

Welding Consumables in Industry

Steel Fabrication



TIENTAI

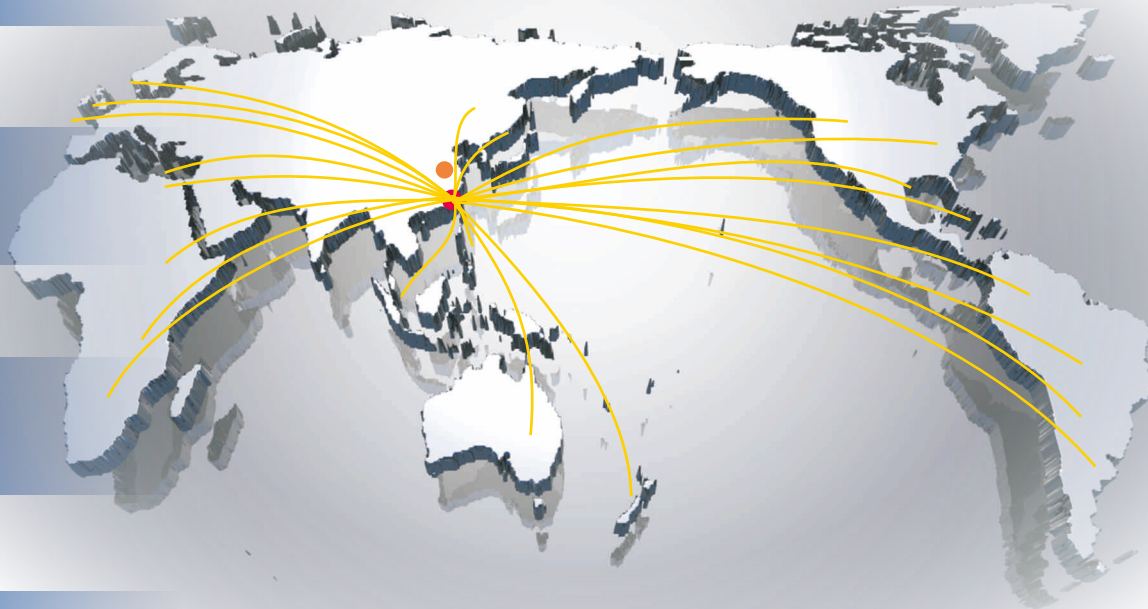
AN ILLINOIS TOOL WORKS COMPANY

[http : / / www.tientai.com](http://www.tientai.com)



TIENTAI ELECTRODE CO., LTD.

ITW- Tradition of Excellence



Illinois Tool Works Inc. (NYSE:ITW) designs and produces an array of highly engineered fasteners and components, equipment and consumable systems, and specialty products and equipment for customers around the world. A Fortune 200 diversified manufacturing company with more than 100 years of history. ITW's 650 decentralized business units in 45 countries employ nearly 49,000 men and women who are focused on creating value-added products and innovative customer solutions.

"During its more than 100 years of existence, ITW's recipe for success has been focused on creating "value-added products for key customers around the world. We do this by growing our business and making acquisitions which provide additional product solutions to our customers.

Many of our best product innovations come from simple observation coupled with a keen understanding of our customers' needs. Most companies design products specifically to increase sales volume. ITW's main goal is not to create a best seller, but to enhance customers. To attain that goal, our product design engineers develop value-added, proprietary products. Our unique approach begins at our customers' plants or worksites. By working closely with our customers. We determine how an ITW product or process could provide a better solution. Proof of our highly innovative culture is seen in our patent activities. In 2004, we had more than 16,000 unexpired patents and pending patent applications worldwide, including 2,900 U.S. Patents and 1,116 pending U.S. Applications. We typically rank in the top 100 of patent issuers in the U.S.

Steel Fabrication



For global Steel Fabrication equipments and construction, TienTai provide consumables with top quality and specialized welding services.



Advantages of Consumable Electrode Arc Welding Processes

- SMAW** : Flexible, all position process; low initial cost; portable; large variety of filler metals available with special characteristics (high deposition, fast travel speed, good fillet weld contour, deep penetration, etc.). Slag requires removal.
- GMAW** : Relatively flexible; requires wire feeder and external gas; need a special power source for all position capability; higher deposition rates than SMAW; no slag; can be adapted to mechanized, automatic, and robotic welding.
- FCAW** : Relatively flexible; requires wire feeder, and most electrodes require external gas; all position capability without special power source; higher deposition rate than SMAW and GMAW; can be adapted to mechanized, automatic, and robotic welding; requires slag removal.
- SAW** : Flat and horizontal position only, but very high deposition rate process. Must be mechanized for highest deposition rates. High current power sources, heavy-duty wire feeders, and welding head or workpiece manipulators are high capital cost items. Mechanized SAW is high quality, low-cost process. Flux is required. Slag and excess flux requires removal.

Your Perfect Welding Solutions

The limited page cannot afford whole specific contents of products and techniques. Please contact us if further information required.



Base metal- Filler Metal Combinations for Structure Design

Base Metals	Mild steels and 50kg/mm ² High Tensile Steels		
Kind of Filler Metals	AWS	AWS Classification	Welding Position
TWE-711	A5.20 (FCAW)	E71T-1C	F、H、V (&V-D)、OH
TM-70C		E70T-1C	F、H
TWE-704-O		E70T-4	F、H
TWE-707-O		E70T-7 (DC-)	F、H
TM-56	A5.18 (GMAW) CO ₂	ER70S-6	F、H、V、OH
TM-58		ER70S-G	F、H、V、OH
TM-70、TM-77	A5.20 (FCAW)	E70C-3M、E70C-6M	F、H
TF-385 x TSW-12M	A5.17 (SAW)	F7A0-EM12K	F、H-Fillet
TF-565 x TSW-12M		F7A2-EM12K	F
E-10	A5.1 (SMAW)	E6019	F、H、V、OH
TL-50		E7016	F、H、V、OH
TL-56		E7028	F、H-Fillet
TF-600 x TES-50G SESNET FLUX / WIRE	A5.25 (ESW)	FES70-ES-G-EW	V-UP
TF-600 x TES-50G SESNET FLUX / WIRE			
FabStar-721	A5.26 (EGW)	EG721T-1	V-UP

Your Perfect Welding Solutions

TIENTAI ELECTRODE CO., LTD.

Steel Fabrication



Base Metal-Filler Metal Combinations for Structure Steels

ASTM Steel Specification Requirements					
Steel Specification	Grade	JIS Specification	(Ksi)Minimum yield strength	(Ksi) Tensile range	Grups
A36 ³		SS400 SN400	36	58-80	Carbon steel
A242 ⁴			42-50	63-70	Carbon steel
A441			40-50	60-70	Low-alloy steel
A516	55		30	205	Carbon steel
	60		32	220	Carbon steel
	65		35	65-80	Carbon steel
	70		38	70-90	Carbon steel
A572	42, 50	SS400 SN400	42, 50	60,65	Carbon steel
	60, 65	SM570	60, 65	75,80	Low-alloy steel
A588 ⁴	≤101mm		50	70	Low-alloy steel
A709	36 ³		36	58-80	Low-alloy steel
	50		50	65	Low-alloy steel
	50W ⁴		50	70	Low-alloy steel
	100,100W (63.5-101mm)		90	100-130	Low-alloy steel
	100,100W (≤65mm)		100	100-130	Low-alloy steel

1. Single value means the lowest value.

2. The list A includes TWE-704-O, TWE-707-O, TWE-701, and TWE-711. All the products above are flux cored wires for mild steel and 50kg high tensile steel. TWE-704-O (DC+) is recommended without any requirement of impact resistance; TWE-701-O (DC+) or TWE-711 (DC+) is recommended with the requirement of impact resistance.

Your Perfect Welding Solutions

TIENTAI ELECTRODE CO., LTD.



Recommendation of Tien Tai Filler Metal (Brand Name)

SMAW	CO ₂ (MAG)	SAW (Flux Wire)	FCAW ²	ESW/EGW
E-10,TL-50,508	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,TAC-16	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,508,56	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
E-10,TL-50,508	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
E-10,TL-50,508	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,508,56	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,508,56	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,508,56	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-60	TM-60	TF-600× TSW-60G	A	TF-600×TES-60G, FabStar 80G
TL-50,TAC-16	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
E-10,TL-50,508	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,508,56	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-50,508,56	TM-56,58	TF-385,565× TSW-8L,12KM	A	TF-600×TSW-50G, FabStar-721
TL-108G	-	-	-	-
TL-118G	-	-	-	-

3.The anti-hydrogen welding consumables should be applied when Grade36 steel A36 and 709 are applied in dynamically loaded structure and the thickness is greater than 1"(25.4mm).

4.TAC-16 or TAC-60 should be chose when A242 and A588 are applied directly in atmospheric corrosion or are exposed in air.

Your Perfect Welding Solutions

TIENTAI ELECTRODE CO., LTD.

Steel Fabrication



Typical chemical composition of weld metal (wt%)

Product Name		C	Si	Mn	Ni	Mo	P	S	Other
TL-581		0.06	0.50	1.30	-	-	0.02	0.005	-
TWE-711		0.05	0.55	1.45	-	-	0.015	0.008	-
FabStar 721		0.05	0.30	1.50	-	0.18	0.015	0.007	-
TM-70C		0.05	0.60	1.55	-	-	0.017	0.007	-
TWE-704-O		0.28	0.30	0.45	-	-	0.015	0.006	Al:1.50
TWE-707-O		0.28	0.15	0.45	-	-	0.016	0.005	Al:1.50
Product Name	Wire	C	Si	Mn	Ni	Mo	P	S	Other
TF-385	TSW-12KM	0.06	0.6	1.4	-	-	<0.035	<0.02	-
	TSW-12KH	0.06	0.7	1.8	-	-	<0.03	<0.02	-
	TSW-E12	0.05	0.7	1.5	-	0.45	<0.03	<0.02	Mo:0.43
TF-565	TSW-12KM	0.06	0.4	1.7	-	-	0.03	<0.02	-
	TSW-12KH	0.05	0.4	2.0	-	-	<0.03	<0.02	-
	TSW-E12	0.06	0.29	1.6	-	0.45	<0.03	<0.02	Mo:0.45

Your Perfect Welding Solutions

TIENTAI ELECTRODE CO., LTD.



Typical mechanical properties of weld metal:

Product Name		Yield Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (%)	Charpy V-Notch (J)	Temperature (°C)	PWHT
TL-581		500	580	30	81	-45	-
TWE-711		530	580	29	100	-20	-
FabStar 721		470	575	25	50	-30	-
TM-70C		550	595	27	90	-20	-
					70	-30	
TWE-704-O		445	570	25	-	-	-
TWE-707-O		450	630	26	-	-	-
Product Name	Wire	Yield Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (%)	Charpy V-Notch (J)	Temperature (°C)	PWHT
TF-385	TSW-12KM	480	550	33	33	-20	-
	TSW-12KH	529	589	30	43	-29	-
	TSW-E12	617	656	29	-	-	-
TF-565	TSW-12KM	460	530	33	40	-40	-
					65	-30	
	TSW-12KH	508	600	31	32	-50	AW
	TSW-E12	546	614	26	60	-30	AW

Your Perfect Welding Solutions

TIENTAI ELECTRODE CO., LTD.

The Portfolio of Brands





Head Office

TienTai Electrode Co., Ltd.
No.6, Kaifa 4th Rd., Rende Township,
Tainan County 717, Taiwan.
Tel: 886-6-2663721 / Fax: 886-6-2664301
<http://www.tientai.com>
E Mail: ttrad@mail.tientai.com.tw

Business Contact 

TIENTAI ELECTRODE CO., LTD.

All data of our products in this brochure are upon careful investigation and intensive research. However, we do not assume any liability for their correctness, please contact our staff before adoption.

PRINTED: 08.2012