東和鋼鐵企業股份有限公司
TUNG HO STEEL ENTERPRISE CORPORATION

鋼板產品型錄 Universal Mill Plate

前 言

隨著東和鋼鐵苗栗廠的窄幅鋼板和扁鋼胚連續鑄造設備先後的投產，東和鋼鐵由長條類鋼品跨足平板類鋼品，成為台灣鋼鐵業中第一家可同時供應鋼板、熱軋H型鋼、鋼筋等建築結構用鋼的專業生產鋼廠。

台灣位處地震頻繁地帶，建築結構設計必須要對耐震功能作更嚴謹的考量，而現行JIS/CNS規範中之熱軋H型鋼由於截面模數及強、弱軸特性之限制，使得國內設計師使用箱型柱(Box Column)及高樑深、寬翼緣、大厚度組合H型鋼來搭配熱軋H型鋼之情形亦相當普遍，東和鋼鐵為滿足設計者及使用者之需求，以減少裁剪加工及降低鋼材耗損為目標，積極投資扁鋼胚、小鋼胚複合連續鑄造設備，跨足平板類鋼品，投入窄幅鋼板之生產製造。

東和鋼鐵公司本著專業的品質管理制度所生產之窄幅鋼板，不僅能確保建築結構用鋼之安全性，並將依客戶所要求之交期，作計畫性之生產，提供確實配合、如期之交貨規劃，全面滿足客戶在使用上之需求。

With the commissioning of the slab continuous caster and universal plate production at Miaoli Works, Tung Ho Steel has expanded from long product production to flat product production. Tung Ho has become the first dedicated structural steel maker in Taiwan with the capability of supplying hot rolled H-beam, universal mill plate and rebar.

As Taiwan is located in an earthquake zone, protection against earthquake has been the most critically considered element in structural design. Due to the fact the H-beam's structural strength has one stronger axis and one weaker axis, Taiwan's structural designers have also considered using column boxes and jumbo welded beams (BH) in connection with H-beams. Thus, in order to fulfill these diverse needs in steel structural design, and to minimize cutting losses in fabrication, Tung Ho aggressively invests in slab continuous casting machine and expands its steel plate production.

Under Tung Ho's tight quality control system, Tung Ho's steel plate can fulfill the safety requirements in structural design. In addition, Tung Ho's flexible production pattern and production schedule allow timely deliver and complete satisfaction to the customers.

苗栗廠
Miaoli Works

ISO 9001

ISO 14001

OHSAS 18001

TAF Certificate (Chemical Analysis)

TAF Certificate (Physical Testing)

DNV Certificate

ABS Certificate

ABS Certificate

熱軋鋼板
Hot Rolled Universal Mill Plate

成品鋼種（Steel Grades）

（1）JIS / CNS：SS，SM，and SN series
（2）ASTM：A36，A572，A709，and A992 series
（3）BS EN 10025 S275 and S355 series

＊各鋼種可接單尺寸及厚度範圍由業務部門另行通知 (Size and Thickness range availability in each steel grade shall be based upon the most up to date availability chart advised by sales division.)

鋼板標準尺寸表（THS Plate Standard Dimensions Table ）

unit : mm

厚度 (thickness) \ 寬度 (width)	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
12	N/A		●	●	●	●	●	●	●	●	N/A								
13			●	●	●	●	●	●	●	●									
14			●	●	●	●	●	●	●	●									
15			●	●	●	●	●	●	●	●	●	●	●						
16	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
18	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
19	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
22	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
36	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
38	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
50	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

＊鋼板理論重量計算方式（Calculation of theoretical weight for plates）：
1.每片鋼板重量（kg）＝厚度（mm）× 寬度（mm）× 長度（m）× 0.00785 四捨五入至小數點第三位
（Piece weight（kg）= thickness（mm）× width（mm）× length（m）× 0.00785）, final piece weight is rounded to the nearest thousandths）
2.總重量（kg）＝每片鋼板重量（kg）× 總片數（Total weight（kg）= piece weight（kg）× total pieces）
＊長度 6-18 公尺（Length 6-18m）
＊非標準尺寸鋼板接單原則另議。（Non-standard dimension plates are negotiable.）

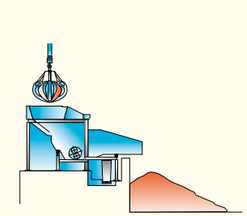
標籤
Lable

（1）ASTM A572 G50
（2）SIZE：PL36×750×15000
（3）HEAT NO：H70223
（4）MFG ORDER NO：02388
（5）東和鋼鐵企業股份有限公司 TUNG HO STEEL ENTERPRISE CORPORATION MADE IN TAIWAN

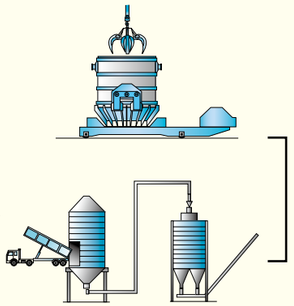
（1）鋼材規範及材質（Steel standard & grade）
（2）鋼板尺寸及長度（Plate dimension & length）
（3）爐號（Heat No.）
（4）工令號（Manufacturing No.）
（5）公司名稱（Producer）

製造流程

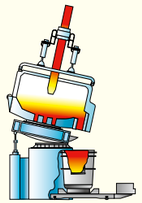
Universal Mill Plate manufacturing flow chart



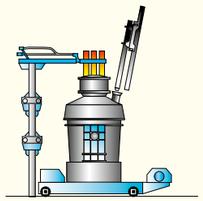
廢鐵前處理
Pretreatment of Raw Material (scrap & pig iron)



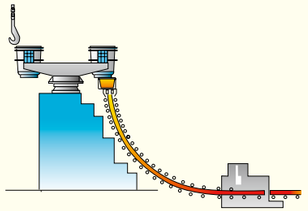
副原料
Sub-Materials



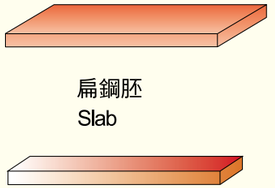
直流電弧爐
D. C. Electric Arc Furnace



精煉爐
Refining Ladle Furnace

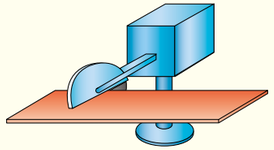


連續鑄造設備
Continuous Casting Machine

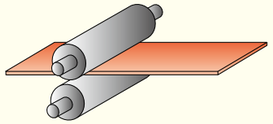


扁鋼胚
Slab

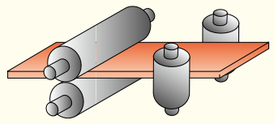
大鋼胚
Bloom



熱間鋸
Hot Saw

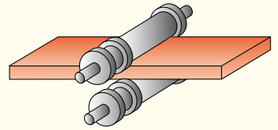


萬能精軋機
Universal Finishing Mill

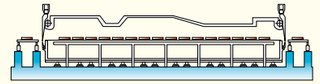


萬能粗軋機
Universal Roughing Mill

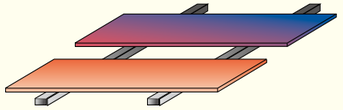
垂直軋邊機
Vertical Edger



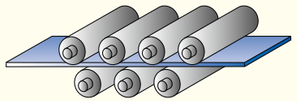
開胚機
Break Down Mill



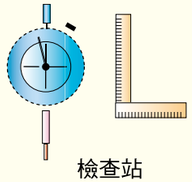
動樑式加熱爐
Reheating Furnace



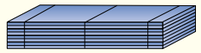
冷卻床
Cooling Bed



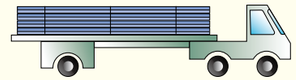
整平機
Leveler



檢查站
Inspection



堆疊捆紮
Piling & Bundling



出貨
Delivery

(a) CNS、JIS & ASTM 結構用鋼材質規範－物理性質

CNS、JIS & ASTM Structurel　Steel Specifications-Physical Property

規　格 Standard	材質代號 Steel Grade	拉力試驗 Tensile Test				彎曲試驗 Bending Test		(c)衝擊試驗 Impact Test		厚度方向特性(斷面縮率%) Reduction ratio of cross section in direction of plate thickness	
		降伏強度 YS: Yield Stress (N/mm²) Fy: Force of Yield (kgf/cm²)			抗拉強度 TS: Tensile Stress (N/mm²) Fu: Force of Ultimate (kgf/cm²)						
		厚度 thickness(mm)									
		t＝16	t＞16 t≦40	t＞40 t≦50							
鋼結構建築用鋼 Steel for structural shapes for use in building framing (ASTM A992-06a)	A992	YS: 345～450 Fy: 3520～4592			TS: ≧450 Fu: ≧4592						
加釩鈮高強度低合金結構用鋼 High-strength low-alloy Columbium-Vanadium structural steel (ASTM A572-07)	A572G50 type3	YS: ≧345 Fy: ≧3520			TS: ≧450 Fu: ≧4592						
結構用碳鋼 Carbon structural steel (ASTM A36-08)	A36	YS: ≧250 Fy: ≧2551			TS: 400～550 Fu: 4082～5612						
建築結構用鋼 Rolled steels for building structure (CNS 13812 G3262-92) (JIS G3136-2005)	SN400A	YS: ≧235 Fy: ≧2398		YS: ≧215 Fy: ≧2194	TS: 400～510 Fu: 4082～5204						
	SN400B	YS: 235～355 Fy: 2398～3622		YS: 215～335 Fy: 2194～3418	TS: 400～510 Fu: 4082～5204						
	SN490B	YS: 325～445 Fy: 3316～4541		YS: 295～415 Fy: 3010～4235	TS: 490～610 Fu: 5000～6224						
	SN490C	YS: 325～445 Fy: 3316～4541		YS: 295～415 Fy: 3010～4235	TS: 490～610 Fu: 5000～6224						
銲接結構用鋼 Rolled steels for welded structure (CNS 2947 G3057-92) (JIS G3106-2008)	SM400A	YS: ≧245 Fy: ≧2500	YS: ≧235 Fy: ≧2398	YS: ≧215 Fy: ≧2194	TS: 400～510 Fu: 4082～5204						
	SM400B										
	SM490A	YS: ≧325 Fy: ≧3316	YS: ≧315 Fy: ≧3214	YS: ≧295 Fy: ≧3010	TS: 490～610 Fu: 5000～6224						
	SM490B										
一般結構用鋼 Rolled steels for general structure (CNS 2473 G3039-95) (JIS G3101-2008)	SS400	YS: ≧245 Fy: ≧2500	YS: ≧235 Fy: ≧2398	YS: ≧215 Fy: ≧2194	TS: 400～510 Fu: 4082～5204						
熱軋結構用鋼 Hot rolled products of structural steels (BS EN 10025-2:2004)	S275JR	YS: ≧275 Fy: ≧2806	YS: ≧265 Fy: ≧2704	YS: ≧255 Fy: ≧2602	TS: 410～560 Fu: 4183～5714						
	S275J0										
	S355JR	YS: ≧355 Fy: ≧3622	YS: ≧345 Fy: ≧3520	YS: ≧335 Fy: ≧3418	TS: 470～630 Fu: 4696～6428						
	S355J0										

拉力試驗 Tensile Test				彎曲試驗 Bending Test		(c)衝擊試驗 Impact Test		厚度方向特性(斷面縮率%) Reduction ratio of cross section in direction of plate thickness	
降伏比(%) Yield Ratio (%)	伸長率(%) Elongation (%)			彎曲角度 Bending Angle	彎曲半徑 Radius of Inside Diameter	試驗溫度 ℃ Test Temp.	吸收能量 J Absorption Energy	三個測試值之平均值 Average of three test value	單一測試值 Single test value
	厚度 thickness(mm)								
	t＝16	t＞16 t≦40	t＞40 t≦50						
≦0.85	(b)≧18			–	–	–	–	–	–
–	(b)≧18			–	–	–	–	–	–
–	(b)≧20			–	–	–	–	–	–
–	≧17	≧21	≧21	–	–			–	–
≦0.80	≧18	≧22	≧22						
	≧17	≧21	≧21			0	≧27		
	≧17	≧21	≧21					≧25	≧15
–	≧18	≧22	≧22	–	–	–	–	–	–
						0	≧27		
–	≧17	≧21	≧21			–	–		
						0	≧27		
–	≧17	≧21	≧21	180°	厚度1.5倍 (1.5 times of thickness)	–	–	–	–
–	l, ≧23 t, ≧21	l, ≧23 t, ≧21	l, ≧22 t, ≧20	–	–	20	≧27	–	–
						0	≧27		
–	l, ≧22 t, ≧20	l, ≧22 t, ≧20	l, ≧21 t, ≧19			20	≧27		
						0	≧27		

(a) 本表所列以 CNS、JIS、BS EN ＆ASTM 結構用鋼板相關材質規範為主，成品厚度範圍為 16～ 50 mm；其他厚度成品物理性質規定請另行查閱相關規範。
(b) ASTM 上述伸長率之規定僅適用於試片平行部長度為 200 mm 之試片，平行部長度為 50 mm 之試片一般實驗室較少使用，請另行查閱相關規範。
(c) JIS 衝擊試驗適用於厚度超過 12mm 之鋼板，其吸收能量試驗值為取三個試片測試值之平均值。

(a) CNS、JIS & ASTM 結構用鋼材質規範－化學成份

CNS、 JIS & ASTM Structural Steel Specifications-Chemical Composition

規　格 Standard	材質代號 Steel Grade	厚度 thickness (mm)	化學成分 Chemical Composition (%) max. 碳 C	矽 Si	錳 Mn	磷 P	硫 S
鋼結構建築用鋼 Steel for structural shapes for use in building framing (ASTM A992-06a)	A992		0.23	0.40	0.50~1.60	0.035	0.045
加釩鈮高強度低合金結構用鋼 High-strength low-alloy Columbium-Vanadium structural steel (ASTM A572-07)	A572G50 type3	16＜t ≦40	(g)(h) 0.23	0.40	(g)(h) 0.80~1.35	0.040	0.050
		40＜t ≦50		0.15~0.40			
結構用碳鋼 Carbon structural steel (ASTM A36-08)	A36	16≦t ≦20	0.25	0.40	–	0.040	0.050
		20＜t ≦40	0.25	0.40	0.80~1.20	0.040	0.050
		40＜t ≦50	0.26	0.15~0.40	0.80~1.20	0.040	0.050
(c) 建築結構用鋼 Rolled steels for building structure (CNS 13812 G3262-92) (JIS G3136-2005)	SN400A		0.24	–	–	0.050	0.050
	SN400B		0.20	0.35	0.60~1.40	0.030	0.015
	SN490B	t ≦40	0.18	0.55	1.60	0.030	0.015
		40＜t ≦50					
	SN490C	t ≦40	0.18	0.55	1.60	0.020	0.008
		40＜t ≦50					
(c) 銲接結構用鋼 Rolled steels for welded structure (CNS 2947 G3057-92) (JIS G3106-2008)	SM400A		0.23	–	(i) ≧2.5C	0.035	0.035
	SM400B		0.20	0.35	0.60~1.40	0.035	0.035
	SM490A		0.20	0.55	1.60	0.035	0.035
	SM490B		0.18	0.55	1.60	0.035	0.035
(c) 一般結構用鋼 Rolled steels for general structure (CNS 2473 G3039-95) (JIS G3101-2008)	SS400		–	–	–	0.050	0.050
熱軋結構用鋼 Hot rolled products of structural steels (BS EN 10025-2:2004)	S275JR	t ≦40	0.21	0.14~0.25	1.50	0.035	0.035
		40＜t ≦50	0.22				
	S275J0	t ≦40	0.18	0.14~0.25	1.50	0.030	0.030
		40＜t ≦50	0.18				
	S355JR	t ≦30	0.24	0.14~0.25	1.60	0.035	0.035
		30＜t ≦50	0.24				
	S355J0	t ≦30	0.20	0.14~0.25	1.60	0.030	0.030
		30＜t ≦40	0.20				
		40＜t ≦50	0.22				
	S450J0	t ≦30	0.20	0.55	1.70	0.030	0.030
		30＜t ≦40	0.20				
		40＜t ≦50	0.22				

(a) 本表所列以 CNS、JIS、BS EN& ASTM 結構用鋼板相關材質規範為主，成品厚度範圍為 16～ 50 mm；其他厚度成品化學成分規定請另行查閱相關規範。
(b) ASTM A36 & A572G50 指定添加銅時，銅含量鋼液分析值不得低於 0.20 %。
(c) JIS SS、SM & SN 必要時可添加表列以外之元素。
(d) JIS SN Ceq=C+Mn/6+Si/24+Ni/40+Cr/5+Mo/4+V/14， ASTM A992 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15，BS EN Cev=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15。

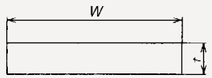
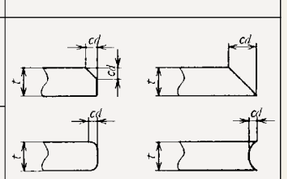
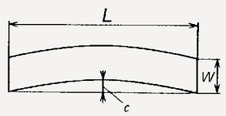
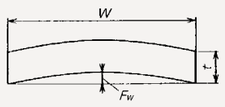
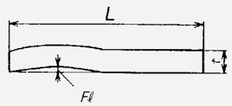
化學成分 Chemical Composition (%) max. 銅 Cu	鎳 Ni	鉻 Cr	鉬 Mo	釩 V	鈮 Nb	錫 Sn	鈦 Ti	氮 N	(d) 碳當量 Ceq/Cev	(e) 銲接破裂感受性組成 Pcm
0.60	0.45	0.35	0.15	(f) 0.15	(f) 0.05	0.02	–	0.012	0.45	–
–	–	–	–	0.01~0.15	0.005~0.05	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	0.36	0.26
–	–	–	–	–	–	–	–	–	0.44	0.29
									0.46	
–	–	–	–	–	–	–	–	–	0.44	0.29
									0.46	
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
0.55	–	–	–	–	–	–	–	0.012	0.40	–
									0.42	–
0.55	–	–	–	–	–	–	–	0.012	0.40	–
									0.42	
0.55	–	–	–	–	–	–	–	0.012	0.45	–
									0.47	
0.55	–	–	–	–	–	–	–	0.012	0.45	–
									0.47	
									0.47	–
0.55	–	–	–	0.13	0.05	–	0.05	0.025	0.47	–
									0.49	
									0.49	–

(e) 焊接破裂感受性組成 Pcm=C+Si/30+Mn/20+Cu/20+Ni/60+ Cr/20+Mo/15+V/10+5B
(f) A992 V+Nb ≦ 0.15%。
(g) A572 G50 Mn/C 比值必須 ≧ 2。
(h) A572 G50 當碳含量規格最大值每減少 0.01% 時，錳含量上限值可增加 0.06%，但是錳含量規格最大值不可超過1.60%。
(i) 碳含量依鋼液分析值之含量。

形狀及尺寸公差 JIS G3194-1998

Shape and Dimension Tolerance

unit:mm

尺寸形狀 Dimension		公差等級 Tolerance Grade				
		A grade	B grade	C grade	D grade	
厚度 Thickness (t)	12≦ t ＜15	± 0.5	± 0.5	+1.1 / -0.3	—	
	15≦ t ＜20	± 0.6	± 0.6	+1.1 / -0.3	—	
	20≦ t ＜25	± 1.0	± 0.8	+1.1 / -0.3	—	
	25≦ t ＜40	± 1.0	± 1.0	+1.4 / -0.3	—	
	40≦ t ≦50	± 1.5	± 1.2	+2.1 / -0.3	—	
寬度 Width (W)	300≦W＜500	± W x 2.0 %	± 3.5	—	—	
	500≦W≦1050	± 10.0	± 3.5	—	—	
長度 Length (L)	—	+200 / -0	+100 / -0	+50 / -0	+25 / -0	
切角 Corner drop (cd)	9≦ t ≦26	—	≦ t x 15 %	—	—	
	27≦ t ≦50	—	≦ 4.0	—	—	
橫曲 Camber (C)	—	≦ L x 0.4 % (and camber of any one meter length must be ≦ 4.0)	≦ L x 0.3 % (and camber of any one meter length must be ≦ 3.0)	≦ L x 0.25 % (and camber of any one meter length must be ≦ 2.5)	—	
寬度方向平坦度 Flatness (Width) (*Fw*)	—	—	≦ W x 0.3 %	—	—	
長度方向平坦度 Flatness (Length) (*Fl*)	—	≦ 20.0 (and flatness of any one meter length must be ≦ 7.0)	≦ 10.0 (and flatness of any one meter length must be ≦ 3.0)	—	—	

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