

**Serving Oil & Gas,
Power Generation Industries,
Contractors, Manufacturers,
Distributors and End-Users
for 30 years**



Tri-Star Industries Pte Ltd

Fasteners Division

Manufactures Special Bolting Products
With the Best Corrosion Protection Coatings



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High Quality Coatings

MASTERCOTE®



We continually improve our Mastercote® coating processes, from material selection to degreasing, pickling, rinsing, controlling thickness and consistency of cadmium plating, phosphate and finishing coating layers.

Mastercote® CPFC system (cadmium base) has been salt-spray tested to 9000 hours without a spot of rust. That is one year under extreme laboratory conditions.

Mastercote® ZPFC system (zinc plated base) has been salt-spray tested to 4000 hours. Results were 20% rusty and 50% stained. Both nuts were functionable.

Mastercote® FC system (phosphate base) - the most economical in our series of coated bolts and nuts, sustains about 3500 hours under the same salt-spray tests.



Cadmium plated, PTFE top coat Mastercote® was tested and witnessed by independent 3rd party to show NO RUST after 9,000 hours (more than 1 year) of salt-fog spray test.

Since 1983...

Mastercote® fluoropolymer coated bolts and nuts were developed by us to initially service the oil and gas companies in Malaysia. We worked closely with them to derive a product that was both effective and cost efficient.

Since then, we have gone through various stages of improvements, notably in the way the substrate metal is treated, in ensuring plating integrity and consistency and the application and curing processes of the base-coats and finishing top-coats. We are able to ensure that the bondings and adhesion on our Mastercote products give the best corrosion resistant properties.

Mastercote® coating is effective and more economical than using stainless, incoloy, titanium and other exotic materials.

Mastercote® bolting materials last much longer than any other fluoropolymer coatings. Mastercote® gives the best corrosion resistance, low friction with self-lubricating, non-galling properties - thus reducing make-up and break out torques. It is excellent for offshore and subsea installations.

Mastercote® resists most acids and is unaffected even when exposed to hydrogen sulphide at 121°C at 2,000psi.

Mastercote® was independently tested by a Major Oil Company in Australia to have superior coating integrity of its cadmium and PTFE layers, compared to fasteners of another popular brand, even after tightening the stud with the nut.



Microscopic analysis of cross section of previously-tightened Tri-Star stud showing the thread root coating still intact.

Extract of the independent report is as follows:

“ In summary the Tri-Star stud and nut showed significantly greater cadmium plating thickness and uniformity at both the contacted surfaces and surfaces free from contact as compared to the Standard (other brand) stud and nut, with the plating thickness showing only minimal affect resulting from the tightening contact.

The thickness of the PTFE on the Tri-Star stud and nut was only marginally reduced at the contacted areas when compared to the Standard stud and nut, which lost most of the coating at the contacted areas.

With these findings it can be concluded that the Tri-Star stud and nut set would be expected to provide increased resistance to makeup damage and a superior service performance to the Standard stud and nut set.”

High Quality Coatings

MASTERGARD®

Environmental friendly option...

Mastergard® is our proprietary name for ceramic base coating with Xylan top coat finish. It is a good alternative to replace cadmium plated base coating in projects which require environmentally friendly specifications. It has been tested serviceable at 4500 hours.

Mastergard® is recommended for chemical, corrosion and abrasion resistant applications in aerospace and marine industry components, automotive engine and exhaust parts.



Continuous Research and Development is part of our corporate culture. We have also developed the use of **Zinga** zinc base coating with Xylan PTFE top coat for fasteners.

Zinga combines the galvanic characteristics of a zinc coating with the barrier protection of a paint. It offers an excellent active and passive protection due to the special zinc on one hand and due to the barrier, provided by both the zinc oxides and the binder, on the other hand.



Zinga on-site 'painting' is a popular zinc coating system developed in Europe which can be used in place of Hot Dip Galvanising, providing Cathodic Protection to steel.

Zinga can also be coated over old depleted Hot Dip Galvanised surfaces, extending the service life of your assets.



Bolts & Nuts

Manufacture to Specifications



ASTM A194 Heavy Hex Nuts



Studbolts & nuts in cadmium chromated finish



A193 B7 Double-ended studs zinc chromated finish



A320 L7 studs with Tommy-bar hole nuts, zinc plated

In-House Testing Procedures

Inspection and Testing Plan in all our Production Units

- QA/ QC personnel release materials to Production after chemical, mechanical & dimensional checks
- Production shopfloors practise total quality control policy in every section of work
- We perform microscopic tests to confirm coating thicknesses on the threads of the bolts; no other coaters practise this method of testing
- Every batch of MASTERCOTE® products are checked/ tested for curing, adhesion, & hardness.

We are ISO 9001 accredited since 1993.



Microscopic Analyser



Tensile Strength Tester



Charpy Tester



Spectrometer

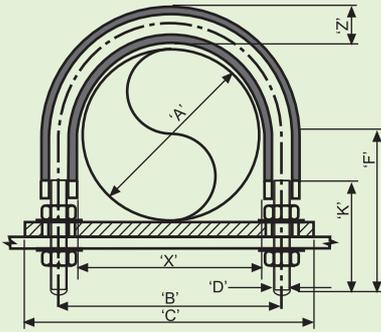
OUR QUALITY is the best - we do not believe in furnishing low quality products in order to meet the lowest price in the market. Instead we assure you that our products will outlast the rest in the market and that means savings in the long term.



Micrographs of coatings on studbolts

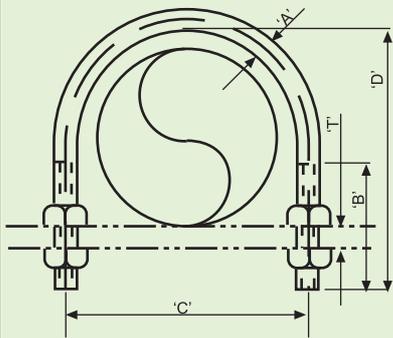
No other manufacturer in the world provides this level of quality assurance!

Quality Bolting System



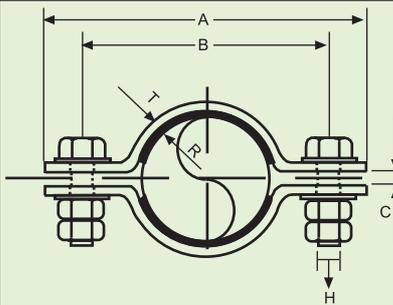
With neoprene sleeve & pad

STAINLESS STEEL / FIBREGLASS PIPE							
A'	B'	C'	D'	F'	K'	X'	Z'
15	37	60	M6	60	57	23	11
20	43	68	M6	65	60	29	11
25	51	72	M6	65	60	36	11
40	75	98	M10	80	70	52	18
50	87	110	M10	90	75	64	18
80	115	140	M12	100	75	92	18
100	141	166	M12	110	75	118	18
150	210	246	M16	180	120	172	30
200	262	312	M16	199	140	224	32



Fluorocarbon coated or galvanised

PIPE SIZE DN	15/ 5/8"	20/ 3/4"	25/ 1"	40/ 1 1/2"	50/ 2"	80/ 3"	100/ 4"
A' ROD DIA.	8	8	8	10	10	16	16
B' ROD DIA.	25	30	30	40	40	55	55
LENGTH							
'C'	40	45	50	65	80	110	140
'D'	45	55	60	85	100	140	165
MAX 'T'	10	10	10	16	16	19	19



Fluorocarbon coated or galvanised with neoprene isolating pad

PIPE SIZE DN	PIPE O.D.	A	B	C	Width & thickness	HOLE H	R	HEX BOLTS		
								SIZE	NO.	BOLT LG
250	278	470	205	20	190x16	24	145	M20	4	115
300	331	525	230	20	190x16	24	172	M20	4	115
350	364	555	250	20	240x16	24	188	M20	4	115
400	416	630	280	24	240x16	28	214	M24	4	125
450	458	670	300	24	300x16	28	235	M24	4	125
500	508	720	325	24	300x16	28	260	M24	4	125



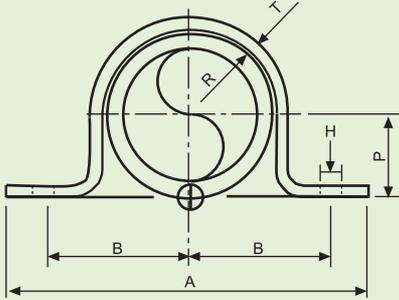
We manufacture 'U' bolts & pipe clamps to clients' specifications, in different thread forms (UNC, 8UN, and or Metric) of carbon and/or Stainless Steel of any material grades and finishes.

Available coating finishes : Zinc plated, Cadmium plated, plus Xylan fluorocarbon finishing coat, or hot-dipped galvanized where applicable.

Optional items : Clamps or 'U' bolts can be supplied with Neoprene sleeve, pad or strip or in vulcanized rubber.

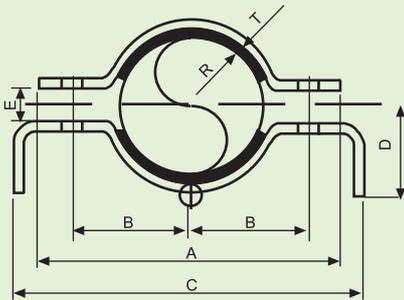
We offer buyers many choices!

Quality Bolting System



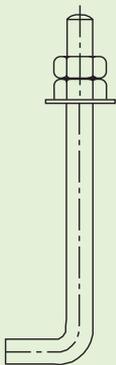
PIPE SIZE NB	PIPE O.D.	A	B	Width & thickness	P	R	HOLE H	HEX BOLTS		
								SIZE	NO.	BOLT LG
1	36	170	60	40x5	32	35	12	M10	2	55
1 1/2	51	200	75	40x8	40	43	15	M12	2	60
2	62	210	80	40x8	45	48	15	M12	2	60
3	91	260	105	50x10	60	63	19	M16	2	65
4	116	290	120	50x10	72	75	19	M16	2	65
6	169	360	150	65x10	99	102	24	M16	2	65
8	221	440	190	65x16	125	128	24	M20	2	75
10	278	490	215	65x16	153	156	24	M20	2	75
12	331	550	245	65x16	180	183	24	M20	2	75
14	364	580	260	65x16	196	199	24	M20	2	75
16	416	650	290	65x16	222	225	28	M24	2	80
18	458	700	315	65x16	245	248	28	M24	2	80
20	508	750	340	65x16	270	273	28	M24	2	80

Fluorocarbon coated or galvanized



PIPE SIZE DN	PIPE O.D.	A	B	C	Width & thickness	D	E	R	HOLE H	HEX BOLTS	
										SIZE	NO.
25	36	150	50	175	40x5	35	10	24	12	M10	2
40	51	180	65	220	40x8	45	10	32	15	M12	2
50	62	190	70	230	40x8	50	10	37	15	M12	2
80	91	230	95	290	50x10	65	16	52	19	M16	2
100	116	265	105	310	50x10	75	16	64	19	M16	2
150	169	330	135	380	65X10	105	20	91	24	M20	2
200	221	440	175	490	65X16	135	20	117	24	M20	2
250	278	470	205	550	65X16	165	20	145	24	M20	2
300	331	525	230	600	65X16	195	20	172	24	M20	2
350	364	555	250	635	65X16	210	20	188	24	M20	2
400	416	630	280	710	65X16	240	24	214	28	M24	2
450	458	670	300	750	75X16	260	24	235	28	M24	2
500	508	720	325	800	75X16	290	24	260	28	M24	2

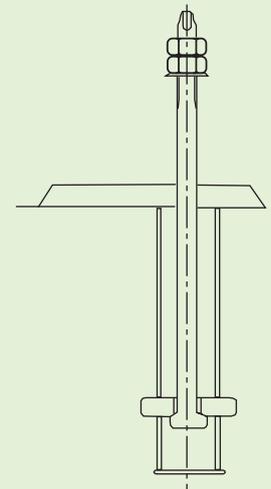
Neoprene sleeve & pad



J-type foundation bolt hot-dipped galv.



I-type foundation bolt hot dipped galv.



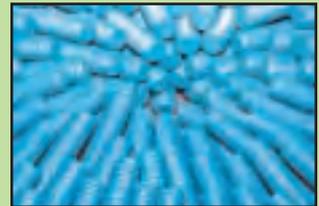
Heavy foundation bolts hot dipped galv.

Our founder, Mr. T S Lim, has more than 40 years of accumulated knowledge in the fasteners industry, having managed the Asian operations of Guest, Keen & Nettlefolds Ltd (GKN), UK from 1967 to 1979.

“Engineers and buyers in the 60’s to early 80’s were very selective and quality conscious and they purchased only from renowned manufacturers. However, today, many traders, stockists and distributors are sourcing all over the world at lowest possible prices without realising that heat treatment issue is a major problem with many low quality producers. Buyers who import from such producers and end-users who use such products are taking a big risk.

Our petroleum studbolt materials are from Ovako Steel AyOb, Finland. We are the sole distributor for the full range covering ASTM A193, B7, B16 and A320 L7 for sizes 1-inch diameter and above. Similar diameter materials are from other reputable mills, mainly in Europe, which have consistently passed our stringent in-house inspections over the years.”

- T S Lim



We manufacture:

Studbolts, Anchor/Foundation Bolts, U-Bolts, Hex Bolts, Pipe Clamps, CNC-Machined Special Fasteners for well-head equipment, together with matching Nuts.

Our material stocks range from **Carbon Steel, Alloy Steel, Stainless Steel, Super Duplex Steel, High Nickel Alloy Steel to Cu/Ni/Al Alloys.**

We also perform in-house **Steel Heat Treatment process** to ensure the exact material grades are achieved.

Our surface treatment processes include **Grit Blasting, Phosphating, Plating (e.g. Zinc, Zinc Nickel, Cadmium), Hot Dip Galvanising and Coating (e.g. Xylan Fluorocarbon, Xylar Ceramic, Everslik, MolyCoat).**

We are the authorised distributor for: **ENERPAC Bolting Tools**

We sell and rent **Hydraulic Bolt Tensioning and Torqueing Tools** and provide full on-site **Bolting Services.**