24	+20	27 ⁽³⁾

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

STRUCTURAL STEELS FOR SHIP BUILDING								
Standard: ABS-Part 2-2013								
Chemical Composition (%)								
Colakoglu Quality ID	Std.	Quality		C	Si	Mn	P	S
			Std.	max.	max.	max.	max.	max.
57701	ABS-Part 2-2013	ABS Grade A	Std.	0.21	0.50	2.5XC	0.035	0.035
57702	ABS-Part 2-2013	ABS Grade B	Std.	0.21	0.35	0.60	0.035	0.035

Explanations

1) C+(Mn/6) value should be max. %0.40.

Mechanical Properties							
Colakoglu Quality ID	Std.	Quality				Impact ⁽²⁾ (tran.)	
			Re(min.)	Rm ⁽¹⁾	A 5 (%)	Temp.	KVc (min.)
			N/mm ²		min.	°C	J
57701	ABS-Part 2-2013	ABS Grade A	235	400-520	22	20	-
57702	ABS-Part 2-2013	ABS Grade B	235	400-520	22	0	27

UNALLOYED GENERAL STRUCTURAL STEEL								
Standard: JIS G3101-2005								
Chemical Composition (%)								
Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S
			Std.	max.	max.		max.	max.
93400	JIS G 3101	SS400	Std.	-	-	-	0.050	0.050

Mechanical Properties									
Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾		Rm ⁽¹⁾	A (%)			Bending
			N/mm ²		N/mm ²	(d=thickness)			(long.;180°)
			≤16	16<d≤40		d≤5	5<d≤16	16<d≤50	(d=thickness)
			min.	min.	min.	min.	min.	min.	mrB
93400	JIS G 3101	SS400	245	235	400-510	21	17	21	1.5d

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

CHROME ADDED GENERAL STRUCTURAL STEELS									
Standard: JIS G3101-2005									
Chemical Composition (%)									
Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	
			Std.	max.	max.		max.	max.	
93430	JIS G 3101	SS400-with Cr	Std.	-	-	-	0.050	0.050	

Mechanical Properties									
Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾		Rm ⁽¹⁾	A (%)			Bending
			N/mm ²		N/mm ²	(d=thickness)			(long.;180°)
			≤16	16<d≤40		d≤5	5<d≤16	16<d≤50	(d=thickness)
			min.	min.	min.	min.	min.	min.	mrB
93430	JIS G 3101	SS400-with Cr	245	235	400-510	21	17	21	1.5d

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

BORON ADDED GENERAL STRUCTURAL STEELS									
Standard: JIS G3101-2005									
Chemical Composition (%)									
Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	B
			Std.	max.	max.		max.	max.	ppm
93420	JIS G 3101	SS400-with B	Std.	-	-	-	0.050	0.050	20-50

Mechanical Properties									
Colakoglu Quality ID	Std.	Quality	Re ⁽¹⁾		Rm ⁽¹⁾	A (%)			Bending
			N/mm ²		N/mm ²	(d=thickness)			(long.;180°)
			≤16	16<d≤40		d≤5	5<d≤16	16<d≤50	(d=thickness)
			min.	min.	min.	min.	min.	min.	mrB
93420	JIS G 3101	SS400-with B	245	235	400-510	21	17	21	1.5d

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

**HOT ROLLED LOW CARBON COMMERCIAL QUALITY STEELS
SUITABLE FOR COLD FORMING**

Standard: JIS G3131-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S
				max.	max.		max.	max.
93111	JIS G 3131	SPHC	Std.	0.15	0.60	-	0.050	0.050

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm ⁽¹⁾	A (%)						Bending
			N/mm ²	(d=thickness)						(long.;180°) (mrb)
				1.2≤d<1,6	1.6≤d<2.0	2.0≤d<2.5	2.5≤d<3.2	3.2≤d<4.0	4.0≤d	(d=thickness 3.2≤d)
				min.	min.	min.	min.	min.	min.	
93111	JIS G 3131	SPHC	270	27	29	29	29	31	31	0.5d

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

**LOW CARBON STEELS WITH BORON SUITABLE
FOR COLD FORMING**

Standard: JIS G3131-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	B
				max.	max.		max.	max.	ppm
93211	JIS G 3131	SPHC-with B	Std.	0.15	0.60	-	0.050	0.050	20-50

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm ⁽¹⁾	A (%)						Bending
			N/mm ²	(d=thickness)						(long.;180°) (mrb)
				1.2≤d<1,6	1.6≤d<2.0	2.0≤d<2.5	2.5≤d<3.2	3.2≤d<4.0	4.0≤d	(d=thickness 3.2≤d)
				min.	min.	min.	min.	min.	min.	
93211	JIS G 3131	SPHC-with B	270	27	29	29	29	31	31	0.5d

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

**HOT ROLLED LOW CARBON PIPE AND PROFILE STEELS SUITABLE
FOR COLD FORMING AND GALVANIZING**

Standard: JIS G3132-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S
				max.	max.	max.	max.	max.
93270	JIS G 3132	SPHT-1	Std.	0.10	0.50	0.040	0.040	0.040
93340	JIS G 3132	SPHT-2	Std.	0.18	0.60	0.35	0.040	0.040

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Rm ⁽¹⁾	A (%)				Bending	
			N/mm ²	(d=thickness)				(long.;180°) (mrb)	
				1.2≤d<1,6	1.6≤d<3.0	3.0≤d<6.0	6.0≤d≤13	(d=thickness 3.2≤d)	
				min.	min.	min.	min.	3.0≤d	3.0<d≤13
93270	JIS G 3132	SPHT-1	270	30	32	35	37	-	0.5d
93340	JIS G 3132	SPHT-2	340	25	27	30	32	1d	1.5d

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

ATMOSPHERE CORROSION RESISTANT STEELS

Standard: JIS G3125-2005

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Si	Mn ⁽¹⁾	P	S	Cu	Cr	Ni
				max.		max.		max.			
93125	JIS G3125	SPA - H	Std.	0.12	0.20 - 0.75	0.60	0.070-0.150	0.035	0.25 - 0.55	0.30 - 1.25	0.65

Explanations

1) Upper limit for Mn can be 1 % by agreement.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality		Re	Rm ⁽¹⁾	A (%)		Bending	
			Sample Thickness	N/mm ²		A50	A200	(long.;180°) mrb	
				(d=thickness)	min.	min.	min.	min.	(d=thickness)
				d≤6	355	490	22	15	0.5 d
6<d≤16	355	490	1.5 d						

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING & BENDING

Standard: AS NZS 1594-2002

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Cu	Al	Ti	N ppm	Ceq
				max.	max.	max.	max.	max.	max.	max.	max.	max.	min.	max.	max.
94250	AS NZS 1594	HA250-low SF ⁽¹⁾	Std.	0.20	1.20	0.35	0.040	0.030	0.25	0.25	0.25	0.10	0.040	120	0.39

Explanations

1) Nb+V = % 0.03 max.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)						Bending		
			N/mm ²		d≤3			3<d			(tran.;180°, d=thickness, mdb)		
			min.	min.	A50	A80	A200	A50	A80	A200	d≤3	3<d≤5	5<d
94250	AS NZS 1594	HA250-low SF ⁽¹⁾	250	350	22	20	16	26	24	17	d	d	2d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
- 2) Bending tests are applied to "Transverse" test samples.

UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING & BENDING

Standard: AS NZS 1594-2002

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Cu	Al	Ti	N ppm	Ceq
				max.	max.	max.	max.	max.	max.	max.	max.	max.	min.	max.	max.
94350	AS NZS 1594	HA350-low SF ⁽¹⁾	Std.	0.20	1.6	0.35	0.040	0.030	0.25	0.25	0.25	0.10	-	120	0.44

Explanations

1) For the quality HA350, V could be %0.10 max. or Nb+V+Ti could be %0.15 max.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A(%)						Bending		
			N/mm ²		d≤3			3<d			(tran.;180°, d=thickness, mdb)		
			min.	min.	A50	A80	A200	A50	A80	A200	d≤3	3<d≤5	5<d
94350	AS NZS 1594	HA350-low Si	350	430	18	16	14	22	20	15	2d	2d	3d

Explanations

- 1) Tensile tests are applied to "Longitudinal" test samples.
- 2) Bending tests are applied to "Transverse" test samples.

UNALLOYED GENERAL STRUCTURAL STEELS

Standard: CSAG40

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cu	Al	N ppm
				max.			max.	max.		min.	max.
96350	CSAG40	350 WT	Std.	0.22	0.80-1.50	0.15-0.40	0.03	0.04	0.20-0.60	0.02	120

Explanations

1) Nb + V = % 0.15 max.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm			A(%)		Impact (long.)	
			N/mm ²			A50	A200	Temp.	KVc (min)	
			min.	min.	max.	min.	min.	°C	J	
96350	CSAG40	350 WT	350	450	650	19	22	-20	27	

HIGH STRENGTH & MICROALLOYED STEELS SUITABLE FOR COLD FORMING & BENDING

Standard: SAE J2340-1999-10

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C	P	S	Cr	Ni	Cu	Mo	V	Ti	Nb
				max.	max.	max.	max.	max.	max.	max.	min.	max.	min.
38340	SAE J2340	340XF	Std.	0.13	0.060	0.015	0.150	0.200	0.200	0.060	0.005	0.005	0.005
38420	SAE J2340	420XF	Std.	0.13	0.060	0.015	0.150	0.200	0.200	0.060	0.005	0.005	0.005

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm	A(%)
			N/mm ²		A50
			min.	min.	
38340	SAE J2340	340XF	340-440	410	25
38420	SAE J2340	420XF	420-520	490	22

Explanations

1) Tensile tests are applied to "Longitudinal" test samples.

HOT ROLLED CARBON STEELS											
Std. : SAE J403-2001											
Chemical Composition (%)											
Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	P	S	Cu	Ni	Cr	Mo
						max.	max.	max.	max.	max.	max.
91006	SAE J 403	SAE 1006	Std.	0.08	0.25-0.40	0.030	0.050	0.35	0.25	0.20	0.06
91008	SAE J 403	SAE 1008	Std.	0.10	0.30-0.50	0.030	0.050	0.35	0.25	0.20	0.06
91108	SAE J 403	SAE 1008-Modified	Std.	0.10	0.30-0.50	0.030	0.050	0.35	0.25	0.20	0.06
91010	SAE J 403	SAE 1010	Std.	0.08 - 0.13	0.30 - 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91110	SAE J 403	SAE 1010-Modified	Std.	0.08 - 0.13	0.30 - 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91012	SAE J 403	SAE 1012	Std.	0.10- 0.15	0.30- 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91112	SAE J 403	SAE 1012-High Mn	Std.	0.10- 0.15	0.30- 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91015	SAE J 403	SAE 1015	Std.	0.13 - 0.18	0.30 - 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91017	SAE J 403	SAE 1017	Std.	0.15-0.20	0.30 - 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91018	SAE J 403	SAE 1018	Std.	0.15 - 0.20	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91118	SAE J 403	SAE 1018-Modified	Std.	0.15 - 0.20	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91020	SAE J 403	SAE 1020	Std.	0.18 - 0.23	0.30 - 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91121	SAE J 403	SAE 1020-low Si	Std.	0.18 - 0.23	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91022	SAE J 403	SAE 1022-Modified	Std.	0.18 - 0.23	0.70 - 1.00	0.030	0.050	0.35	0.25	0.20	0.06
91222	SAE J 403	SAE 1022-high Mn	Std.	0.17-0.22	0.70 - 1.60	0.030	0.050	0.35	0.25	0.20	0.06
91122	SAE J 403	SAE 1022-low Si	Std.	0.18 - 0.23	0.70 - 1.00	0.030	0.050	0.35	0.25	0.20	0.06
91025	SAE J 403	SAE 1025	Std.	0.22 - 0.28	0.30 - 0.60	0.030	0.050	0.35	0.25	0.20	0.06
91026	SAE J 403	SAE 1026	Std.	0.22 - 0.28	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91030	SAE J 403	SAE 1030	Std.	0.28 - 0.34	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06

HOT ROLLED MEDIUM & HIGH CARBON STEELS											
Standard: SAE J403-2001											
Chemical Composition (%)											
Colakoglu Quality ID	Std.	Quality	Std.	C	Mn	P	S	Cu	Ni	Cr	Mo
						max.	max.	max.	max.	max.	max.
91040	SAE J 403	SAE 1040	Std.	0.37- 0.44	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91045	SAE J 403	SAE 1045	Std.	0.43 - 0.50	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91145	SAE J 403	SAE 1045-Special	Std.	0.42 - 0.48	0.50 - 0.80	0.030	0.050	0.35	0.25	0.20	0.06
91050	SAE J 403	SAE 1050	Std.	0.48 - 0.55	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06
91055	SAE J 403	SAE 1055	Std.	0.5 - 0.6	0.6 - 0.9	0.030	0.050	0.35	0.25	0.20	0.06
91060	SAE J 403	SAE 1060	Std.	0.55 - 0.65	0.60 - 0.90	0.030	0.050	0.35	0.25	0.20	0.06

HOT ROLLED MEDIUM & HIGH CARBON STEELS

Std. :SAE J 404-2000

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality	C	Mn	P	S	Si	Ni	Cr	Mo
			max.	max.	max.	max.	max.	max.	max.	max.
92130	SAE J 404-2000	SAE 4130	0.28-0.33	0.40-0.60	0.030	0.040	0.15-0.35	-	0.80-1.10	0.15-0.25

STEELS FOR PIPE LINES

Standard: API 5L 45th Edition-2012/ISO 3183-2012

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C ⁽³⁾	Mn ⁽³⁾	P	S	Cr	Ni	Cu	Mo	B
				max.	max.	max.	max.	max.	max.	max.	max.	max.
95130	API 5L / ISO 3183	A PSL1 / L210 PSL1	Std.	0.22	0.90	0.030	0.030	0.50	0.50	0.50	0.15	10
95135 ⁽¹⁾⁽²⁾	API 5L / ISO 3183	B PSL1 / L245 PSL1	Std.	0.26	1.20	0.030	0.030	0.50	0.50	0.50	0.15	10
95142 ⁽¹⁾	API 5L / ISO 3183	X42 PSL1 L290 PSL1	Std.	0.26	1.30	0.030	0.030	0.50	0.50	0.50	0.15	10
95146 ⁽¹⁾	API 5L / ISO 3183	X46 PSL1 L320 PSL1	Std.	0.26	1.40	0.030	0.030	0.50	0.50	0.50	0.15	10
95152 ⁽¹⁾	API 5L / ISO 3183	X52 PSL1 L360 PSL1	Std.	0.26	1.40	0.030	0.030	0.50	0.50	0.50	0.15	10
95156 ⁽¹⁾	API 5L / ISO 3183	X56 PSL1 L390 PSL1	Std.	0.26	1.40	0.030	0.030	0.50	0.50	0.50	0.15	10
95160 ⁽¹⁾	API 5L / ISO 3183	X60 PSL1 L415 PSL1	Std.	0.26	1.40	0.030	0.030	0.50	0.50	0.50	0.15	10
95165 ⁽¹⁾	API 5L / ISO 3183	X65 PSL1 L450 PSL1	Std.	0.26	1.45	0.030	0.030	0.50	0.50	0.50	0.15	10
95170 ⁽¹⁾	API 5L / ISO 3183	X70 PSL1 L485 PSL1	Std.	0.26	1.65	0.030	0.030	0.50	0.50	0.50	0.15	10

Explanations

1) Nb+V+Ti≤0.15

2) Nb+V≤0.06

3) For each reduction of 0.01 % for carbon, an increase of 0.05 % for manganese is permitted, up to a maximum of 1.65 % for L245, L290, L320 and L360 grades, 1.75 % for X56, X60 and X65 grades, 2.00% for X70 grade.

4) For L360/X52 and lower grades, 0.5 % Cr : % 0.5, Ni : % 0.5 and Mo : % 0.15 is permitted.

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	Af(%)
			N/mm ²		
			min.	min.	min.
95130	API 5L / ISO 3183	A PSL1 / L210 PSL1	210	335	"2"
95135	API 5L / ISO 3183	B PSL1 / L245 PSL1	245	415	"2"
95142	API 5L / ISO 3183	X42 PSL1 L290 PSL1	290	415	"2"
95146	API 5L / ISO 3183	X46 PSL1 L320 PSL1	320	435	"2"
95152	API 5L / ISO 3183	X52 PSL1 L360 PSL1	360	460	"2"
95156	API 5L / ISO 3183	X56 PSL1 L390 PSL1	390	490	"2"
95160	API 5L / ISO 3183	X60 PSL1 L415 PSL1	415	520	"2"
95165	API 5L / ISO 3183	X65 PSL1 L450 PSL1	450	535	"2"
95170	API 5L / ISO 3183	X70 PSL1 L485 PSL1	485	570	"2"

Explanations

1) Tensile tests are applied to "Transversal" test samples.

2) Af % = 1940 Axc0.2 / U0.9 (Axc : Cross sectional area,mm² ;

U : Minimum tensile strength, N / mm²).

STEELS FOR PIPE LINES

Standard: API 5L 45th Edition-2012/ISO 3183-2012

Chemical Composition (%)

Colakoglu Quality ID	Std.	Quality		C ⁽⁵⁾	Mn ⁽⁵⁾	Si	P	S	Cr	Ni	Cu	Mo	Ti	V	Nb	B	C equivalence	
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	ppm, max.
95035 ⁽²⁾	API 5L/ISO 3183	BM PSL2 / L245M PSL2	Std.	0.22	1.20	0.45	0.025	0.015	0.30	0.30	0.50	0.15	0.04	0.05	0.05	10	0.43	0.25
95042 ⁽²⁾	API 5L/ISO 3183	X42M PSL2 / L290M PSL2	Std.	0.22	1.30	0.45	0.025	0.015	0.30	0.30	0.50	0.15	0.04	0.05	0.05	10	0.43	0.25
95046 ^(2,3)	API 5L/ISO 3183	X46M PSL2 / L320M PSL2	Std.	0.22	1.30	0.45	0.025	0.015	0.30	0.30	0.50	0.15	0.04	0.05	0.05	10	0.43	0.25
95052 ^(2,3)	API 5L/ISO 3183	X52M PSL2 / L360M PSL2	Std.	0.22	1.40	0.45	0.025	0.015	0.30	0.30	0.50	0.15	"3"	"3"	"3"	10	0.43	0.25
95056 ^(2,3)	API 5L/ISO 3183	X56M PSL2 / L390M PSL2	Std.	0.22	1.40	0.45	0.025	0.015	0.30	0.30	0.50	0.15	"3"	"3"	"3"	10	0.43	0.25
95060 ⁽⁴⁾	API 5L/ISO 3183	X60M PSL2 / L415M PSL2	Std.	0.12	1.60	0.45	0.025	0.015	0.50	0.50	0.50	0.50	"3"	"3"	"3"	10	0.43	0.25
95065 ⁽⁴⁾	API 5L/ISO 3183	X65M PSL2 / L450M PSL2	Std.	0.12	1.60	0.45	0.025	0.015	0.50	0.50	0.50	0.50	"3"	"3"	"3"	10	0.43	0.25
95070 ⁽⁴⁾	API 5L/ISO 3183	X70M PSL2 / L485M PSL2	Std.	0.12	1.70	0.45	0.025	0.015	0.50	0.50	0.50	0.50	"3"	"3"	"3"	10	0.43	0.25

Explanations

1) Nb+V≤0.06

2) Cu 0.5 % , Cr 0.3 % , Ni 0.3 % and Mo 0.15%

3) Nb+V+Ti≤0.15

4) Cu 0.5 % , Cr 0.5 % , Ni 0.5 % and Mo 0.5%

5) For each reduction of 0.01 % for carbon, an increase of 0.05 % for manganese is permitted, up to a maximum of 1.50 for X42PSL2, X46PSL2 and X52PSL2 1.65 % for X56PSL2, X60PSL2 and X65PSL2 grades and up to a maximum 2.00 % for X70PSL2 grade.

STEELS FOR PIPE LINES

Standard: API 5L 45th Edition-2012/ISO 3183-2012

Mechanical Properties

Colakoglu Quality ID	Std.	Quality	R _t ^(0,5)		R _m ⁽¹⁾		R _t _{0,5l} /R _m	A ₅₀ (%)	Impact ⁽³⁾⁽⁴⁾ (tran.)		DWTT (tran.)
			N/mm ²						Temp.	KVC (min.)	% Shear Area
			min.	max.	min.	max.					
95035	API 5L/ISO 3183	BM PSL2 / L245M PSL2	245	450	415	760	0.93	"2"	0	40	85
95042	API 5L/ISO 3183	X42M PSL2 / L290M PSL2	290	495	415	760	0.93	"2"	0	40	85
95046	API 5L/ISO 3183	X46M PSL2 / L320M PSL2	320	525	435	760	0.93	"2"	0	40	85
95052	API 5L/ISO 3183	X52M PSL2 / L360M PSL2	360	530	460	760	0.93	"2"	0	40	85
95056	API 5L/ISO 3183	X56M PSL2 / L390M PSL2	390	545	490	760	0.93	"2"	0	40	85
95060	API 5L/ISO 3183	X60M PSL2 / L415M PSL2	415	565	520	760	0.93	"2"	0	40	85
95065	API 5L/ISO 3183	X65M PSL2 / L450M PSL2	450	600	535	760	0.93	"2"	0	54	85
95070	API 5L/ISO 3183	X70M PSL2 / L485M PSL2	485	635	570	760	0.93	"2"	0	68	85

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) A50 % = 1944 So0.2 / U0.9 (S0 : Cross sectional area,mm2 ; U : tensile strength N / mm2)
- 3) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 4) Impact tests are carried out if it is customer's request in order.
- 5) DWT tests are applied to "Transverse" test samples.

STEELS FOR CASING AND / OR TUBING

Standard: API 5CT -2011

Chemical Composition (%)

Çolakoglu Quality ID	Std.	Quality		C	Mn	Si	P	S	Cr	Ni	Sn	Cu	Al	Mo	V	Ti	N	B	Ca	Nb
				max.	max.	max.	max.	max.	max.	max.	max.	max.	max.	min.	min.	max.	max.	max.	ppm max.	ppm max.
95254	API 5CT	J55 Upgradeable (Tubing)	Std.	0.25-0.30	1.20-1.40	0.15-0.25	0.015	0.005	0.10	0.07	0.012	0.15	0.015-0.050	0.030	0.008	0.010	90	5	15-50	-
95255	API 5CT	J55 Upgradeable (Casing)	Std.	0.23-0.27	1.20-1.40	0.15-0.30	0.020	0.005	0.15-0.35	0.07	0.012	0.15	0.045 max.	0.030	0.008	0.010	100	5	15-50	-
95256	API 5CT	J55 Upgradeable	Std.	0.23-0.27	1.20-1.40	-	0.020	0.010	-	-	-	-	-	-	0.010	-	-	5	-	-
95257	API 5CT	J55 Upgradeable	Std.	0.24-0.27	1.25-1.35	0.15-0.25	0.020	0.005	0.20-0.30	-	-	-	-	0.08-0.12	0.010	-	-	5	15-50	-
95355	API 5CT	J55 regular	Std.	0.17-0.23	0.90-1.45	0.30	0.020	0.015	0.10	0.10	0.015	0.15	0.015-0.050	0.080	0.06	0.020	100	5	15-50	0.05
95356	API 5CT	J55 regular	Std.	0.22-0.26	1.10-1.30	0.15-0.30	0.020	0.008	0.10	0.07	0.012	0.15	0.015-0.050	0.040	0.008	0.010	90	5	15-50	-
95455	API 5CT	SCT J55 Upgradeable	Std.	0.025-0.029	1.25-1.40	0.20-0.25	0.015	0.005	-	0.07	0.012	0.15	0.045 max.	0.030	0.008	0.018-0.035	100	10-25	15-50	-

Mechanical Properties

Çolakoglu Quality ID	Std.	Quality	Re		Rm ⁽¹⁾		A ₅₀ (%)	Impact (long.) ⁽²⁾	
			N/mm ²					Temp.	KVc (min.)
			min.	max.	min.	max.	min.		
95254	API 5CT	J55 Upgradeable (Tubing)	379	552	517	—	(3)	-20	27
95255	API 5CT	J55 Upgradeable (Casing)	379	552	517	—	(3)	-20	27
95256	API 5CT	J55 Upgradeable	379	552	517	—	(3)	-20	27
95257	API 5CT	J55 Upgradeable	379	552	517	—	(3)	-20	27
95355	API 5CT	J55 regular	379	552	517	—	(3)	-20	27
95356	API 5CT	J55 regular	379	552	517	—	(3)	-20	27
95455	API 5CT	SCT J55 Upgradeable	379	552	517	—	(3)	-20	27

Explanations

- 1) Tensile and Impact tests are applied to "Longitudinal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) A50 (%) = 1944 S0 0.2 / U0.9 (So : sectional area , mm2 ; U : tensile strength, N/mm2)

UNALLOYED GENERAL STRUCTURAL STEELS (FLOOR PLATE)								
Standard: ASTM A 36-2005 Floor Plate Standard: ASTM A786								
Chemical Composition (%)								
Colakoglu Quality ID	Std.	Quality		C ⁽²⁾	Mn ^(1,2)	Si	P	S
				max.		max.	max.	max.
56435 ⁽³⁾	ASTM A 36: 2005	ASTM A 36 ASTM A786	Std.	0.26	0.80-1.20	0.40	0.040	0.050

Explanations

- 1) Upper limit for Mn does not apply if the thickness of strips are 20 mm and thinner.
- 2) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.35
- 3) Optionally, Cu 0.20 % is permitted.

Mechanical Properties								
Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A (%)		Impact ⁽²⁾⁽³⁾	
			N/mm ²		A 50	A 200	Temp.	KVc (min)
			min.	min.	min.	min.	°C	J
56435	ASTM A 36: 2005	ASTM A 36 ASTM A786	250	400 - 550	23	20	-20	40

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.

UNALLOYED GENERAL STRUCTURAL STEELS SUITABLE FOR GALVANIZING (FLOOR PLATE)								
Standard: ASTM A 36-2005 Floor Plate Standard: ASTM A786								
Chemical Composition (%)								
Colakoglu Quality ID	Std.	Quality		C ⁽²⁾	Mn ^(1,2)	Si	P	S
				max.		max.	max.	max.
56437 ⁽³⁾	ASTM A 36: 2005	ASTM A 36 ASTM A786	Std.	0.26	0.80-1.20	0.40	0.040	0.050

Explanations

- 1) Upper limit for Mn does not apply if the thickness of strips are 20 mm and thinner.
- 2) For each reduction of 0.01 % for carbon, an increase of 0.06 % for manganese is permitted, up to a maximum of 1.35.
- 3) Optionally, Cu 0.20 % is permitted.

Mechanical Properties								
Colakoglu Quality ID	Std.	Quality	Re	Rm ⁽¹⁾	A (%)		Impact ⁽²⁾⁽³⁾	
			N/mm ²		A 50	A 200	Temp.	KVc (min)
			min.	min.	min.	min.	°C	J
56437	ASTM A 36: 2005	ASTM A 36 ASTM A786	250	400 - 550	23	20	-20	40

Explanations

- 1) Tensile tests are applied to "Transversal" test samples.
- 2) Impact tests are not carried out if nominal thickness is lesser than 6 mm.
- 3) Impact tests are carried out if it is customer's request in order.





HOT ROLLED FLAT STEEL PRODUCTS

PRODUCTION LIMITS
& TOLERANCES

Group No.	STANDARDS & STEEL GRADES
1	<p>DIN 1614-Part 1 (St22, St22 Low Cu, RRSt23, St24, RRSt 23-with B, St 24-with B) DIN EN 10111 (DD11 Low Cu, DD11, DD11 High Stren, DD12, DD13, DD 11-Titan SIRIA, DD 11-Titan SIRMAC, DD12-with B, DD13-with B) ASTM A 1011 (CS Type B) SAE J403 (SAE 1006, SAE 1006 Low Mn) JIS G3132 (SPHT-1) JIS G3131 (SPHC, SPHC-with B)</p>
2	<p>DIN EN 10025-Part 2 (S235JR, S235JR (Cu+Cr+Ni≤0.35), S235J0, S235J0 (Cu+Cr+Ni≤0.35), S235JR+N, S235JR+Cu, S235J2+N, S235J2C, S235J2C+N, S235J2, S235JR+N Low Si, S235J2+N Low Si, S235JR Strap Steel, S235JR Strap Steel Low Si, S235J2C-Special Jantsa, S235J2C+N (HL 1932-01), S275J2C (HL 1937-02), S235JR-Titan S5092 Rev 27, S235JR-Titan S5095 Rev 4) DIN EN 10025-5 (S235J0W, S235J2W) DIN EN 10028-Part 2 (P235GH) DIN EN 10120 (P245NB) DIN 10217-1 (P235 TR1, P235 TR2, P235 TR1 Low Si, P235 TR2 Low Si) DIN 10217-2 (P235GH Low Si) ASTM A53 (Grade A, Grade B) ASTM A 283 (Grade C) ASTM A 1011 (SS Grade 33, SS Grade 36 Type 1) ASTM A 1018 (CS Type B, SS Grade 33, A 1018 SS Grade 36 Type 1) SAE J403 (SAE 1008, SAE 1008 Modified, SAE 1010, SAE 1010 High Mn, SAE 1012, SAE 1012 High Mn) JIS G3132 (SPHT-2) API 5L (A PSL1-L210, B PSL1-L245, BM PSL2 L245M) AS NZS 1594-2002 (HA-250 Low Si)</p>
3	<p>DIN EN 10025-2 (S275JR, S275J2+N, S275J0, S275J2, S275JR+N (Low Si), S275J2+N (Low Si), S275JR+N, S275JRC, S275JRC+N Special, S275J2C, S275J2C+N, S275J2C (HL 1937-03) S275J2C+N) (Jantasa), S275J0-Titan SIRMAC, S275J0-Titan SIRMAC) DIN EN 10028-2 (P265 GH, P295 GH) DIN EN 10120 (P265 NB, P310 NB) DIN EN 10149-2 (S280MC Special, S315MC, S355MC, S355MC Special, S355MC-Titan S5088 Rev 10) DIN EN 10207-2005 (P275SL) DIN 10217-3 (P275NL1 Low Si) ASTM (A 36) ASTM A 1011 (SS Grade 36 Type 2, HSLAS Grade 45 Class 2, HSLAS Grade 50 Class 2) ASTM A 1018 (SS Grade 36 Type 2, SS Grade 40, HSLAS Grade 45 Class 1, HSLAS Grade 45 Class 2) ASTM A 500 (Grade B) ASTM A786 (ASTM A 36) SAE J403 (SAE 1015, SAE 1017, SAE 1018, SAE 1018-Special (Low S), SAE 1020, SAE 1022, SAE 1021 Low Si, SAE 1022 Low Si, SAE 1022 High Mn) JIS G 3125 (SPA-H), JIS G 3101 (SS400, SS400 with B, SS400 with Cr), API 5L (X42 PSL1 L290, X46 PSL1 L320, X42N PSL2 L290M, X46N PSL2 L320M) ABS-Part 2-2013 (Grade A, Grade B) UPI (37726, 37743) SAE J2340-1999-10 (340 XF, 420XF)</p>

Group No.	STANDARDS & STEEL GRADES
4	<p>DIN EN 10025-2 (S355JR, S355J2 Low Si, S355JR+N Low Si, S355JR-Special, S355JR+N Low Si (Fe510DTCL), S355JR+N (Fe520DTCL), S355J0, S355J0 Low Si, S355J2 Low Si, S355J2+N (Low Si), S355J0C Low Si, S355J2, S355J2C Low Si, S355J2C, S355J2C Low Si, S355J2C+N, S355J2C+N-Special, S355J2+N, S355J2+N+Cu, S355J2C (S355J2C+N) (Jantaş), S355J2C+N (Jantaş), S355J2C (HL 1953-01, E335, S355J0-Titan SIRMAC, S355JR+N (Fe510DTCL))</p> <p>DIN EN 10025-5 (S355J0W, S355J2W, S355J0WP, S355J2WP)</p> <p>DIN EN 10028 (P355 GH, P355 NL1)</p> <p>DIN EN 10083-2/3 (28Mn6, 27MnCrB5-2, 30MnB5, 34MnB5, 26MnB5, 22MnB5)</p> <p>DIN EN 10120 (P355NB) DIN EN 10338 (HDT 580X-DP600, HCT 600X-DP600)</p> <p>ASTM A 500 (Grade C)</p> <p>ASTM A 572 (Grade 50 Type 1, Grade 50 Type 2, Grade 55 Type 1, Grade 55 Type 2, Grade 60 Type 1)</p> <p>ASTM A 1011 (SS Grade 50 Low Si, SS Grade 50, SS Grade 55 Low Si, SS Grade 55, HSLAS (Grade 50 Class 1, Grade 50 Class 1-Si, Grade 50 Class 1-Cu, Grade 55 Class 1, Grade 55 Class 1-Si, Grade 55 Class 2))</p> <p>ASTM A 1018 HSLAS (Grade 50 Class 1, Grade 50 Class 1-Cu, Grade 50 Class 1-Si, Grade 55 Class 1, Grade 55 Class 1-Si, Grade 50 Class -Si+Cu, Grade 50 Class 2, Grade 55 Class 2)</p> <p>SAE J403 (SAE 1025, SAE 1025, SAE 1030).</p> <p>SAE J404-2000 (SAE 4130)</p> <p>CSAG40 (350 WT)</p> <p>AS NZS 1594-2002 (HA-350 Low Si)</p>
5	<p>SAE J403 (SAE 1040, SAE 1045, SAE 1045-Özel, C35E, C45E+Cr),</p> <p>API 5CT (J55 regular (casing&tubing), J55 upgradeable (tubing), J55 upgradeable (casing), J55 upgradeable, 5CT J55 (upgradeable))</p>
6	<p>SAE J403 (SAE 1050, SAE 1055, SAE 1060, C60E, C60E+Cr, C60E-1-Cr)</p>
7	<p>DIN EN 10149-2 (S420MC, S420MC (HX420LAD), S420MC (HL-2242-01), S420MC with Si)</p> <p>ASTM A 1011 HSLAS (Grade 60 Class 1, Grade 60 Class 1-Cu, Grade 60 Class 2,)</p> <p>ASTM A 1018 HSLAS (Grade 60 Class 2, Grade 60 Class 1)</p> <p>ASTM A 1018 HSLAS (Grade 60 Class 2, Grade 60 Class 1)</p> <p>ASTM A 516 (Grade 60)</p> <p>API 5L (X52 PSL1 L360, X56 PSL1 L390, X56 PSL 1 L390, X52M PSL2 L360M, X56M PSL2 L390M, X60 PSL1 L415, X60M PSL2 L415M,)</p>
8	<p>DIN EN 10149-2 (S460MC (HL-6000-02), S460MC, S460MC Si'lu)</p> <p>DIN EN 10025-3 (S420N-Special (SAH540))</p> <p>API 5L (X65 PSL1 L450, X65M PSL2 L450M)</p> <p>ASTM A 1018 HSLAS (Grade 65 Class 2)</p> <p>ASTM A 572 (Grade 65 Type 1)</p>
9	<p>DIN EN 10149-2 (S500MC, S500MC with Si, S550MC, S550MC with Si, S600MC, S700MC)</p> <p>ASTM A 1011 HSLAS (Grade 70 Class 2)</p> <p>ASTM A 1018 HSLAS (Grade 70 Class 2)</p> <p>SAE J403 (SAE 1070, SAE 1080)</p> <p>DIN EN 10025-3 (SS 36 Type 2)</p> <p>API 5L (X70 PSL1 L485, X70M PSL2 L485M)</p> <p>DIN EN 10338 (HCT780X (DP 780), HDT780C (CP 800))</p>

STANDARD HOT ROLLED FLAT STEEL COIL PRODUCTION LIMITS

Thickness (mm)	Maximum Width (mm)								
	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8	Group-9
1.00-1.14	1000 **	1000 **							
1.15-1.19	1000	1000							
1.20-1.29	1250	1250							
1.30-1.39	1250*	1250*							
1.40-1.49	1400*	1400*	1150						
1.50-1.59	1500*	1500*	1250	1250					
1.60-1.69	1550	1550	1300	1300					
1.70-1.79	1550	1550	1350*	1350	1000				
1.80-1.99	1650	1550	1400*	1400	1200	1000	1000		
2.00-2.09	1650	1600	1500*	1500*	1250	1000	1200*	1000*	1000*
2.10-2.19	1650	1600	1500*	1500*	1250	1000	1250	1250*	1000
2.20-2.29	1650	1600	1550	1550	1250	1100	1450	1450	1200
2.30-2.39	1650	1650	1650	1650	1450	1150	1450	1450	1200
2.40-2.49	1650	1650	1650	1650	1450	1250	1450	1450	1250
2.50-2.59	1650	1650	1650	1650	1450	1250	1450	1450	1250*
2.60-2.89	1650	1650	1650	1650	1450	1250	1450	1450	1250
2.90-2.99	1650	1650	1650	1650	1650	1450	1450	1450	1250*
3.00-3.09	1650	1650	1650	1650	1650	1450	1650	1650	1650
3.10-3.39	1650	1650	1650	1650	1650	1450	1650	1650	1650
3.40-3.89	1650	1650	1650	1650	1650	1450	1650	1650	1650
3.90-3.99	1650	1650	1650	1650	1650	1650	1650	1650	1650
4.00-4.39	1650	1650	1650	1650	1650	1650	1650	1650	1650
4.40-4.99	1650	1650	1650	1650	1650	1650	1650	1650	1650
5.00-5.79	1650	1650	1650	1650	1650	1650	1650	1650	1650
5.80-18.99	1650	1650	1650	1650	1650	1650	1650	1650	1650
19.00-26.00	1650	1650	1650	1650	1650	1650	1650	1500	1500

(*) There may be a limit differences for some steel grades in the groups with this * sign.

(**) Just for domestic market, export orders shall be discussed at the time of orders.

Notes:

For the coils with 1,5 mm and lower strip thickness, there may be the coil teleskopy, folded and some damage at the inner and outer wraps.

HOT ROLLED FLAT STEEL COIL PRODUCTION LIMITS FOR THE CUSTOMERS THAT SURFACE SENSIBILITY IS IMPORTANT

Thickness (mm)	Maximum Width (mm)								
	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8	Group-9
1.35-1.39	1250								
1.40-1.49	1250								
1.50-1.59	1350	1350	1200						
1.60-1.69	1450	1450	1300	1200*					
1.70-1.79	1500	1500	1350*	1250*					
1.80-1.99	1500	1550	1400*	1300*					
2.00-2.09	1500	1600	1500*	1400*	1250	1000	1200	1000*	
2.10-2.19	1500	1600	1500*	1500*	1250	1000	1250	1250	
2.20-2.29	1500	1600	1550	1550	1250	1100	1450	1450	
2.30-2.39	1500	1650	1650	1650	1450	1150	1450	1450	
2.40-2.49	1500	1650	1650	1650	1450	1250	1450	1450	
2.50-2.59	1550	1650	1650	1650	1450	1250	1450	1450	
2.60-2.89	1550	1650	1650	1650	1450	1250	1450	1450	
2.90-2.99	1550	1650	1650	1650	1650	1450	1450	1450	
3.00-3.09	1650	1650	1650	1650	1650	1450	1650	1650	1650
3.10-3.39	1650	1650	1650	1650	1650	1450	1650	1650	1650
3.40-3.89	1650	1650	1650	1650	1650	1450	1650	1650	1650
3.90-3.99	1650	1650	1650	1650	1650	1650	1650	1650	1650
4.00-4.39	1650	1650	1650	1650	1650	1650	1650	1650	1650
4.40-4.99	1650	1650	1650	1650	1650	1650	1650	1650	1650
5.00-5.79	1650	1650	1650	1650	1650	1650	1650	1650	1650
5.80-18.99	1650	1650	1650	1650	1650	1650	1650	1650	1650
19.00-26.00*	1650	1650	1650	1650	1650	1650	1650	1500	1500*

(*) There may be a limit differences for some steel grades in the groups with this * sign.

Notes:

For the coils with 1,5 mm and lower strip thickness, there may be the coil telescopy, folded and some damage at the inner and outer wraps.

AVAILABLE SLAB LIMITS ACC. TO STRIP THICKNESS

Strip Thickness (mm)	Strip Width (mm)			
	1000-1050	1200-1270	1500	1550
	Slab Length (mm)			
1,1	8000			
1,2	8000			
1,3-1,49	11800	11800		
1,5	11800	11800		
1,8	11800	11800		
2	11800	11800		9000*
3			10000*	
4			10000*	

Notes:

- * Specified limitations, due to the legal obligations for overland transport.
Longer slabs can be used for orders which will be shipped by vessels.
- For 1,3mm and lower strip thickness, 5800mm slabs shall be preferred.

CALCULATED STEEL COIL WEIGTHS DEPENDING ON THE SLAB LENGTHS

		Slab Length (mm)					
		5800	7300	8000	9000	10000	11800
Coil Width (mm)	900		11.1	12.2			18
	950		12.4	13.5			20
	1000	9.8	12.4	13.5			20
	1050	10.3	13.6	14.2			21
	1100	10.7	13.6	14.9			22
	1150	11.2	14.2	15.6			23
	1200	11.7	14.8	16.2			24
	1250	12.2	15.4	16.9			25
	1300	12.8		17.6		22	
	1350	13.3		18.3		22.8	
	1400	13.7		19		23.7	
	1450	14.2		19.6		24.5	
	1500	14.7		20.3		25.4	
	1550	15.2		21	23.6		
	1600	15.7		21.7	24.4		
1650	16.2		22.3				

HOT ROLLED FLAT STEEL COIL TOLERANCES

General

The specified values for tolerances shall not apply to the uncropped ends of the coil for a total length "l" which is calculated using the formula:

$$l (m) = \frac{90}{\text{nominal thickness (mm)}}$$

provided that the result does not exceed 20 meters.

TOLERANCES ON THICKNESS

The tolerances on thickness for continuously hot-rolled low carbon steel sheet/plate for cold forming.

Nominal Thickness (mm)	Tolerances for a nominal width (mm)		
	W≤1200	1200<W≤ 1500	1500<W≤ 1650
≤ 2.00	± 0.13	± 0.14	± 0.16
> 2.00 ≤ 2.50	± 0.14	± 0.16	± 0.17
> 2.50 ≤ 3.00	± 0.15	± 0.17	± 0.18
> 3.00 ≤ 4.00	± 0.17	± 0.18	± 0.20
> 4.00 ≤ 5.00	± 0.18	± 0.20	± 0.21
> 5.00 ≤ 6.00	± 0.20	± 0.21	± 0.22
> 6.00 ≤ 8.00	± 0.22	± 0.23	± 0.23

The tolerances on thickness for steels with normal deformation resistance at elevated temperatures are given the table below. These tolerances are indicated as category A.

Nominal Thickness (mm)	Tolerances for a nominal width (mm)		
	W≤1200	1200<W≤ 1500	1500<W≤ 1650
≤ 2.00	± 0.17	± 0.19	± 0.21
> 2.00 ≤ 2.50	± 0.18	± 0.21	± 0.23
> 2.50 ≤ 3.00	± 0.20	± 0.22	± 0.24
> 3.00 ≤ 4.00	± 0.22	± 0.24	± 0.26
> 4.00 ≤ 5.00	± 0.24	± 0.26	± 0.28
> 5.00 ≤ 6.00	± 0.26	± 0.28	± 0.29
> 6.00 ≤ 8.00	± 0.29	± 0.30	± 0.31
> 8.00 ≤ 10.00	± 0.32	± 0.33	± 0.34
> 10.00 ≤ 12.50	± 0.35	± 0.36	± 0.37
> 12.50 ≤ 15.00	± 0.37	± 0.38	± 0.40
> 15.00 ≤ 25.00	± 0.40	± 0.42	± 0.45

The tolerances on thickness for steels exhibiting a high deformation resistance at elevated temperatures shall be increased by the amounts specified in table below.

Category	Deformation Resistance	Increment of Thickness Tolerance
A	235 MPa < Yield Strength ≤ 355 MPa	-
B	355 MPa < Yield Strength ≤ 420 MPa	% 15
C	420 MPa < Yield Strength ≤ 480 MPa	% 30
D	480 MPa < Yield Strength	% 40

Note:

The thickness shall be measured at any point situated at least 40 mm from the edges for products with mill edges. Special thickness tolerances shall be agreed at the time of enquiry and order

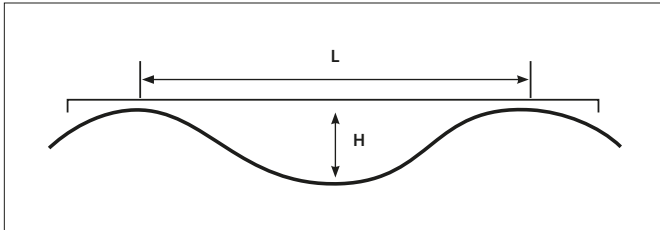
TOLERANCES ON WIDTH

The width shall be measured at right angles to the longitudinal axis of the product.

Nominal Width (mm)	Tolerances (mm)	
	Mill Edges	
	Lower	Upper
$W \leq 1200$	0	+20
$1200 < W \leq 1500$	0	+20
$W > 1500$	0	+25

TOLERANCES ON FLATNESS

Deviation from flatness shall be determined by measuring the deviation in distance between the product and a flat horizontal surface on which it is placed.



Nominal Thickness (mm)	Nominal Width (mm)	Tolerances on Flatness (mm)	Special Tolerances on Flatness (mm)
t≤2	W≤1200	18	9
	1200<W≤1500	20	10
	1500<W	25	13
2<t≤25	W≤1200	15	8
	1200<W≤1500	18	9
	1500<W	23	12

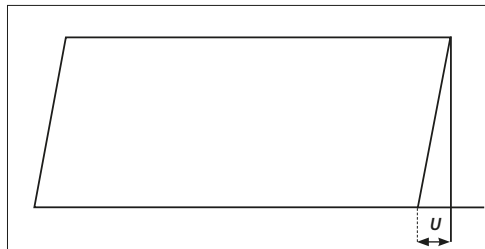
Tolerances on flatness for steels exhibiting a high deformation resistance at elevated temperatures.

For The Grades of Group B, C, D			
Category	Tolerances on Flatness (mm)		
Nominal Thickness t≤ 25 mm	Nominal Width (mm)		
	W≤1200	1200<W≤1500	W>1500
B	18	23	28
C	23	30	38
D	Shall be agreed at the time of enquiry and order.		

OUT OF SQUARENESS TOLERANCES

The out-of-squareness “u” is the orthogonal projection of a transverse edge over a longitudinal edge.

The out-of-squareness “u” measured shall not exceed 1 % of the actual width of the sheet/plate.

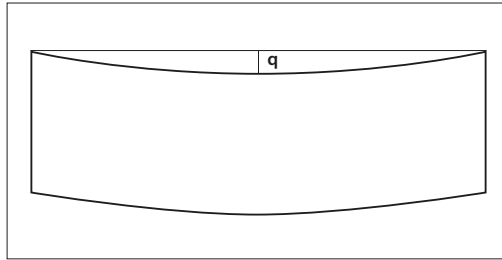


EDGE CAMBER

The Edge Camber is the maximum deviation of a longitudinal edge from a straight edge measuring base applied to it.

The camber is measured on the concave edge.

For sheet /plate the measuring base shall be the length of the product for a nominal length <5000mm.



Type of Product	Dimensions		Gauge Lengths (mm)	Tolerances in "q"(mm)	
	Width (mm)	Length (mm)		Mill Edge	Trimmed Edge
Sheet - Plate	>= 600	>= 5000	5000	20	15
	>= 600	< 5000	Actual Length (L)	+ 0.005 x L	+ 0.005 x L
Coil	>= 600	-	5000	20	15

FORM OF COILS

Coils shall be tightly wound, as round as possible and edge parallel, any gradual displacement of the strip edges in one direction not exceeding 35mm for widths less than 600mm and 60mm for widths not less than 600mm for strip with mill edges.

Unless otherwise is specified at the time of order, deviations from inside diameter tolerances are as follows;

±7% for strip with mill edges.

(DIN 1016-1987)

COIL DIMENSIONS AND WEIGHTS

Tolerances on coil inside diameter and maximum values for outside diameter and coil weight are given in following table.

Description	Values and Tolerance
Inside Diameter	762 +0/-50
Outside Diameter	Max. 2100 mm
Coil Weight	Max. 39 tonnes

FLOOR PLATES (TEARDROP PATTERN) PRODUCTION LIMITS & TOLERANCES

Floor plates produce according to ASTM A786/A786M(2009) with the Pattern No:4.
Production limits are as in follows;

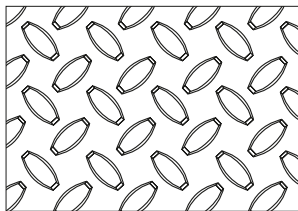
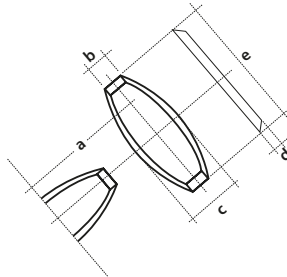
Thick-ness (mm)	Maximum Width (mm)								
	Group1	Group2	Group3	Group4	Group5	Group6	Group7	Group8	Group9
2.0-2.99		1250							
3.0-3.99		1550							
4.0-4.99		1550							
5.0-5.99		1550							
6.0-12.0		1550							

Notes:

Minimum order width is 800 mm.

Other grades shall be discussed at the time of orders.

Minimum mill campaign shall be 2000 m tonnes.



	Dimension
a	~ 30 mm
b	4 +/- 0.5 mm
c	8.5 +/- 1 mm
d	1-2 mm*
e	30 +/- 2 mm

* Except the core thickness between 4 - 2.5 mm for which the height of patern (d) may vary 0.7 mm to 2 mm and core thickness of less than 2.5 mm for which the height of patern (d) may vary 0.5 mm to 2 mm.