

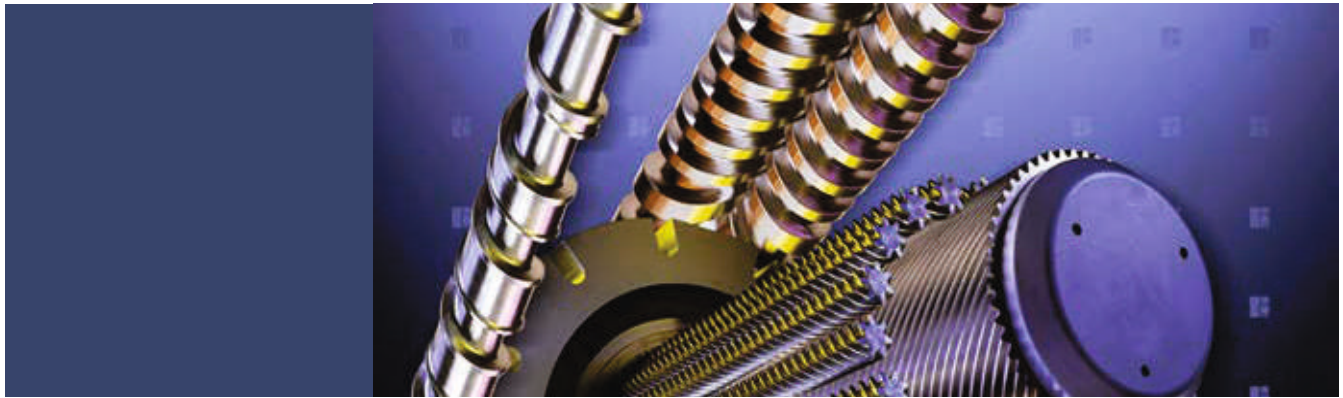


AN IATF 16949 CERTIFIED COMPANY

REDEFINING FASTENING SOLUTION



CATALOGUE 2026



## Introduction

Caparo is diversified, UK based group, specializing principally in the Manufacture & Supply of Steel, Automotive and General Engineering Products, the group has a grown as a global entity. The group was founded in 1968 by Late Load Paul and since then Caparo is expanding its business operations in UK, USA, India, Spain, & Dubai. Caparo group has grown by setting up new Greenfield Projects, acquisitions & organic growth of established business. Caparo has now envisaged major expansion plans in India in fields of Fasteners, Stampings, Foundry, Tubes & Forgings.

Caparo India, the Indian business arm of Caparo Group, began its operations in 1994, as a joint venture with India's largest car manufacturer— Maruti Udyog. Today, through its two strategic business entities, Caparo Engineering India Ltd. and Caparo Maruti Ltd, the group offers end-to-end solutions in designing, developing and manufacturing automotive systems, assemblies, advanced composites, modules and components to Indian Automotive OEMs and Engineering Industry.

Caparo India leverages its exhaustive capabilities in metal Stamping, Fastening, Tubing, Forging and Aluminium Foundry businesses, coupled with its state-of-the-art Tool Room and R&D Centre, to service top-notch clients such as GM, Ford, Maruti, Honda, Tata Motors, Ashok Leyland and JCB. The company's ability to offer complete lifecycle solutions backed by a global support system, technological superiority and customer orientation, make it a force to reckon with in its areas of expertise.



## WHAT IS HYDROGEN EMBRITTLEMENT?

When atomic hydrogen enters steel, it can cause a loss in ductility or load carrying ability or cracking (usually as sub-microscopic cracks), or catastrophic brittle failures at applied stresses well below the yield strength. The Hydrogen Embrittlement caused failure, the actual breaking of the component into two or more pieces. The fracture is delayed. Problems occur when least expected. Sometimes it occurs within hours after the tensile load is applied; sometimes not for months, but seldom years. But when it happens, it's sudden, with no advance warning or any visible signs of imminence, Failures occurring in service are serious and costly, sometimes catastrophic.

Hydrogen embrittlement is associated with fasteners made of carbon and alloy steels. It is only usually expected to be a risk for higher tensile fasteners with hardness above 320HV. It is caused by the absorption of atomic hydrogen into the fastener's surface during manufacturing and processing, particularly during acid pickling and alkaline cleaning prior to plating, and then during actual electroplating. The deposited metallic coating entraps the hydrogen against the base metal. When load or stress is applied the hydrogen gas migrates towards points of highest stress concentration. Pressure builds until the strength of the base metal is exceeded and minute ruptures occur. Hydrogen is exceptionally mobile and quickly penetrates into any recently formed cracks, lesions or material surface discontinuities, which become high stress areas.

## HOW TO MINIMIZE THE RISK OF HYDROGEN EMBRITTLEMENT?

Though the experts recommend various preventive measures, there is no known guaranteed process to eliminate Hydrogen embrittlement 100%. When embrittlement failures do occur, they will usually only affect 2-3% of the components. The embrittling process is a random effect, and the de-embrittling process can be regarded similarly. Whilst prediction is difficult, if the following preventative actions are applied, then the risk should be minimised.

1. Mechanically clean the products if possible.
2. Mechanically plate high strength components.
3. Avoid any embrittling process if possible.
4. Use stringent baking control.

The rapid transfer into the baking oven possibly reduces the opportunity for harmful hydrogen to begin its inward migration. It is the prevention of inward migration that will reduce the probability of embrittlement failure.

## PREVENTATIVE ACTIONS TO REDUCE RISKS IN PLATING.

Process	Details	Hydrogen Embrittlement Risk	Preventive Action
Degrease	Solvent		
	Alkali soak		
	Electro Clean	some	Only use anodically
De-rust or De-scale	Acid	High	Use inhibited short time
	Alkaline de-rusts	Low	Poor at de-rusting
	Abrasive clean	None	
Phosphate	Acid process	Medium	Bake – reduces with time
Electro plating	Acid type	Medium	Bake
Electro plating	Alkaline type	High	Bake

Last but not the least is to Consider alternative surface coatings like, Geomet, Delta Tone, Delta Seal, Magni, Mechanical Zinc plating. They will cost more than normal plating.

(Ref: ISO 898: Part XII, ISO 4042 :1999(E), IFI-142-1997)

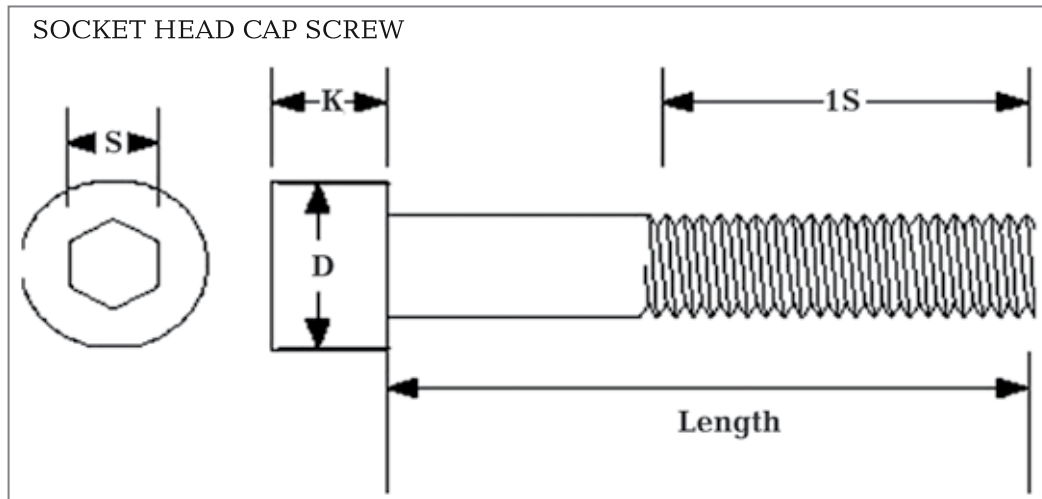


# Stress Area, Proof Load and Tightening Torque



EFFECTIVE FROM 01-04-2026

Nominal Dia	Pitch	Stress Area mm <sup>2</sup>	Proof Load in 1000 kg			Tightening Torque in kg-m		
			8.8	10.9	12.9	8.8	10.9	12.9
M6	1.0	20.1	1.16	1.59	1.91	1.2	1.7	2.1
M8	1.25	36.6	2.13	2.90	3.48	3.0	4.2	5.1
	1.0	39.2	2.28	3.10	3.72	3.2	4.5	5.4
M10	1.5	58.0	3.38	4.59	5.51	5.9	8.4	10.0
	1.25	61.2	3.55	4.86	5.82	6.3	8.9	10.6
	1.0	64.5	3.74	5.12	6.13	6.6	9.3	11.2
M12	1.75	84.3	4.90	6.68	8.01	10.4	14.6	17.5
	1.5	88.1	5.11	6.99	8.38	10.9	15.3	18.3
	1.25	92.1	5.34	7.29	8.75	11.3	15.9	19.1
M14	2.0	115.0	6.67	9.10	10.90	16.5	23.0	27.8
	1.5	125.0	7.25	9.90	11.90	17.9	25.2	30.2
M16	2.0	157.0	9.10	12.40	14.90	25.7	36.2	43.4
	1.5	167.0	9.69	13.20	15.90	27.4	38.5	46.2
M18	2.5	192.0	11.50	15.20	18.20	35.4	49.8	59.7
	1.5	210.0	13.00	17.10	20.50	38.7	54.4	65.3
M20	2.5	245.0	14.70	19.40	23.30	50.2	70.6	84.7
	1.5	272.0	16.30	21.50	25.80	55.7	78.3	94.0
M22	2.5	303.0	18.20	24.00	28.80	68.3	96.0	115.2
	1.5	333.0	20.00	26.40	31.60	75	105.5	126.6
M24	3.0	353.0	21.20	28.00	33.50	86.8	122.0	146.4
	2.0	384.0	23.00	30.40	36.50	94.4	132.7	159.3
M27	3.0	459.0	28.03	38.84	45.36	89.40	135.07	158.0
	2.0	496.0	30.38	42.00	49.03	93.99	145.26	170.74
M30	3.5	561.0	34.35	47.50	55.45	12.13	183.49	216.62
	2.0	621.0	38.02	52.50	61.37	130.38	206.42	242.10
M33	3.5	694.0	42.41	58.10	68.60	238.99	350.96	410.67
M36	4.0	817.0	49.95	69.11	80.73	211.21	321.10	377.17
M42	4.5	1121.0	68.50	94.84	-	368.65	541.43	633.49
Nominal Dia	Pitch	Stress Area mm <sup>2</sup>	Proof Load in 1000 kg			Tightening Torque in kg-m		
			R	T	V	R	T	V
1/4	BSW	20.6	1.11	1.34	1.61	1.2	1.4	1.7
	BSF	23.0	1.24	1.49	1.79	1.3	1.5	1.9
5/16	BSW	34.0	1.84	2.21	2.65	2.4	2.8	3.5
	BSF	36.6	1.98	2.38	2.85	2.6	3	3.8
3/8	BSW	50.3	2.71	3.27	3.92	4.2	5	6.3
	BSF	54.1	2.92	3.52	4.22	4.5	5.4	6.8
7/16	BSW	69.0	3.72	4.48	5.38	6.7	8	10.1
	BSF	74.7	4.03	4.86	5.83	7.3	8.6	10.9
1/2	BSW	89.4	4.83	5.81	6.97	10	11.8	14.9
	BSF	98.1	5.3	6.37	7365	11	13	16.3
5/8	BSW	146.5	7.91	9.52	11.42	20.5	24.2	30.5
	BSF	156.8	8.47	10.19	12.23	21.9	25.9	32.7
3/4	BSW	216.8	11.71	14.09	16.91	36.3	42.9	54.2
	BSF	227.1	12.26	14.46	17.71	38.1	45	56.8
7/8	BSW	298.7	16.13	19.42	23.3	58.4	69	87.1
	BSF	314.2	16.97	20.42	24.41	61.4	72.6	91.6
1	BSW	392.3	21.18	25.5	30.6	87.7	103.6	130.7
	BSF	414.2	22.37	26.92	32.31	92.6	109.4	138
Nominal Dia	Pitch	Stress Area mm <sup>2</sup>	Proof Load in 1000 kg			Tightening Torque in kg-m		
			5	7	8	5	7	8
1/4	UNC	20.9	1.36	1.69	1.92	1.4	1.8	2
	UNF	23.7	1.54	1.92	2.18	1.6	2	2.2
5/16	UNC	34.3	2.23	2.78	3.16	2.9	3.6	4
	UNF	37.9	2.46	3.07	3.48	3.2	4	4.4
3/8	UNC	50.7	3.3	4.11	4.67	5.2	6.5	7.1
	UNF	57.2	3.72	4.63	5.26	5.8	7.3	8
7/16	UNC	69.5	4.52	5.63	6.4	8.3	10.3	11.4
	UNF	77.3	5.02	6.26	7.11	9.2	11.5	12.6
1/2	UNC	92.8	6.03	7.52	8.54	12.6	15.7	17.3
	UNF	104.0	6.76	8.42	9.57	14.2	17.6	19.4
5/8	UNC	147.7	9.6	11.97	11.59	25.1	31.3	34.5
	UNF	166.5	10.82	13.48	15.31	28.3	35.3	38.9
3/4	UNC	218.1	14.17	17.66	20.06	44.5	55.5	61.1
	UNF	241.9	15.73	19.6	22.26	49.4	61.6	67.8
7/8	UNC	301.3	19.58	24.4	27.72	71.8	89.5	98.6
	UNF	331.0	21.47	26.81	30.45	78.9	98.3	108.3
1	UNC	394.8	25.66	31.98	36.33	107.5	134	147.6
	UNF	430.3	27.97	34.86	39.59	117.2	146	160.9



## FIRM FAITH ON CAPARO SOCKET HEAD CAP SCREW

While using Fasteners all are aware the importance of fasteners technology. Higher Pressure higher Stress and higher Speed demand Strong & reliable joints and its give reliable fasteners only.

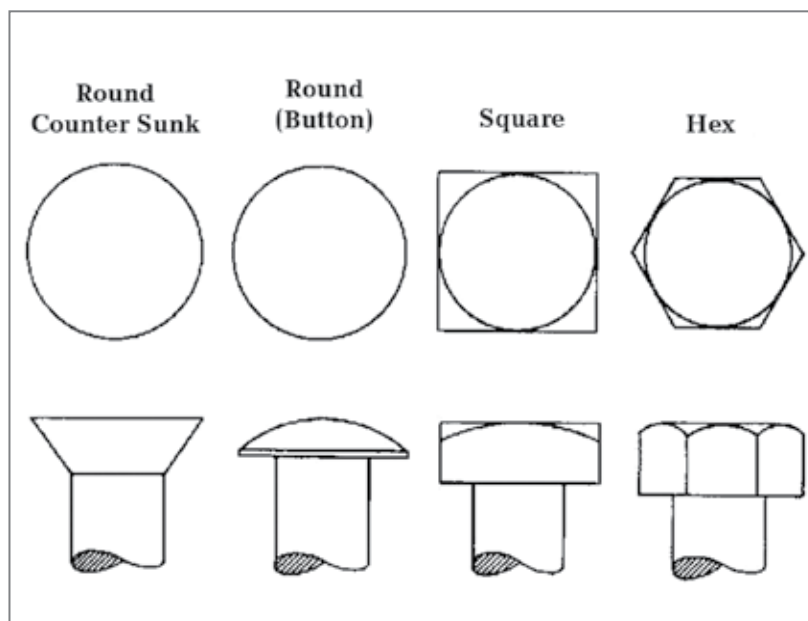
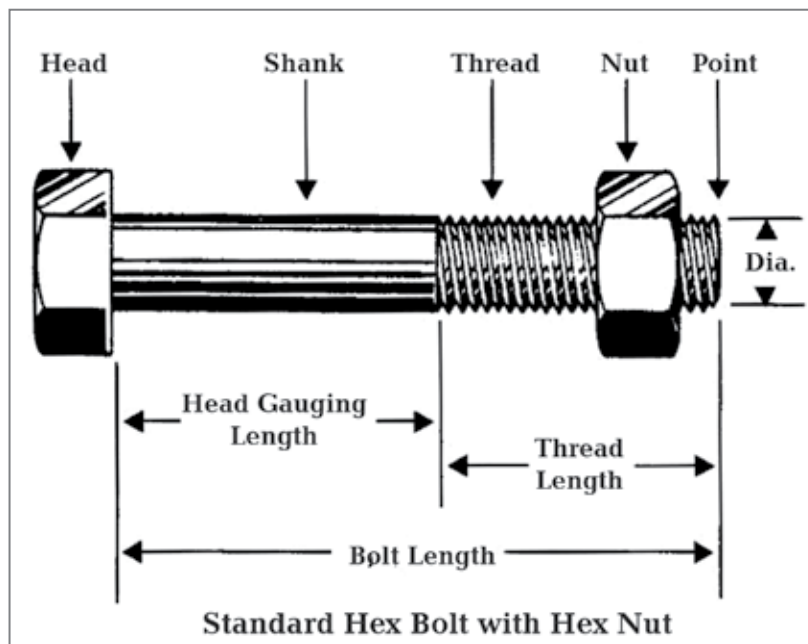
This is the reason Industry is using more and more Socket Head Cap Screw. The Strongest threaded fasteners have the extra strength and fatigue resistance required for complete reliability in high strength fastening.

NOM. THREAD DIAMETER	M 3	M 4	M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 18	M 20	M 22	M 24	M 27	M 30	M 33	M 36	M 39	M 42
THREAD PITCH	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	3	3.5	3.5	4	4	4.5
HEAD Max.	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40	45	50	54	-	63
DIAMETER																			
D Min.	5.32	6.78	8.28	9.78	12.73	15.73	17.73	20.67	23.67	26.67	29.67	32.61	35.61	39.61	44.61	49.61	53.54	-	62.54
HEAD HEIGHT Max.	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30	33	36	-	42
K																			
Min.	2.86	3.82	4.82	5.70	7.64	9.64	11.57	13.57	15.57	17.57	19.48	21.48	23.48	26.48	29.48	32.38	35.38	-	41.38
Nominal Key Size	2.5	3	4	5	6	8	10	12	14	14	17	17	19	19	22	24	27	-	32
max.	2.58	3.071	4.084	5.084	6.14	8.175	10.127	12.146	14.159	14.212	17.216	17.23	19.275	19.275	22.275	24.275	27.275	-	32.33
S																			
Min.	2.52	3.02	4.02	5.02	6.02	8.025	10.025	12.032	14.032	14.032	17.05	17.05	19.065	19.065	22.065	24.065	27.065	-	32.08
SOCKET DEPTH	1.3	2	2.5	3	4	5	6	7	8	9	10	11	12	13.5	15.5	18	19	-	24
RADIUS Under Head	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.6	0.8	0.8	0.8	1	1	1	1	-	1.2

1. High life Rolled Threads are more uniform and have closer tolerance because CAPARO roll thread dies and techniques produce smoother surface and better size control. Fully formed radius root run out increase fatigue life of threads by reducing stress concentration and avoiding sharp corner where failures may start.
2. **Socket Depth:** - Controlled Socket depth gives optimum wrench engagement, permit full tightening without cracking.
3. **Specially formed Head:** - Controlled head forging forms uniform grain flow without crack flow lines. It makes Head stronger & prevents failure in vital fitted area.
4. **Heat Treatment:** - Heat Treatment is tailored to suit the specific chemistry of every lot of Steel. Atmosphere controlled furnace eliminate possibilities of surface carburization or decarburization to ensure maximum strength and toughness.

## MEASUREMENT STYLES OF HEAD

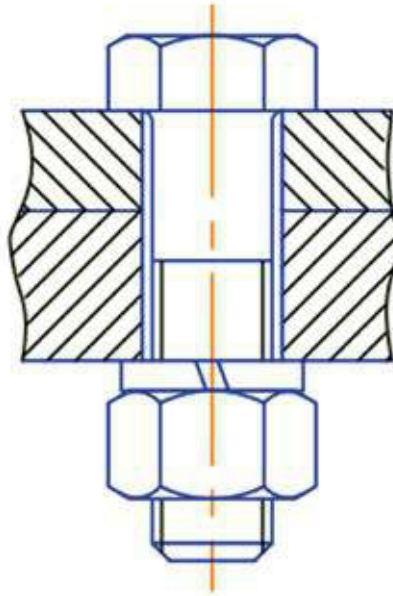
Diameter of all bolts is measured as the outside of major diameter of the thread. The length of a headed bolt is measured from the largest diameter of the bearing surface of the head to the extreme end of the point in a line parallel to the axis of the bolt. For example, square or hex head bolts are measured from under the head to the end of the bolt; a bolt with a countersunk head is measured overall. The point of a bolt is always included in the measured length. Headless fasteners such as studs are measured overall, including points, except for continuous-thread alloy studs made to ASTM Specification A193. This type is measured from first thread to first thread.



## 'Caparo' High Strength Friction Grip( Structural) Bolts, Nuts and Washers in Friction Grip Joints.

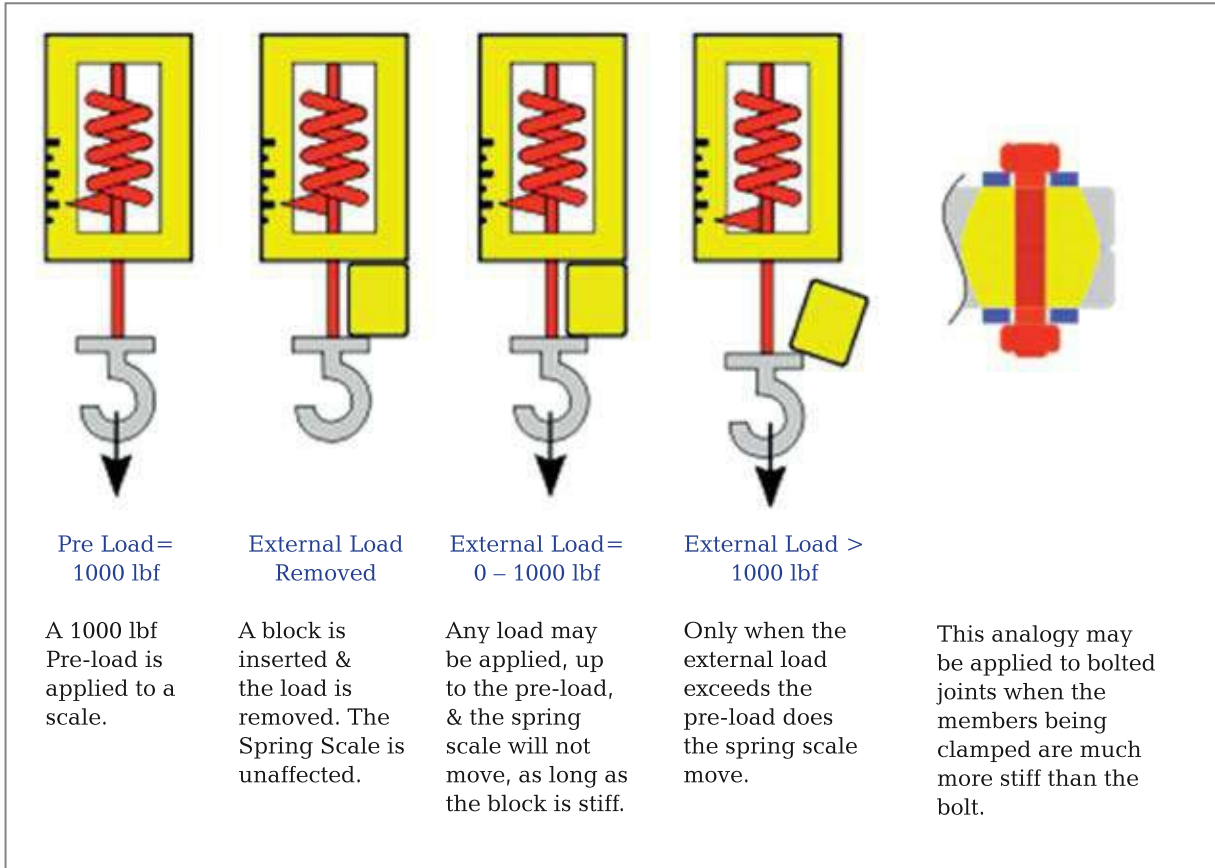
Bolted joints are one of the most common elements in construction and machine design. They consist of fasteners that capture and join other parts, and are secured with the mating of screw threads.

There are two main types of bolted joint designs. In one method the bolt is tightened to a calculated clamp load, usually by applying a measured torque load. The joint will be designed in such a way that the clamp load is never overcome by the forces acting on the joint (and therefore the joined parts see no relative motion).



This type of joint design provides several properties:

- Greater preloads in bolted joints reduce the fatigue loading of the fastener.
- For cyclic loads, the fastener is not subjected to the full amplitude of the load; as a result, the fastener's fatigue life can be increased or—if the material exhibits an endurance limit—extended indefinitely.
- As long as the external loads on a joint don't exceed the clamp load, the fastener is not subjected to any motion and will not come loose, obviating the need for locking mechanisms.
- The other type of bolted joint does not have a designed clamp load but relies on the shear strength of the bolt shaft. This may include clevis linkages, joints that can move, and joints that rely on a locking mechanism (like lock washers, thread adhesives, and lock nuts)
- The clamp load, also called preload, of a fastener is created when a torque is applied, and is generally a percentage of the fastener's proof strength; a fastener is manufactured to various standards that define, among other things, its strength and clamp load.
- When a fastener is tightened, it is stretched and the parts being fastened are compressed; this can be modeled as a spring-like assembly that has a non-intuitive distribution of strain. External forces are designed to act on the fastened parts rather than on the fastener, and as long as the forces acting on the fastened parts do not exceed the clamp load, the fastener is not subjected to any increased load.



- However, this is a simplified model that is only valid when the fastened parts are much stiffer than the fastener. In reality, the fastener is subjected to a small fraction of the external load even if that external load does not exceed the clamp load. When the fastened parts are less stiff than the fastener (soft, compressed gaskets for example), this model breaks down; the fastener is subjected to a load that is the sum of the pre-load and the external load.



Pic – Rolling of Grip Bolts in a Circular rolling machine.



EFFECTIVE FROM 01-04-2026

**GENERAL CONDITION FOR**  
Price List No.15 Effective from 01 April, 2026

All enquiries, quotations, orders or contracts are entitled to follow the conditions as per the enclosures given below unless otherwise accepted in writing by CAPARO Engineering India Ltd (Herein after called the COMPANY).

#### **PRICES**

Prices will be charged as per the prevailing price list at the time of dispatch, unless otherwise specially agreed to prices are F.O.R Destination/Chopanki basis as mutually agreed. Excise duty, educational cess. Sales taxes & other government levies & duties to the purchasers account as per prevailing norm during the dispatches

#### **LOSS OR DAMAGE**

The Company accepts no responsibility once the goods is handed over to the transporters. Company does not own any responsibility for any loss or damages to the goods during the transit.

#### **PACKAGING**

Prices are inclusive of goods in packed cartoons.

#### **PAYMENT**

Payment are as per mutually agreed terms & any payment made delay after due date shall attract penal interest as per banking norm.

#### **DELIVERY**

All offers for executing orders are from the stock, provided the same is available in ex-stock. For forward delivery, the dates are given without any assurance & no responsibility is guaranteed by the Company as the delivery failure may arise due to circumstances beyond the Company's control.

#### **FORCE MAJEURE**

The Company shall not be responsible for failure or delay in delivering the goods or any part thereof (or any consequential damages) due to acts of GOD. enemies of Government of India, Wars, embargo, riots, civil or political disturbances, strikes, lockouts, stoppages of labour, shortages of raw material and/or labour shortage of motive-power, non availability of shipping spaces or import or export license, breakdown of machinery, restraints imposed on the company by the Government, municipality or any other cause beyond the Company's control, such failure/delay shall not entitle the purchasers to cancel the contract nor is the Company liable to make good any damage arising from such failure to delivery or delay in delivery.

#### **INFRINGEMENT OF PATENT & TRADE MARK**

Any ordered goods are manufactured to customer's drawings or specifications, the responsibilities to ensure that these do not result in infringement of any patent or trade mark will lie entirely with the customer's concerned & customer shall be solely responsible for the consequence in case of any such infringement.

#### **ACCEPTANCE OR RETURNS**

In case of wrong dispatches the customers should intimate to the Company within 15 days of receipt of goods & prior confirmation should be obtained from the Company in writing before returning the wrong dispatches.

#### **CONFIRMATION**

The company shall not be responsible for any order booked by Sales man & agents which is not confirmed by company in writing

#### **GUARANTEE**

The company shall undertake the free replacement of goods against defects due to workmanship by the company after returning the defective products to the company's premises. But the Company shall not entertain the defective product for free replacement, arises due to improper use/process or processes at customers end. The Company also accepts no responsibilities for any contingent or resulting liabilities or losses arising through any defective goods supplied. Any claim for such replacement under this clause will arise only if the material is returned in good condition within three months from the date of supply. The Company's decision on the cause for any such defects is final & binding.

#### **CANCELLATION OF ORDERS**

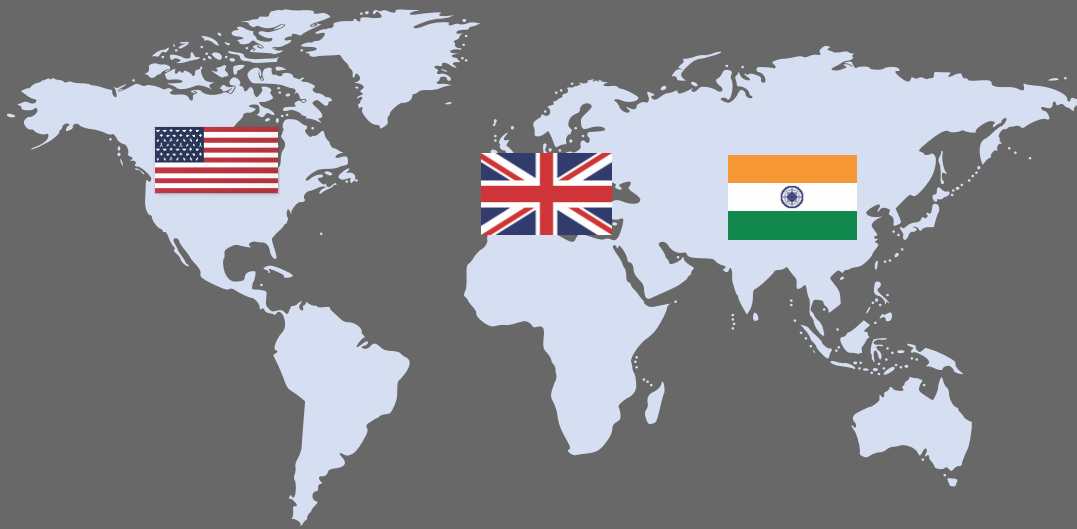
The company reserves the right to refuse the cancellation of orders once it has been accepted. Failure on the part of purchaser to accept the delivery and remit the payment will be considered a breach of contracts & Company is entitled to cancel the contract & proceed legally for recovering the payment if any.

Supplies shall be made in Blackened / phosphating finish. Other special finishes are at extra cost.

Maximum retail selling prices (Exclusive of GST & other levies as applicable) shall not exceed the printed prices on the cartoon boxes. However the customer is free to sell the product less than printed prices.

The company will not stand guarantee for socket products above 10.9 grade used in plated condition which has been plated at customer's end.

Any dispute or claim arising on or out of, or in connection with quotation, contracts, for supplies by the company shall be referred to the sole Arbitrator appointed by the Managing Director of the Company and the decision made by such our Arbitrator shall be final & binding on both the parties.



## CAPARO OPERATIONS IN INDIA

Caparo Maruti Ltd.  
**Gurugram, Bawal, Halol**

Caparo Power Ltd.  
**Bawal**

Caparo Engineering India Ltd.  
**Chopanki**

Caparo Stampings  
**Pithampur, NOIDA, Pune, Chennai,  
 Halol, Jamshedpur & Bawal**

Caparo Aluminium Foundry, **Chennai**

Caparo Forge, **Chennai**

Caparo MI Steel  
 Processors Pvt. Ltd., **Bawal**



CAPARO ENGINEERING  
 INDIA LTD.

**Corporate Office :**

7, Maruti Joint Venture Complex  
 Delhi Gurgaon Road, Gurugram-122 015  
 Ph.: 0124-4318100



### FACTORY

Plot No.A-7, Chopanki Industrial Area,  
 Bhiwadi-301 707, Distt. Alwar, Rajasthan INDIA  
 Tel: +91 1493 516640/42  
 Web: [www.caparo.co.in](http://www.caparo.co.in)