



ST590 High Strength Steel Sheet



Substitution for Phosphor Bronze and Brass-ST590

ST590 is a new type steel which is developed by TATA STEEL in Germany. It meets ROHS and REACH which used substitution for phosphor bronze and brass. The application includes most of connector and terminal for consumer electronic products.

Advantage:

Environment:

ST590 is a carbon steel material, it can be 100% recycled.

Low cost:

The cost of ST590 only less 50% to compare with phosphor bronze, when the ratio of scrap to 70% for customer use, ST590 also can help our client to save 30% cost at least. Basically, it can help customer increase their competition in the market.

High strength:

ST590 tensile strength is 570-680 mpa that is equal to C5191/C5210 H/EH.

Formability(r/t):

As the same tensile strength with C5191/C5210, ST590 has lower r/t ratio. In the bending of 90 degree, GW/BW=0.3/0.3.

Conductivity (IACS):

Change the stereotype that carbon steel has low conductivity, ST590 has 10.2% IACS that is similar to C5191/C5210. This is one of the reasons that ST590 can quickly enter the Market.

Stress relaxation

Under 150°C/1000 hours test conditions, ST590-stress relaxation is 95% better than C6191 & C5210 (60%)

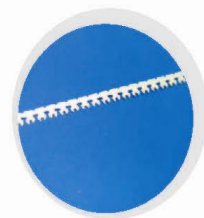
Application

SFP 、 QSFP: HDMI cable/PCB side

Display port , DC/Audio jack , battery contact , RF ,

SIM card connector , FPC , FFC. LVDS , Memory Card

SATA , RJ , BTB

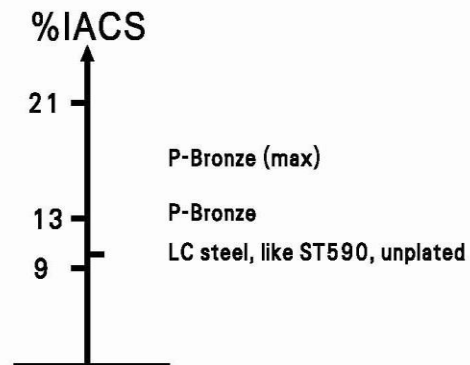


The good of Electrical Conductivity and Formability 、 The specification of Production

TATA Steel Plating's steel-based materials for connectors

Electrical Conductivity

Conductivity can be increased by 2...5% by copper plating



Bending properties

Our high strength materials demonstrate excellent bending properties.

Material	r/t ratio for 90° Bend		Elongation %
	GW	BW	
ST590	0.3 (90°)	0.3 (90°)	3-8
	0.8 (180°)	1.6 (180°)	
C5191 H	1	2	>=10
C5191 EH	2	4	>=5
C5191 SH	4	6	>=3



Sample

Good Way(GW)Test



Bad Way(GW)Test



Specification :

The steel type :
Low Carbon Steel

The Composition Carbon :
0.001-0.17%

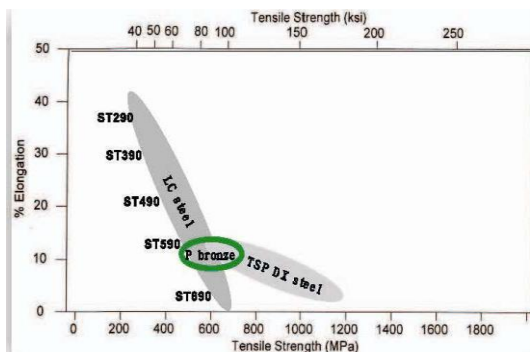
The Thickness of coating :
2-10 μ m(as customer's need)

Surface : Ra 0.1-0.30 μ m

The thickness : 0.06-1.20 mm

The width : 2-630 mm

The electrical conductivity :
9-10% IACS



Chemical Composition 、 Mechanical Properties 、 Comparative List

Chemical Composition

Material	C	Mn	P	S	Al
ST590	0.159	0.999	0.014	0.01	0.047

Mechanical Properties

Material	Hardness (HV)	Y.S. (N/mm ²)	T.S. (N/mm ²)	Elongation (%)	The thickness of Coating(μ m) %
ST590	190-215	560 min	570-680	3-8	0-by customer's need

Comparative List

Material	ST590	C5191 H	C5191 EH	C5191 SH	Wieland B16 R560	Wieland B16 R640
Y.S.(N/mm ²)	≥ 560	≥ 530	≥ 600	≥ 690	≥ 530	≥ 610
T.S.(N/mm ²)	570-680	525-670	≥ 670	≥ 720	560-650	640-730
Hardness (HV)	195-215	170-200	≥ 200	220-240	180-210	200-230
Elongation (%)	3-8	≥ 10	≥ 5	≥ 3	≥ 5	≥ 3
IACS(%)	9-12	9-13	9-13	9-13	9-14	9-14
Thermo conductivity (W-m-k)	70	67	67	67	67	67
Density(g/cm ³)	7.9	8.9	8.9	8.9	8.9	8.9
r/t ratio	0.3/0.3	1.0/2.0	2.0/4.0	4.0/6.0	0.5/1.0	1.0/4.0
Stress relaxation % (1000H/150°C)	95	60	60	60	30	30
Modulus of Elasticity (KN/mm ²)(Gpa)	210	115	115	115	115	115

SALT SPRAY TESTING REPORT

Temperature of testing box : 35 +/-2°C

Temperature of air tube : 47 +/-2°C

Testing time : 24/48 hours

Pressure : 1.00 +/- 0.01 kg/cm²

Concentration of Testing liquid : (NaCl₂): 5+/-1%

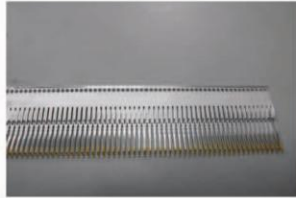
PH : 6.5~7.2

Result : 24 /48 hours pass

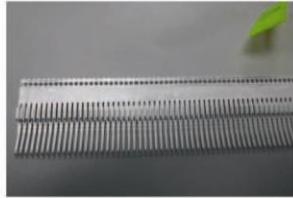
48H salt spray test

After stamping , Nickel plating 1.50 μ m
+Tin 2 μ m + gold flash + sealing reagent
SA-816

After stamping , Nickel plating 1.50 μ m +Tin
2 μ m + sealing reagent SA-816



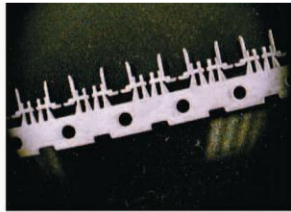
Pass



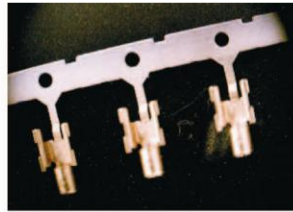
Pass

48H Salt cross compare

1.After the sealing process(Stamping + Nickel plating 2 μ m) , sealing reagent SA-816 => PSS



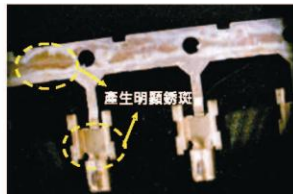
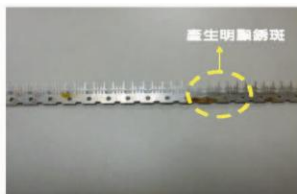
ST590



C5191

48H Salt cross compare

2.No sealing process(Stamping + Nickel plating 2 μ m) , sealing reagent SA-816 => FAIL



Customer test report



■ Insert and pull on force

1. Equipment : Pull dynamometer
2. Terms : as customer's need
3. Standard : Max 50N/ Each: Min 1.5 N
4. Picture :



5. Result :

No	Result		
	all	L	N
1	48	12	11
2	49	13	10
3	47	12	11

6. Conclusion : PASS

■ The rise of temperature

1. Equipment : data collecting instrument 、 Load testing Mchine
2. Terms : 10A 125V 4H
3. Standard : connector temperature: Max 30℃
4. Pictures :



No	Temperature (Max)℃	Temperature (Min)℃	Temperature rise ℃
1	47.30	24.30	23.00
2	50.30	24.70	25.60
3	51.40	24.60	26.80
4	43.80	24.30	19.50
5	41.30	22.70	18.60
6	43.20	23.30	19.90



Application

HDMI



RJ Connector



FPC Connector



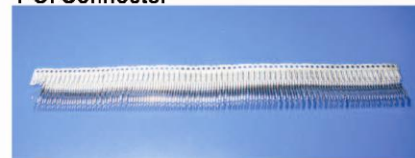
SFP



SIM Card Connector



PCI Connector



NB Battery Male



LED

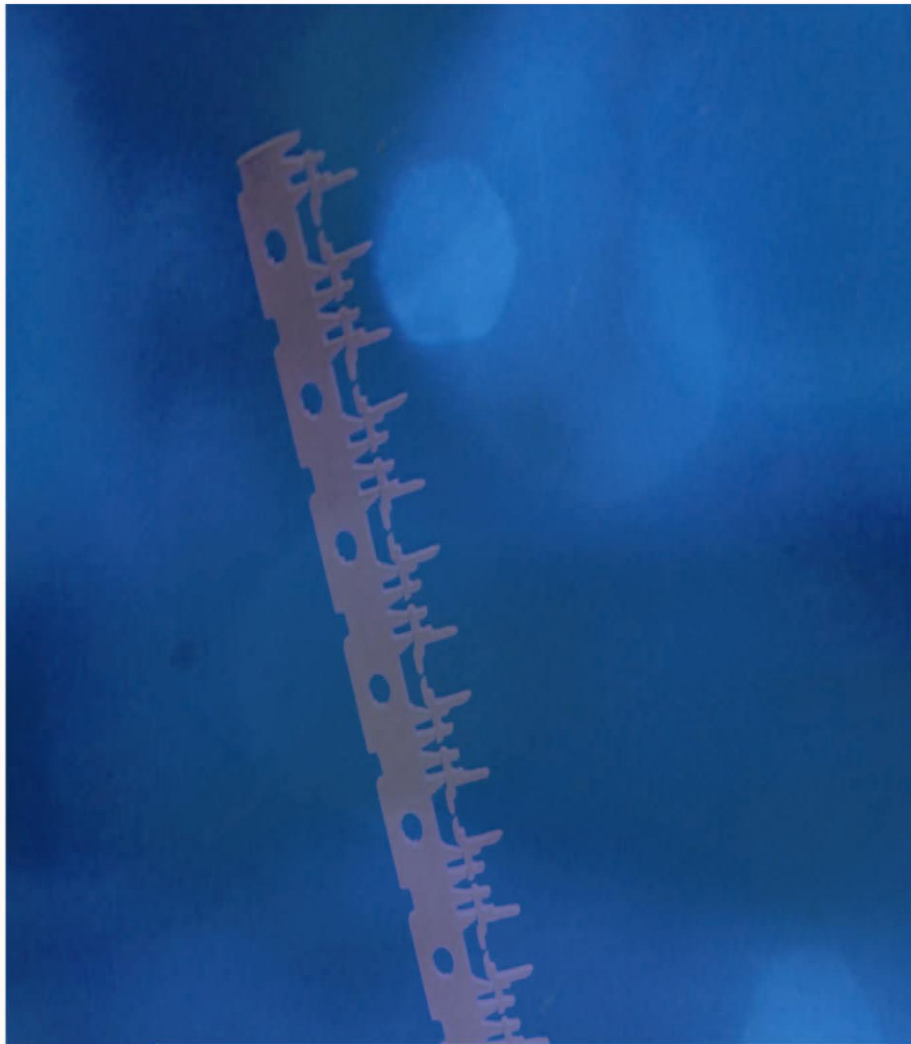


SATA



DC/Audio Jack





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