



**BROOKS** forgings  
the Manufacturing & Global Sourcing Specialists

# Industrial Catalogue

Brooks Forgings Ltd, established in 1960, is one of the UK's leading manufacturers of Forged Machined and Fabricated components.

With our extensive in-house manufacturing capabilities we are able to produce standards and specials to suit customer specific requirements.

**We offer an extensive range of manufacturing capabilities under one roof.**

## Product Range

Holding Down Bolts  
Hammerhead T Bolts  
Special Fasteners  
Eye Bolts & Eye Nuts  
Lifting Tackle  
Shackles  
U-Bolts  
J-Bolts  
L-Bolts  
Galvanised Fasteners  
Forged Blanks & Usages  
Torsion Bars  
Tension System Components  
Brackets  
Crusher Bolts  
Shear Reinforcement Systems  
Threaded Rebar  
Overhead Power Line Fittings  
Mooring Rings  
Chain Link Adjusters

## Our Capabilities

Upset Forging  
Drop Forging  
Open Die Forging  
Horizontal Counterblow Forging  
Hand Forging  
Machining  
Fabrication & Assembly  
Flash Butt Welding  
Robot Welding  
Thread Rolling  
Ring Rolling  
Hot & Cold Bending  
Hot & Cold Pressing  
Swaging & Pointing  
Computer Aided Design & Machining  
Die Cutting & Sinking  
Casting  
Sawing  
Marking & Traceability  
Quality Control  
Destructive & Tensile Testing  
Forging Simulation  
Stress Analysis  
3D Printing & Prototyping  
Import & Export Services  
Warehousing

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Call Us Today With Your Requirements  
**+44 (0)1384 563356**

**BROOKS** forgings  
INDUSTRIAL COMPONENTS CATALOGUE

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WHILST BROOKS FORGINGS LTD HAS TAKEN EVERY CARE WHEN PREPARING THIS CATALOGUE, THERE MAY STILL BE ERRORS OR INACCURACIES WITHIN THE TECHNICAL DATA PRESENTED.

WE ADVISE THAT THE RELEVANT STANDARDS ARE ALWAYS REFERRED TO AND ARE CROSS REFERENCED TO ENSURE ACCURACY.

NO LIABILITY CAN BE ACCEPTED FOR ANY ERRORS OR THE CONSEQUENCES ARISING FROM SUCH ERRORS.

VER/ISSUE 3

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[www.brooksforgings.co.uk](http://www.brooksforgings.co.uk)



## Manufacturer of Forged, Machined and Fabricated Components

Brooks Forgings Ltd, established in 1960, is one of the UK's leading manufacturers of Forged and Machined Industrial Components.

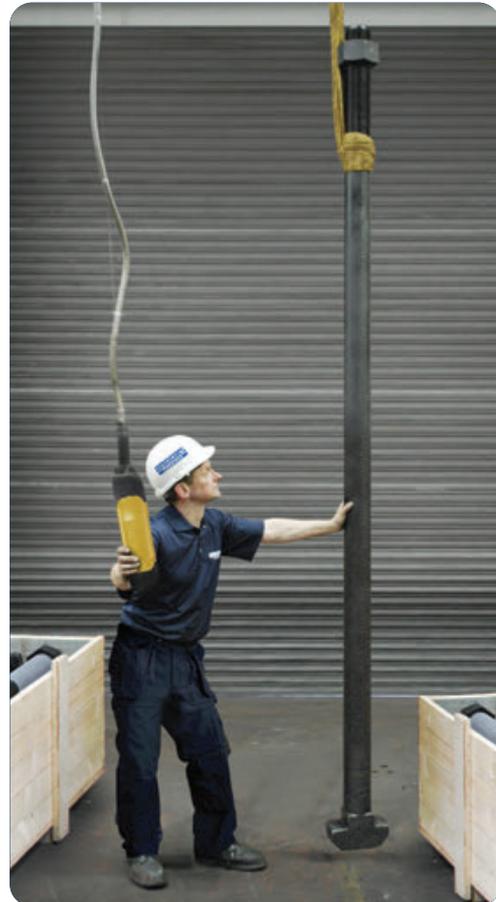
With our extensive in-house manufacturing capabilities we are able to produce standards and specials to suit customer specific requirements.

### Forging Capacity

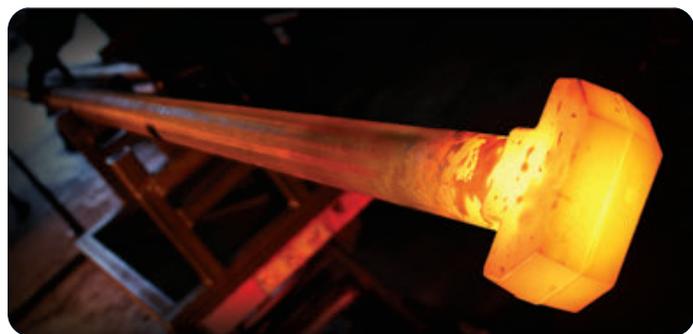
At the heart of our manufacturing facility are 16 forging cells, each utilising the latest heating technology. Capable of forging from 10mm diameter up to 100mm diameter and lengths up to 6000mm.

In-house CAD/CAM and tool making capabilities enable us to manufacture specials and standard head forms on short lead times.

**CE Approved Forging to EN15048.**



## 16 HOT FORGING CELLS



## Manufacturing Capabilities

Our extensive range of manufacturing processes gives us the ability to supply to many different industry sectors.

By utilising our design department and the extensive knowledge at our disposal, we are able to offer a fully bespoke service.

Very few companies in the industry are able to provide the same extent of services under one roof



Counterblow Forging



Split Die Upset Forging



Closed Die Upset Forging



Drop Forging



Open Die Forging



Hand Forging



Hot & Cold Bending



Hot & Cold Pressing



Swaging & Pointing



Machining



Fabrication & Assembly



Flash Butt Welding



Die Sinking



Quality Control

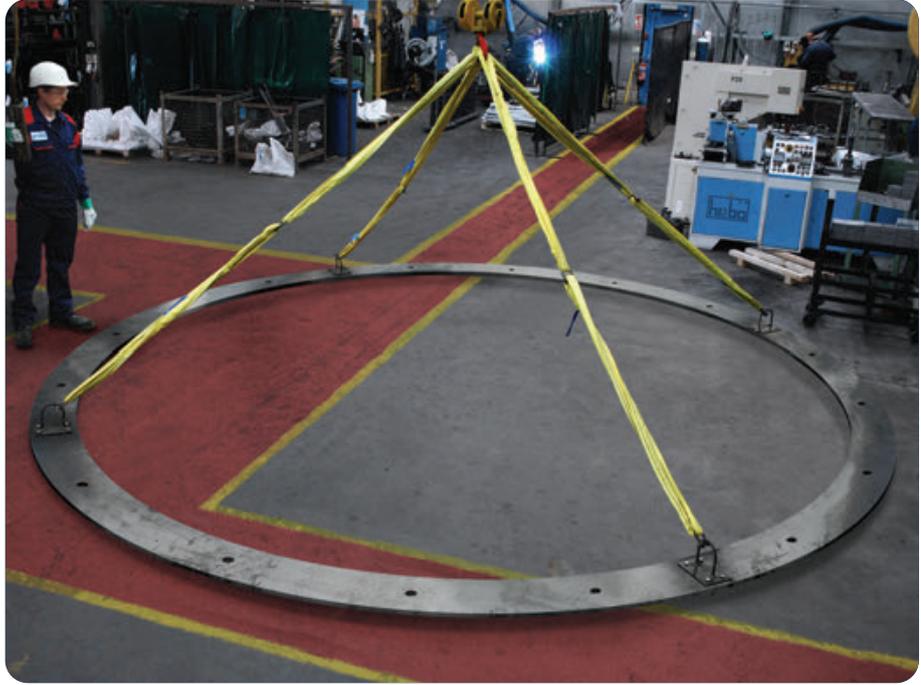


Warehousing



## Material Stock for Production

Material stock is considered a valuable resource at Brooks Forgings. By having dedicated warehousing, holding over 250 tonnes of stock, we have the capacity to purchase material in larger more economical volumes, minimising the requirement for multiple deliveries from suppliers.

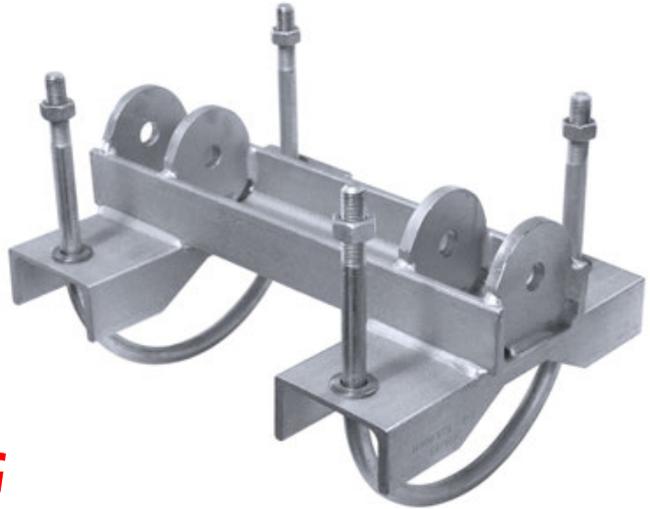


## Fabrication Capacity

Alongside traditional methods, we are able to offer Robot Welding and Flash Butt Welding as part of our standard service.

This gives us the flexibility to offer our customers the most cost effective method of fabrication.

**CE Approved Fabrication to EN 1090.**



## ROBOT WELDING FLASH BUTT WELDING

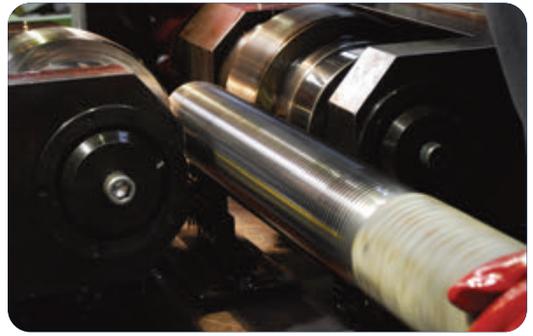


## Machining Capacity

Our dedicated machining department specialises in the production of special and standard fasteners. We manufacture to national and international standards, customer drawings and component samples by reverse engineering.

A comprehensive CNC machining capacity gives us the ability to deal with low and high volume requirements and provides our customers with consistent quality and accuracy.

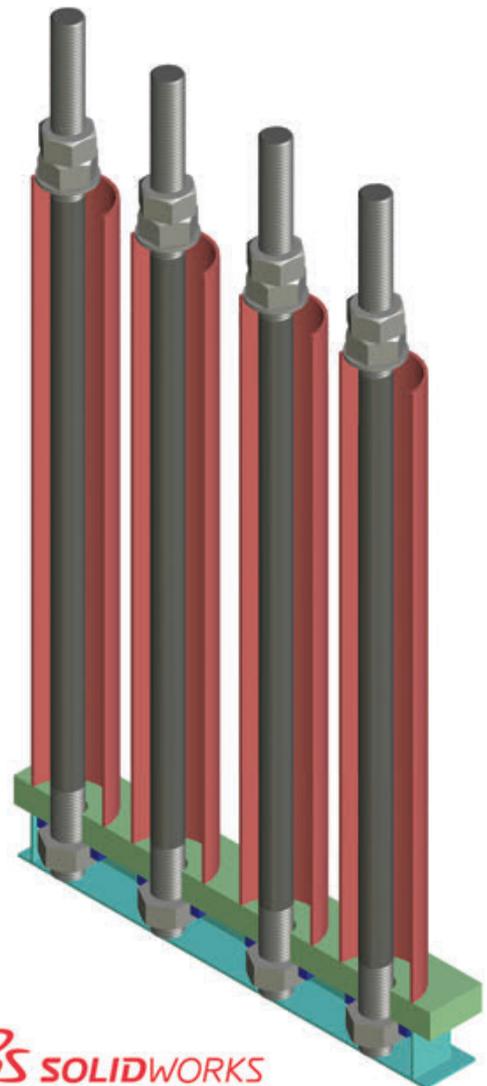
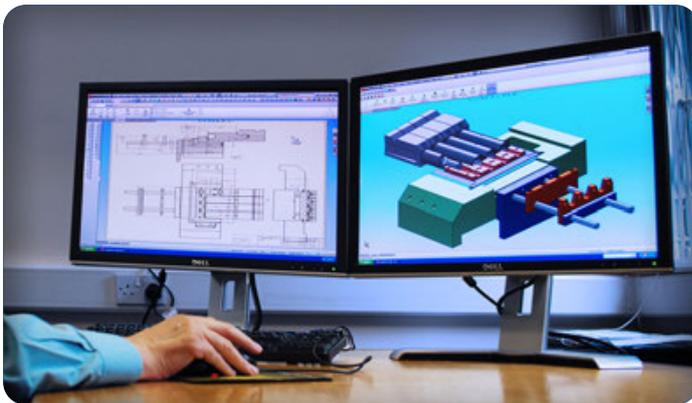
## 13 CNC MACHINES



## CAD / CAM Design

Our CAD Design facility is an important department, enabling us to communicate ideas and information for various products and specifications.

We are able to review and break down customers' supplied drawings into individual components, rendering new drawings for approval prior to manufacturing.



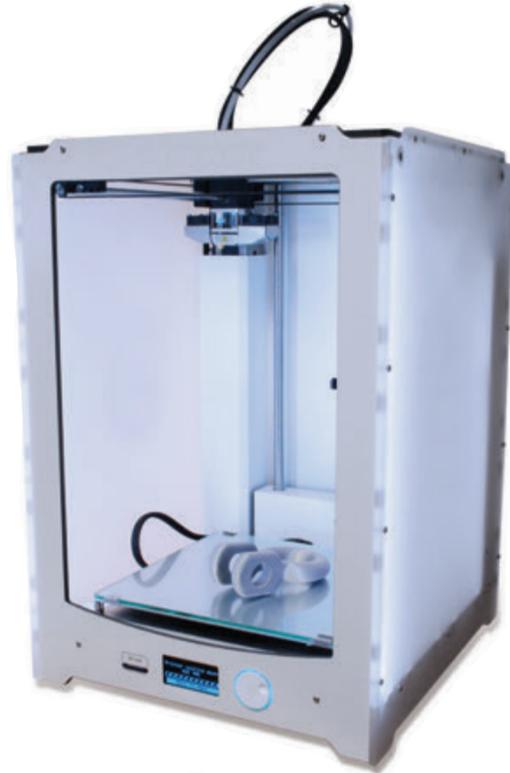
## 3D Printing – Additive Manufacturing

3D printing enables the low-cost production of prototype parts with incredible accuracy.

A physical and dimensionally accurate component can be 3D printed and handed to the client, giving them the ability to finish machine and even implement into a sub-assembly for final suitability testing.



*3D Printed Shackle in the final machined state.*



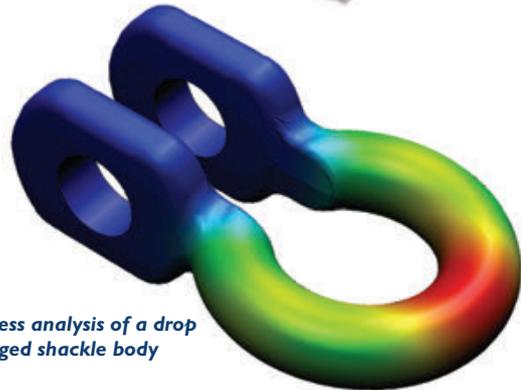
## Stress Analysis

Various types of Stress Analysis are incorporated into the latest Solidworks package, enabling Brooks Forgings engineers to carry out simulation on either individual parts or assemblies by using finite element analysis.

This process can improve and validate performance and reduce the need for costly prototypes or revisions later on in the project.

This also enables us to evaluate product structure, design suitability, and make alterations to suit various requirements.

We can also input various material properties making the system fully customisable.

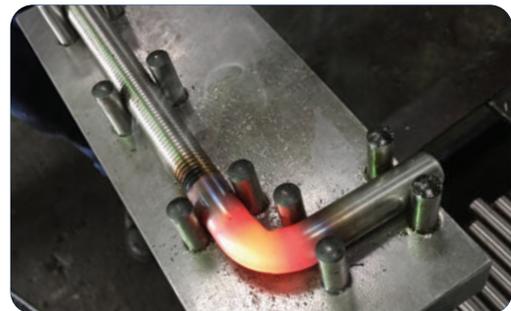


*Stress analysis of a drop forged shackle body*

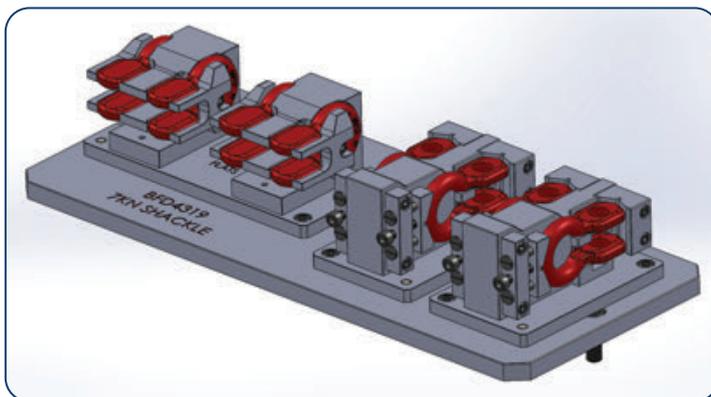
## Jig, Fixture & Packaging Design

Our in-house design team is able to design various jigs, fixtures and packaging scenarios in preparation for the manufacturing process, component inspection, and final packing & despatch.

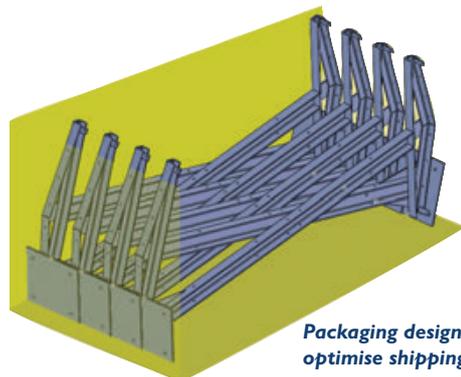
This is designed to assist with lead time estimation, production rates, machine setup and final shipping costs.



*Pin jigs for in-production dimensional inspection*



*Fixture designs for final CNC machining process.*



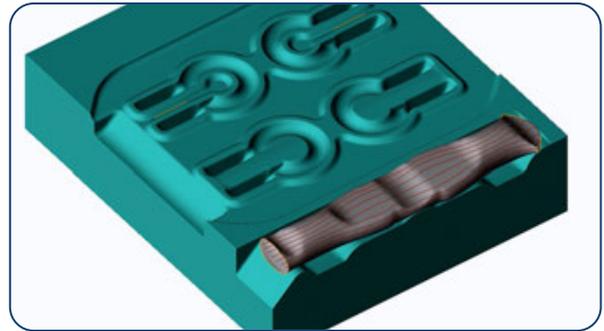
*Packaging design to optimise shipping costs*

# QForm Forging Simulation

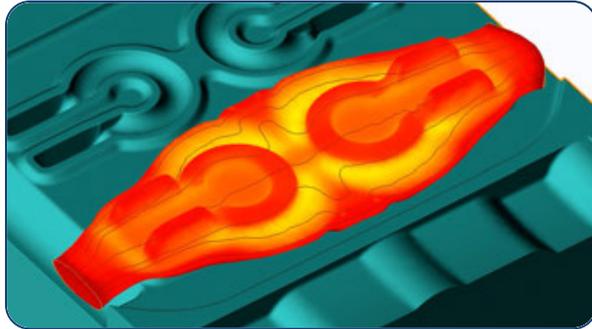
QForm is forging simulation software that enables the development and optimisation of tooling and accurately simulates and analyses the forging process.

Why is this so important? It is possible to identify flaws such as inadequate impression filling, laps or folds, and flow-through defects.

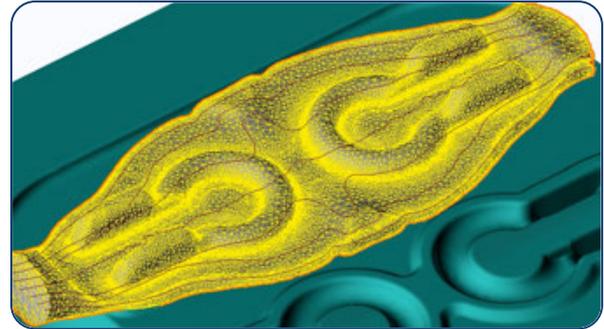
Further optimisation of the process can be achieved by varying starting material diameter, forging forces and analysis of die tooling stresses to improve durability and longevity.



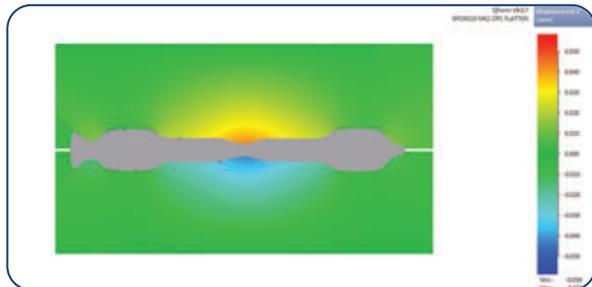
QForm - Stage One - Flattener



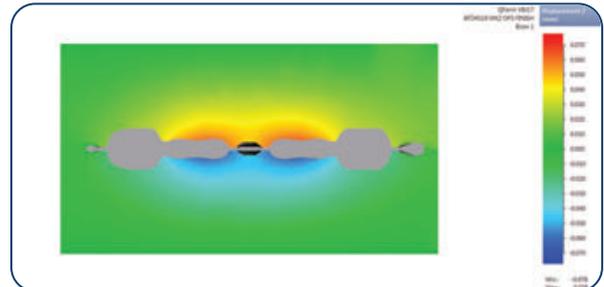
QForm - Stage Two - Moulder with temperature overlay



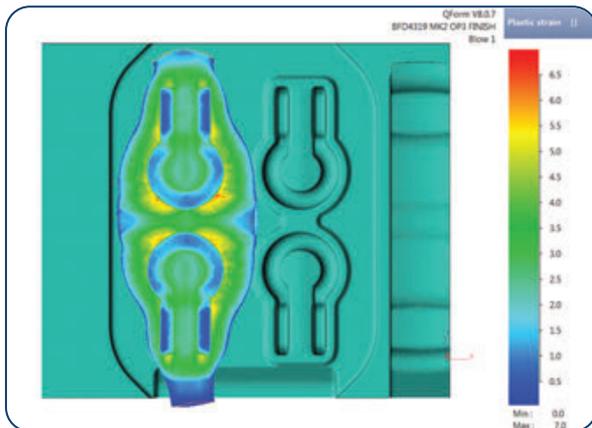
QForm - Stage Three - Finisher with mesh overlay



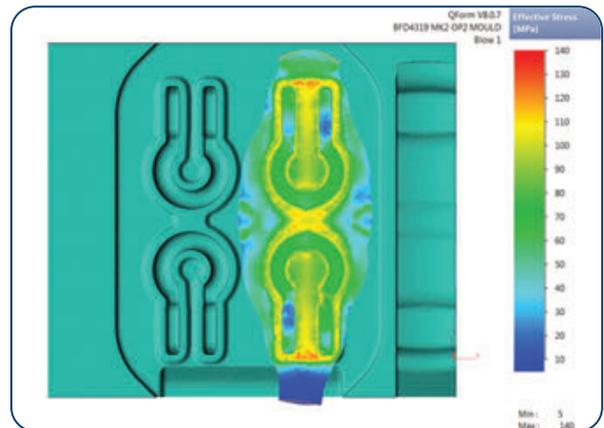
QForm - Flattener displacement analysis



QForm - Finisher displacement analysis



QForm - Finisher plastic strain analysis



QForm - Moulder effective stress analysis

A combination of 3D printing and QForm enables Brooks Forgings to improve lead times and the overall efficiency of the manufacturing process by eliminating forging defects and final application suitability issues before final production tooling and samples are physically produced.



## Quality Control

Our reputation for quality is underpinned by operating to BS EN ISO 9001, throughout all stages of production.

Component traceability is ensured by individual cast identification supported by all levels of certification. We offer Certificates of Conformity through to BS EN 10204 2.1, 2.2, 3.1 and independent inspection to BS EN 10204 3.2.

Quality plans, first article and dimensional inspection reports are available upon request.



### Micro Percussion Marking System

We have both portable and bench top micro-percussion marking systems. Commonly used for jobs requiring full traceability and unique component identification.

### 50 Tonne Destructive/Tensile Testing Machine

Mayes 4 Column Vertical Tensile Testing Machine. 500 KN model.

### Portable CMM

The FARO Gage is a portable CMM that increases measurement productivity and flexibility and enhances accuracy in any production environment.

### Brinell and Rockwell Hardness Testers

We have several on-site testing machines to measure the hardness of materials.

### Coating Thickness Gauges

Our coating thickness gauge has an extensive range of features offering full batching and statistical capability. Measuring range up to 50 millimetres. High accuracy of up to  $\pm 1\%$  when referred to reference standards.

### Liquid Penetrant Inspection

Liquid penetrant inspection (LPI) is a commonly used inspection method to locate surface-breaking defects such as hairline cracks and surface porosity.

### Cyclops Portable Thermometer

A general purpose, high temperature, portable infrared thermometer, designed for accurate measurement of temperatures in the range 550 to 3000°C/ 1022 to 5432°F.

### Energy Dispersive X-Ray Fluorescence Analyser (EDXRF)

Hand held energy-dispersive x-ray fluorescence analyser. It can quickly, non-destructively, determine the elemental composition of metal and precious metal samples.

### Inspection Jigs

Our in house tool room plays a vital part in assisting our quality control department.

Component inspection jigs can be produced ensuring 100% dimensional checks throughout production.

### Marposs Merlin Gage Computer

Designed for the shop floor environment, the Marposs Merlin is specifically designed for measuring applications and statistical analysis.



## Quality Documentation

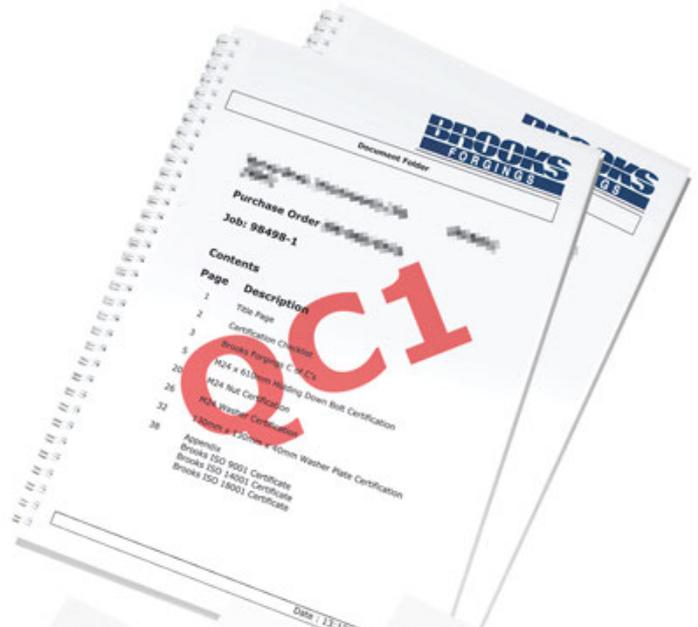
Our ISO 9001 registration demonstrates our competency and experience in all areas of our quality control system. Many projects within the construction industry demand vigorous traceability of all supplied components, we are able to provide detailed quality manuals to grade 1, 2 and 3.

- Quality Control & Experience
- Material Identification & Traceability
- Product Identification & Traceability
- Process Methods
- Photographic Records
- Information Management System
- Quality Assurance Systems

**FULL QUALITY  
DOCUMENTATION  
TO QC1, QC2 & QC3  
ON REQUEST**



European Certified  
Materials



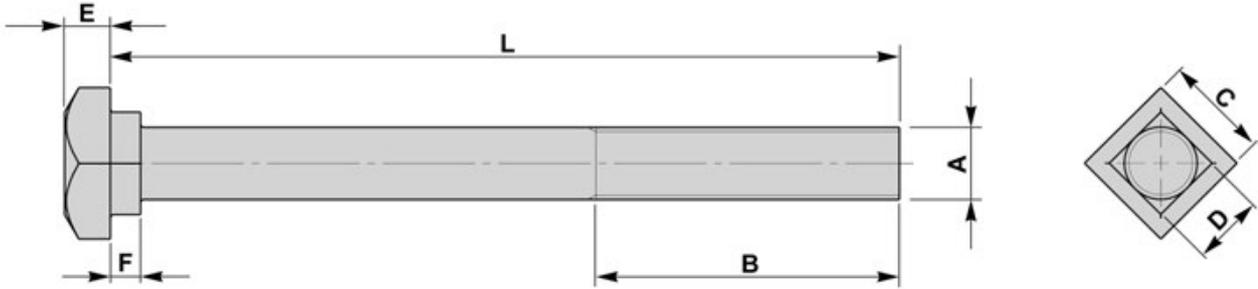
**APPROVED TO ISO 9001  
QUALITY**

**ISO 14001  
ENVIRONMENTAL**

**OHSAS 45001  
HEALTH & SAFETY**

**BS 7419 - SQ SQ HOLDING DOWN BOLTS**

**BFE 3**



THREAD DIA	A	M16	M20	M24	M30	M36	M42	M48	M56	M64
<b>B</b>	MAX	122	127.5	133	140.5	148	155.5	163	172.5	182
	MIN	116	120	124	130	136	142	148	156	164
SHANK DIA	MAX	16.7	20.84	24.84	30.84	37	43	49	57.2	65.2
	MIN	15.3	19.16	23.16	29.16	35	41	47	54.8	62.8
<b>C</b>	MAX	24	30	36	46	55	65	75	85	95
	MIN	23.16	29.16	35	45	53.8	63.1	73.1	82.8	92.8
<b>D</b>	MAX	16.7	20.84	24.84	30.84	37	43	49	57.2	65.2
	MIN	15.3	19.16	23.16	29.16	35	41	47	54.8	62.8
<b>E</b>	NOM	10	12.5	15	18.7	22.5	26	30	35	40
	MIN	9.25	11.6	14.1	17.65	21.45	24.95	28.95	33.75	38.75
	MAX	10.75	13.4	15.9	19.75	23.55	27.05	31.05	36.25	41.25
<b>F</b>	NOM	8	10	12	15	18	21	24	28	32
	MIN	7.25	9.25	11.1	14.1	17.1	19.95	22.95	26.95	30.75
	MAX	8.75	10.75	12.9	15.9	18.9	22.05	25.05	29.05	33.25
<b>L</b>	<b>FOR DIMENSIONS SEE TABLE OPPOSITE NON STANDARD LENGTHS AVAILABLE UPON REQUEST</b>									



BS 7419 - SQ SQ HOLDING DOWN BOLTS

**M16 - M72**  
**UP TO 6000MM LENGTH**  
**IN 8.8 GRADE**

**BS 7419 - SQ SQ HOLDING DOWN BOLTS**

**NOMINAL LENGTH (L) OF PREFERRED SIZES INCLUDING WEIGHTS**

**THREAD DIAMETERS**

M16		M20		M24		M30		M36	
mm	Weight (kg)	mm	Weight (kg)	mm	Weight (kg)	mm	Weight (kg)	mm	Weight (kg)
300	0.53	300	0.85	---	---	---	---	---	---
375	0.64	375	1.03	375	1.51	---	---	---	---
450	0.76	450	1.22	450	1.78	450	2.90	450	4.22
525	0.88	525	1.43	525	2.04	525	3.35	525	4.82
600	1.00	600	1.58	600	2.31	600	3.77	600	5.42
---	---	750	1.95	750	2.84	750	4.60	750	6.62
---	---	1000	2.00	1000	3.72	1000	5.95	1000	8.62
---	---	---	---	1250	4.61	1250	7.34	1250	10.62

**TOLERANCES ON NOMINAL LENGTH (L)**

NOMINAL LENGTH (mm)	TOLERANCE (mm)
250 < L ≤ 315	± 5.2
315 < L ≤ 400	± 5.7
400 < L ≤ 500	± 6.3
500 < L ≤ 630	± 7.0
630 < L ≤ 800	± 8.0
800 < L ≤ 1000	± 9.0
1000 < L ≤ 1250	± 10.5
> 1250	PER AGREEMENT

**EXTRA TOLERANCE**

Square square bolts are designed to be used with washer plates.

When located in position the square under head slots into the hole, preventing rotation when tightening.

This application also gives tolerance for lining up with structural stanchion base plates.

**WASHER PLATES - PAGE 39**

**MATERIAL**

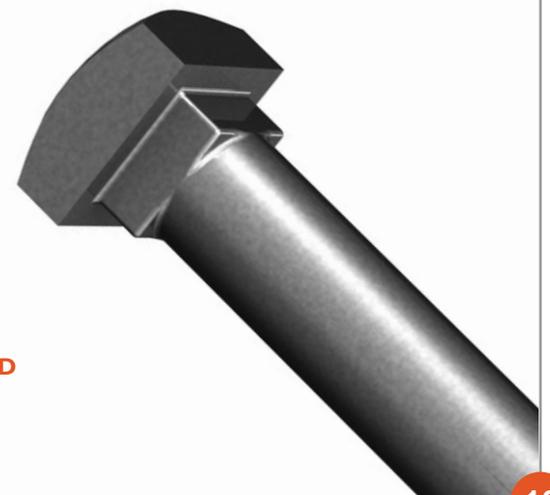
**CARBON STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARD LENGTHS BOTH SHORTER AND LONGER THAN SHOWN ARE AVAILABLE**

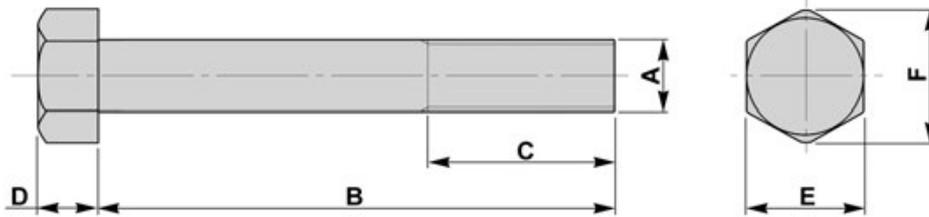
**UP TO 6000MM LONG ON REQUEST**



## BS 4190 - HEXAGON BOLTS - METRIC

- TO BS 4190

**BFF 1**



**WASHER FACE ON REQUEST**

STANDARD THREAD LENGTHS	
Normal length of bolt B	Length of thread C
Up to and including 125mm	2A + 6mm
Over 125mm up to and including 200mm	2A + 12mm
Over 200mm	2A + 25mm

THREAD DIA	PITCH OF THREAD	DIA OF SHANK UNTHREADED		WIDTH ACROSS FLATS		WIDTH ACROSS CORNERS		HEIGHT OF HEAD		RADIUS UNDER HEAD
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
A	Coarse Pitch Series	E		F		D				
mm		mm	mm	mm	mm	mm	mm	mm	mm	
M5	0.8	4.52	5.48	7.64	8	8.63	9.2	3.13	3.88	0.35
M6	1	5.52	6.48	9.64	10	10.89	11.5	3.63	4.38	0.40
M8	1.25	7.42	8.58	12.57	13	14.20	15.0	5.13	5.88	0.80
M10	1.5	9.42	10.58	16.57	17	18.72	19.6	6.55	7.45	0.80
M12	1.75	11.30	12.70	18.48	19	20.88	21.9	7.55	8.45	1.25
M16	2	15.30	16.70	23.16	24	26.17	27.7	9.55	10.45	1.25
M20	2.5	19.16	20.84	29.16	30	32.95	34.6	12.10	13.90	1.78
(M22)	2.5	21.16	22.84	31.00	32	35.03	36.9	13.10	14.90	1.78
M24	3	23.16	24.84	35.00	36	39.55	41.6	14.10	15.90	1.78
(M27)	3	26.16	27.84	40.00	41	45.20	47.3	16.10	17.90	2.28
M30	3.5	29.16	30.84	45.00	46	50.85	53.1	17.95	20.05	2.28
(M33)	3.5	32.00	34.00	49.00	50	55.37	57.7	19.95	22.05	2.28
M36	4	35.00	37.00	53.80	55	60.79	63.5	21.95	24.05	2.70
(M39)	4	38.00	40.00	58.80	60	66.44	69.3	23.95	26.05	2.70
M42	4.5	41.00	43.00	63.80	65	72.09	75.1	24.95	27.05	2.80
(M45)	4.5	44.00	46.00	68.80	70	77.74	80.8	26.95	29.05	3.30
M48	5	47.00	49.00	73.80	75	83.39	86.6	28.95	31.05	3.80
(M52)	5	50.80	53.20	78.80	80	89.04	92.4	31.75	34.25	4.70
M56	5.5	54.80	57.20	83.60	85	94.47	98.1	33.75	36.25	4.90
(M60)	5.5	58.80	61.20	88.60	90	100.12	103.9	36.75	39.25	4.90
M64	6	62.80	65.20	93.60	95	105.77	109.7	38.75	41.25	4.90
(M68)	6	66.80	69.20	98.60	100	111.42	115.5	41.75	44.25	4.90

**MATERIAL**

**GRADE 4.6, 5.6, 6.9**  
**STAINLESS STEELS**  
**AVAILABLE IN BS3692**  
**GRADES 8.8, 10.9, 12.9**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

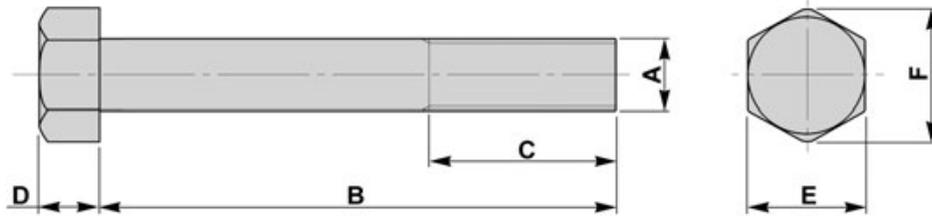
**NON STANDARD**  
**THREAD LENGTH AVAILABLE**  
**LENGTHS UP TO 3000MM**

**( ) = DENOTES NON PREFERRED SIZES**

## BS 3692 - HEXAGON BOLTS - METRIC

**BFF 2**

- TO BS 3692



**WASHER FACE ON REQUEST**

STANDARD THREAD LENGTHS	
Normal length of bolt B	Length of thread C
Up to and including 125mm	2A + 6mm
Over 125mm up to and including 200mm	2A + 12mm
Over 200mm	2A + 25mm

THREAD DIA	PITCH OF THREAD	DIA OF SHANK UNTHREADED		WIDTH ACROSS FLATS		WIDTH ACROSS CORNERS		HEIGHT OF HEAD		RADIUS UNDER HEAD	
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
A	Coarse Pitch Series			E		F		D			
mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
M5	0.8	4.82	5.0	7.85	8.0	8.87	9.2	3.35	3.66	0.2	0.35
M6	1	5.82	6.0	9.78	10.0	11.05	11.5	3.85	4.15	0.25	0.4
M8	1.25	7.78	8.0	12.73	13.0	14.38	15.0	5.35	5.65	0.4	0.6
M10	1.5	9.78	10.0	16.73	17.0	18.90	19.6	6.82	7.18	0.4	0.6
M12	1.75	11.73	12.0	18.67	19.0	21.10	21.9	7.82	8.18	0.6	1.1
(M14)	2	13.73	14.0	21.67	22.0	24.49	25.4	8.82	9.18	0.6	1.1
M16	2	15.73	16.0	23.67	24.0	26.75	27.7	9.82	10.18	0.6	1.1
(M18)	2.5	17.73	18.0	26.67	27.0	30.14	31.2	11.79	12.22	0.6	1.1
M20	2.5	19.67	20.0	29.67	30.0	33.53	34.6	12.79	13.22	0.8	1.2
(M22)	2.5	21.67	22.0	31.61	32.0	35.72	36.9	13.79	14.22	0.8	1.2
M24	3	23.67	24.0	35.38	36.0	39.98	41.6	14.79	15.22	0.8	1.2
(M27)	3	26.67	27.0	40.38	41.0	45.63	47.3	16.79	17.22	1.0	1.7
M30	3.5	29.67	30.0	45.38	46.0	51.28	53.1	18.74	19.26	1.0	1.7
(M33)	3.5	32.61	33.0	49.38	50.0	55.80	57.7	20.74	21.26	1.0	1.7
M36	4	35.61	36.0	54.26	55.0	61.31	63.5	22.74	23.26	1.0	1.7
(M39)	4	38.61	39.0	59.26	60.0	66.96	69.3	24.74	25.26	1.0	1.7
M42	4.5	41.61	42.0	64.26	65.0	72.61	75.1	25.74	26.26	1.2	1.8
(M45)	4.5	44.61	45.0	69.26	70.0	78.26	80.8	27.74	28.26	1.2	1.8
M48	5	47.61	48.0	74.26	75.0	83.91	86.6	29.74	30.26	1.6	2.3
(M52)	5	51.54	52.0	79.26	80.0	89.56	92.4	32.69	33.21	1.6	2.3
M56	5.5	55.54	56.0	84.13	85.0	95.07	98.1	34.69	35.31	2.0	3.5
(M60)	5.5	59.54	60.0	89.13	90.0	100.72	103.9	37.69	38.31	2.0	3.5
M64	6	63.54	64.0	94.13	95.0	106.37	109.7	39.69	40.31	2.0	3.5
(M68)	6	67.54	68.0	99.13	100.0	112.02	115.5	42.69	43.31	2.0	3.5

**MATERIAL**

**GRADE 4.6, 5.6, 6.9**  
**STAINLESS STEELS**  
**AVAILABLE IN BS3692**  
**GRADES 8.8, 10.9, 12.9**

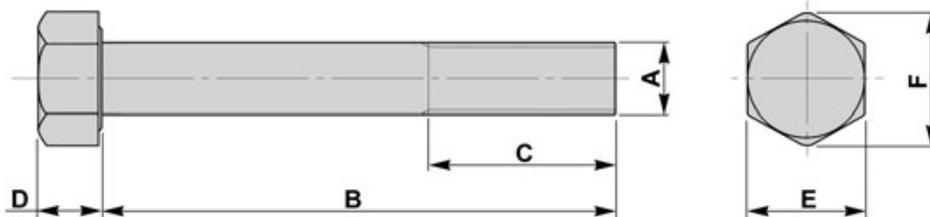
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARD**  
**THREAD LENGTH AVAILABLE**  
**LENGTHS UP TO 3000MM**  
**( ) = DENOTES NON PREFERRED SIZES**

## ISO 4014 / DIN 931 - HEXAGON BOLTS

- TO ISO 4014
- PART THREADED



**ALL SIZES SHOWN ARE GRADE B ISO4014  
GRADE A SIZES ALSO AVAILABLE ON REQUEST**

STANDARD THREAD LENGTHS	
Normal length of bolt B	Length of thread C
Up to and including 125mm	2A + 6mm
Over 125mm up to and including 200mm	2A + 12mm
Over 200mm	2A + 25mm

THREAD DIA	PITCH OF THREAD	DIA OF SHANK UNTHREADED		E		F	D			RADIUS UNDER HEAD
		GRADE B		GRADE B		GRADE B	GRADE B			
		MIN	MAX	MIN	MAX	MIN	MIN	MAX	NOM	MIN
mm	Coarse Pitch Series	mm	mm	mm	mm	mm	mm	mm	mm	mm
M12	1.75	11.57	12.00	17.57	18.00	19.85	7.21	7.79	7.50	0.60
M16	2	15.57	16.00	23.16	24.00	26.17	9.71	10.29	10.00	0.60
M20	2.5	19.48	20.00	29.16	30.00	32.95	12.15	12.85	12.50	0.80
(M22)	2.5	21.48	22.00	33.00	34.00	37.29	13.65	14.35	14.00	0.80
M24	3	23.48	24.00	35.00	36.00	39.55	14.65	15.35	15.00	0.80
(M27)	3	26.48	27.00	40.00	41.00	45.20	13.65	17.35	17.00	1.00
M30	3.5	29.48	30.00	45.00	46.00	50.85	18.28	19.12	18.70	1.00
(M33)	3.5	32.38	33.00	49.00	50.00	55.37	20.58	21.42	21.00	1.00
M36	4	35.38	36.00	53.8	55.00	60.79	22.08	22.92	22.50	1.00
(M39)	4	38.38	39.00	58.80	60.00	66.44	24.58	25.42	25.00	1.00
M42	4.5	41.38	42.00	63.10	65.00	71.30	25.58	26.42	26.00	1.20
(M45)	4.5	44.38	45.00	68.10	70.00	76.95	27.58	28.42	28.00	1.20
M48	5	47.38	48.00	73.10	75.00	82.60	29.58	30.42	30.00	1.60
(M52)	5	51.26	52.00	78.10	80.00	88.25	32.50	33.50	33.00	1.60
M56	5.5	55.26	56.00	82.80	85.00	93.56	34.50	35.50	35.00	2.00
(M60)	5.5	59.26	60.00	87.80	90.00	99.21	37.50	38.50	38.00	2.00
M64	6	63.26	64.00	92.80	95.00	104.86	39.50	40.50	40.00	2.00

**MATERIAL**

**GRADES**

4.6, 5.6, 6.9, 8.8, 10.9, 12.9

**STAINLESS STEELS**

**FINISH**

**SELF COLOUR**

GALVANISED

ELECTROPLATED

SHERARDISED

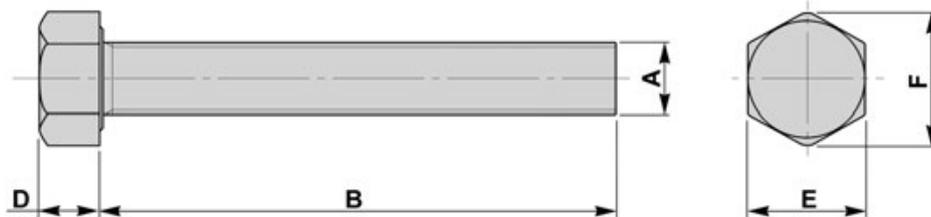
PTFE COATING

**NON STANDARD  
THREAD LENGTH AVAILABLE  
LENGTHS UP TO 3000MM**

**( ) = DENOTES NON PREFERRED SIZES**

## ISO 4017 / DIN 933 - HEXAGON BOLTS

- TO ISO 4017  
 - FULLY THREADED



**ALL SIZES SHOWN ARE GRADE B ISO4017  
 GRADE A SIZES ALSO AVAILABLE ON REQUEST**

THREAD DIA	PITCH OF THREAD	E		F	D			RADIUS UNDER HEAD
		MIN	MAX	MIN	MIN	MAX	NOM	MIN
A	Coarse Pitch Series	GRADE B		GRADE B	GRADE B			
mm		mm	mm	mm	mm	mm	mm	mm
M12	1.75	17.57	18.00	19.85	7.21	7.79	7.50	0.60
M16	2	23.16	24.00	26.17	9.71	10.29	10.00	0.60
M20	2.5	29.16	30.00	32.95	12.15	12.85	12.50	0.80
(M22)	2.5	33.00	34.00	37.29	13.65	14.35	14.00	0.80
M24	3	35.00	36.00	39.55	14.65	15.35	15.00	0.80
(M27)	3	40.00	41.00	45.20	13.65	17.35	17.00	1.00
M30	3.5	45.00	46.00	50.85	18.28	19.12	18.70	1.00
(M33)	3.5	49.00	50.00	55.37	20.58	21.42	21.00	1.00
M36	4	53.8	55.00	60.79	22.08	22.92	22.50	1.00
(M39)	4	58.80	60.00	66.44	24.58	25.42	25.00	1.00
M42	4.5	63.10	65.00	71.30	25.58	26.42	26.00	1.20
(M45)	4.5	68.10	70.00	76.95	27.58	28.42	28.00	1.20
M48	5	73.10	75.00	82.60	29.58	30.42	30.00	1.60
(M52)	5	78.10	80.00	88.25	32.50	33.50	33.00	1.60
M56	5.5	82.80	85.00	93.56	34.50	35.50	35.00	2.00
(M60)	5.5	87.80	90.00	99.21	37.50	38.50	38.00	2.00
M64	6	92.80	95.00	104.86	39.50	40.50	40.00	2.00

**MATERIAL**

**GRADES**

4.6, 5.6, 6.9, 8.8, 10.9, 12.9

STAINLESS STEELS

**FINISH**

SELF COLOUR

GALVANISED

ELECTROPLATED

SHERARDISED

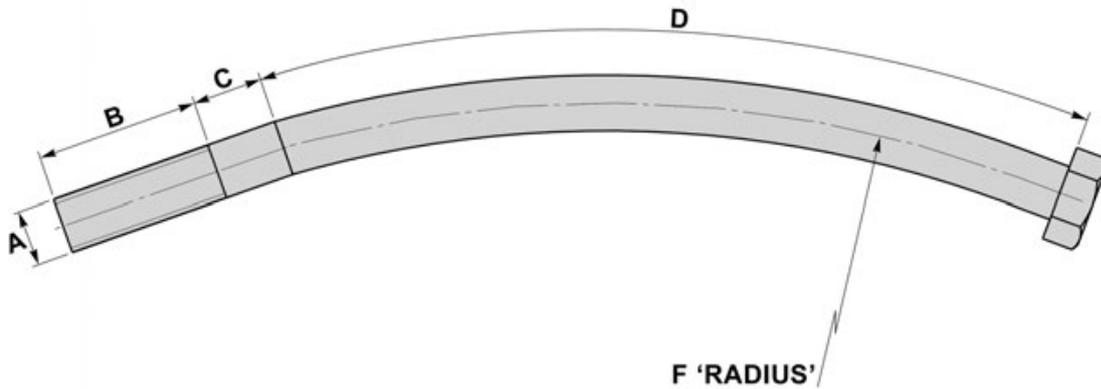
PTFE COATING

**NON STANDARD  
 THREAD LENGTH AVAILABLE  
 LENGTHS UP TO 3000MM**

**( ) = DENOTES NON PREFERRED SIZES**

## CURVED / TUNNEL BOLTS

**BFF 10**



**MANUFACTURED TO SUIT  
CUSTOMER REQUIREMENTS**

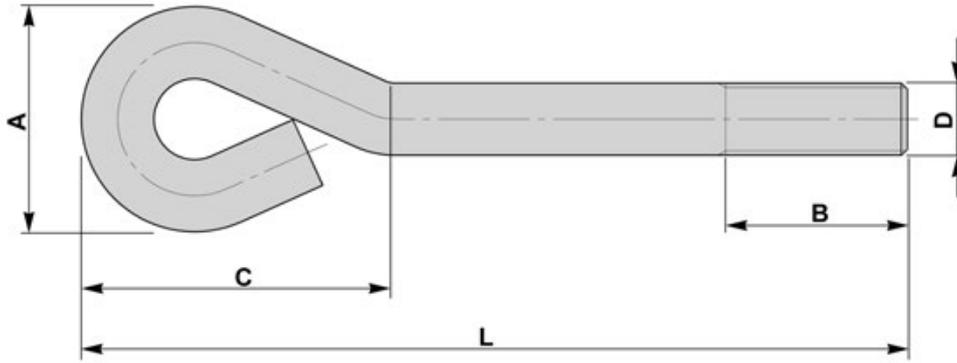
**UP TO M48 ON REQUEST**



**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

**DIN 529 - TYPE A**



<b>D</b>	<b>A</b>	<b>C</b>
mm	mm	mm
M8	24	45
M10	30	55
M12	36	65
M16	48	85
M20	60	105
M24	75	125
M30	95	155
M36	115	190
M42	135	220
M48	155	250
M56	180	290
M64	200	335
M72	240	370

**THREAD AND OVERALL LENGTHS TO  
 SUIT CUSTOMER REQUIREMENTS**

**NON STANDARDS MANUFACTURED  
 ON REQUEST**

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

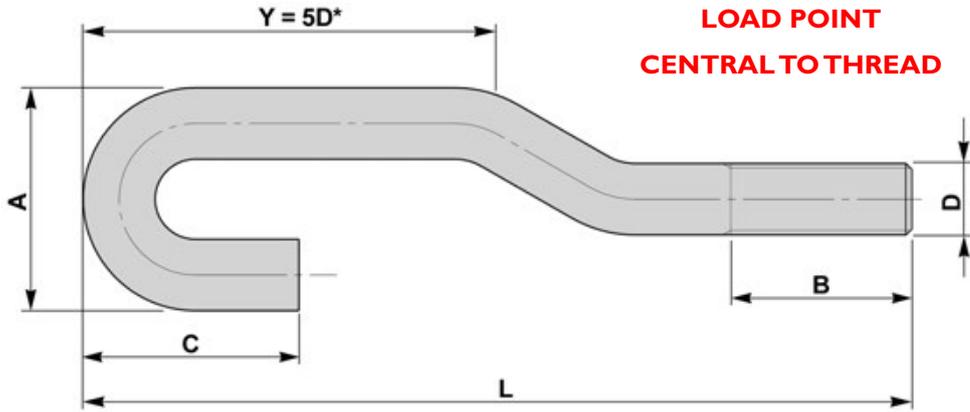
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

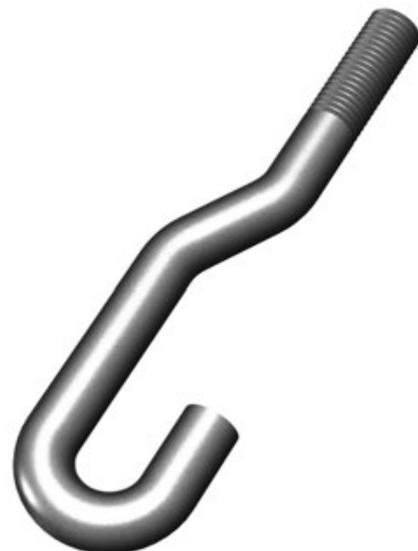


DIN 529 - TYPE B

**BFF 12**



D	A	C
mm	mm	mm
M8	24	20
M10	30	25
M12	36	30
M16	48	40
M20	60	50
M24	75	60
M30	95	75
M36	115	90
M42	135	105
M48	155	120
M56	180	140
M64	200	160
M72	240	180

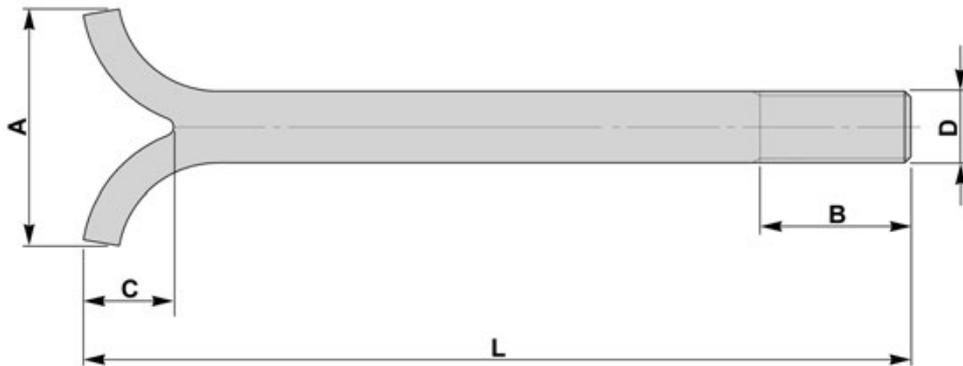


**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

DIN 529 - TYPE C

**BFF 13**



D	A	C
mm	mm	mm
M8	16	12
M10	20	15
M12	24	18
M16	32	24
M20	40	30
M24	48	36
M30	60	45
M36	72	54
M42	85	63
M48	98	72
M56	<b>NON STANDARD SIZES ON REQUEST</b>	
M64		
M72		
M72		



**MATERIAL**

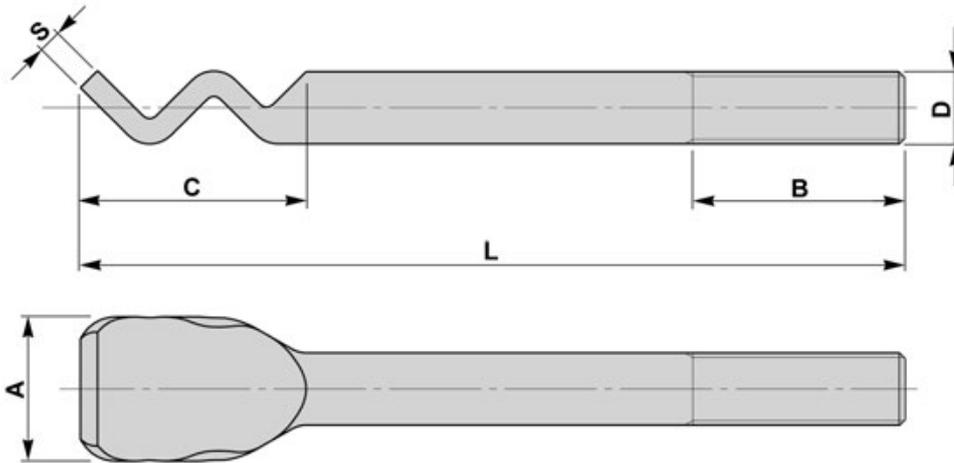
**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

## DIN 529 - TYPE D

**BFF 16**



D	A	C	S
mm	mm	mm	mm
M8	16	24	3
M10	20	30	3.5
M12	24	36	4
M16	32	48	5
M20	40	60	6
M24	48	72	8

**THREAD AND OVERALL LENGTHS TO  
SUIT CUSTOMER REQUIREMENTS**

**NON STANDARDS MANUFACTURED  
ON REQUEST**

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

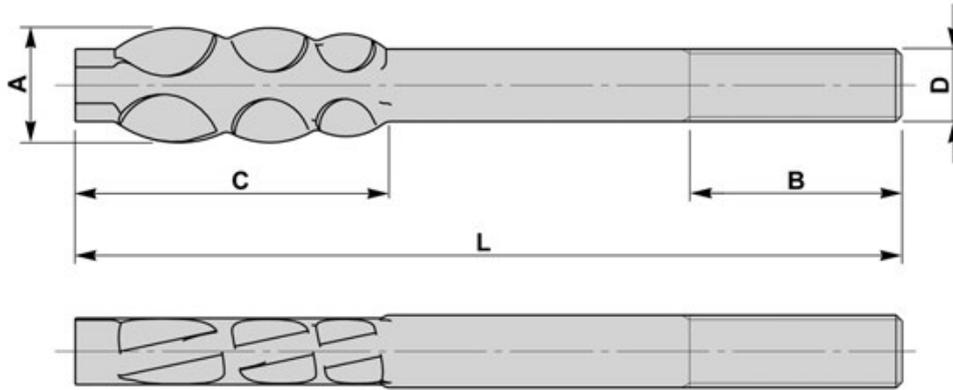
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



DIN 529 - TYPE E

**BFF 11**



D	A	C
mm	mm	mm
M8	16	45
M10	20	55
M12	24	70
M16	32	90
M20	40	100
M24	48	135
M30	60	150
M36	72	180
M42	85	260
M48	98	260



**SHORTER AND LONGER  
 LENGTHS AVAILABLE  
 UPON REQUEST**



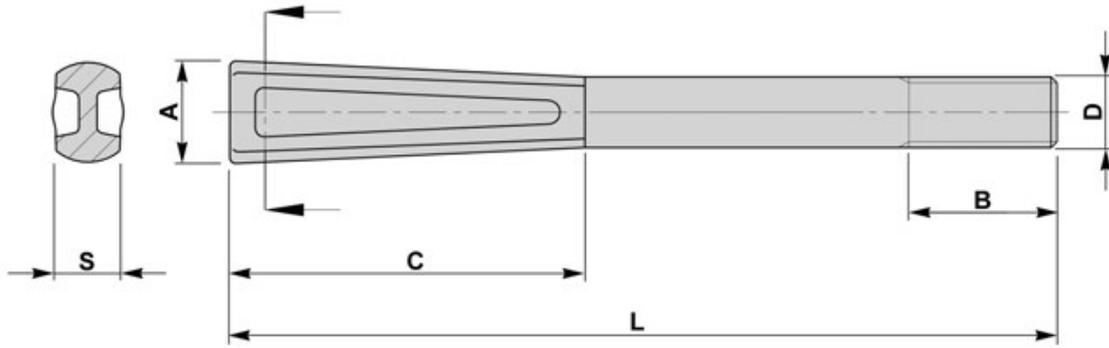
**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

## DIN 529 - TYPE F



D	A	C	S
mm	mm	mm	mm
M8	14	50	6
M10	16	50	8
M12	20	55	10
M16	25	85	14
M20	30	95	18
M24	35	120	22
M30	45	130	26
M36	55	190	30
M42	65	200	36
M48	75	220	42

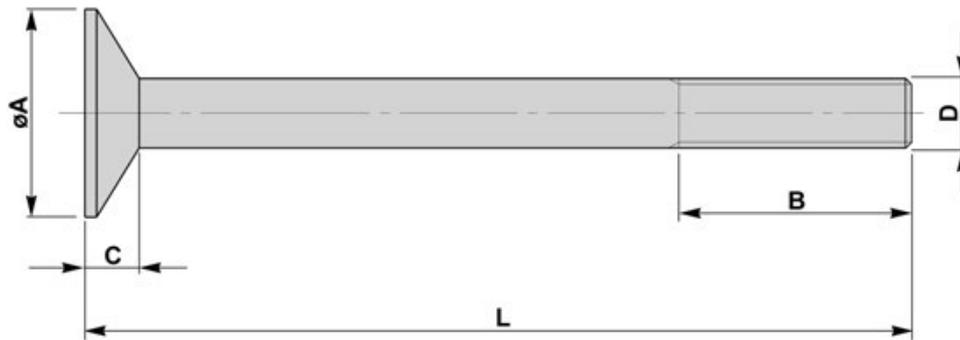
**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING



DIN 529 - TYPE G

**BFF 14**



D	A	C
mm	mm	mm
M8	20	5
M10	25	6
M12	30	7
M16	40	10
M20	50	12
M24	60	14
M30	75	18
M36	90	22
M42	105	25
M48	120	29
M56	140	34
M64	160	38
M72	180	43



**THREAD AND OVERALL  
LENGTHS TO SUIT  
CUSTOMER REQUIREMENTS**

**NON STANDARDS  
MANUFACTURED ON  
REQUEST**

**MATERIAL**

**CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8**

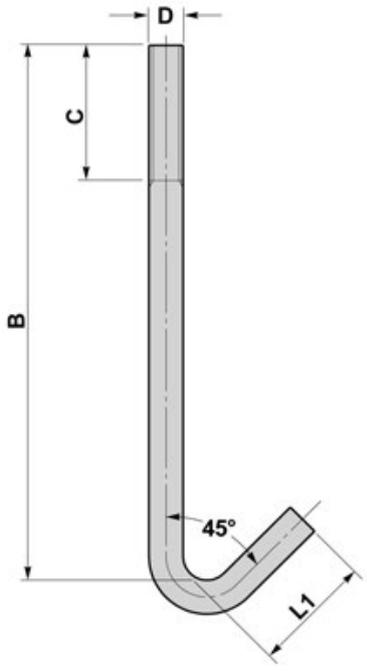
**FINISH**

**SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING**

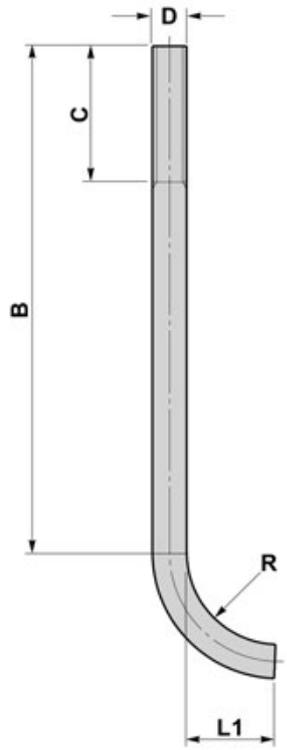


**ANCHOR BOLTS - MISCELLANEOUS**

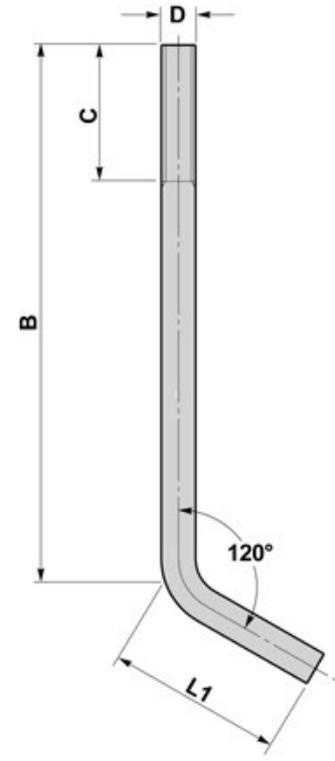
**TYPE A**



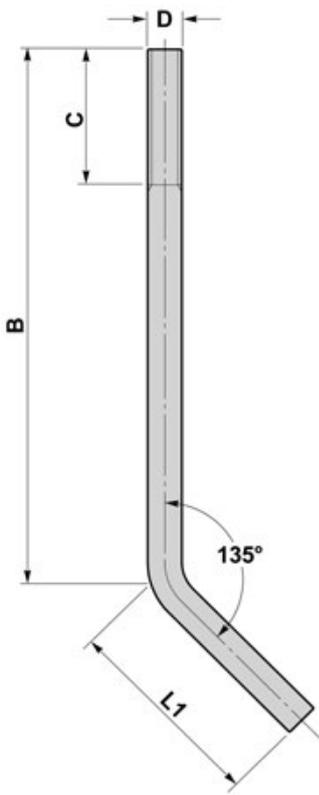
**TYPE B**



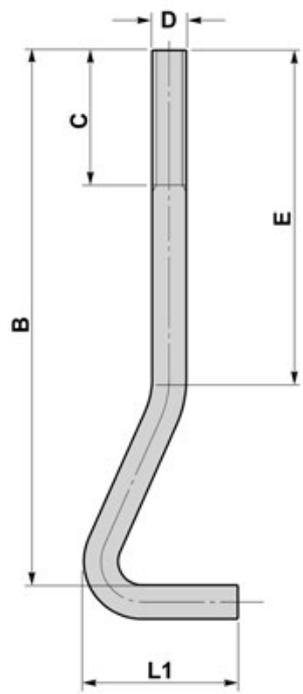
**TYPE C**



**TYPE D**



**TYPE E**



**NON STANDARDS  
MADE TO SUIT  
CUSTOMER  
REQUIREMENTS  
M8 - M100**

**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

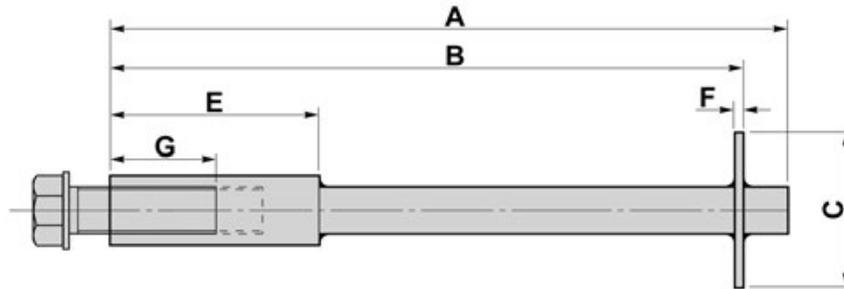
**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

ANCHOR BOLTS - MISCELLANEOUS

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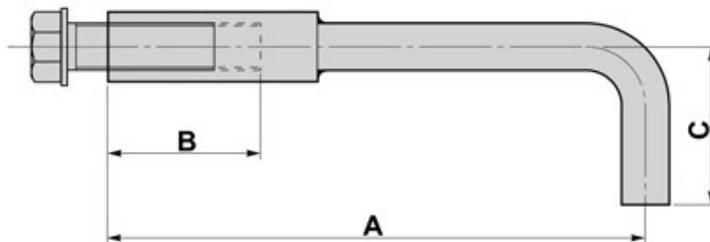
## CAST IN ANCHOR SOCKETS

### - CAST IN SOCKET WITH PLATE



TO SUIT	A	B	C	E	F	G
Bolt Size	mm	mm	mm SQ	mm	mm	mm
M20 x 50	198	180	60	50	8	22 - 28
M24 x 60	240	220	70	60	8	27 - 34
M30 x 80	300	278	80	75	10	33 - 42
M36 x 80	308	283	90	90	10	40 - 51
M42 x 80	397	370	100	105	12	57 - 59
M48 x 120	408	377	120	120	16	53 - 68
M56 x 140	420	389	130	140	16	62 - 79

### - CAST IN SOCKET (BENT)



TO SUIT	A	B	C
Bolt Size	mm	mm	mm
M20 x 50	210	50	60
M24 x 60	260	65	60
M30 x 80	280	65	80
M36 x 80	320	80	80
M42 x 80	345	90	90
M48 x 120	375	90	100
M56 x 140	420	110	110





## HAMMERHEAD T BOLTS

Brooks Forgings Ltd manufacture and supply Hammerhead T Bolts to DIN 7992, DIN 261, DIN 188 and DIN 186.

### THE FULLY REMOVABLE FOUNDATION SYSTEM SOLUTION

When used in conjunction with pre-fabricated tube assemblies the Hammerhead T Bolt becomes a removable and reusable foundation solution.

With the tube assembly cast into concrete the bolt can be simply inserted and twisted through 90° locking it into the specially fabricated base plate.

In case of application error, commonly position or location issues, the low cost tube assembly can be discarded and the bolt removed for re-use during correct installation.



**FORGING**



**MACHINING**



**ROLL THREADING**

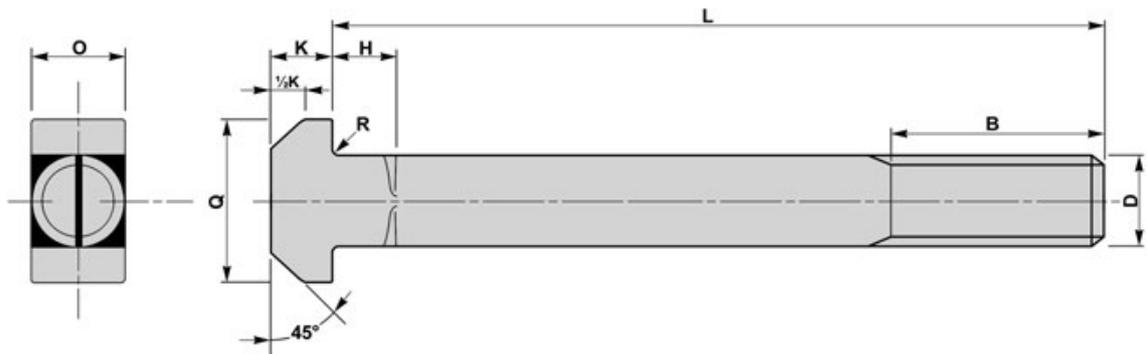


**BOLT SIZES UP TO M100**

**SPECIAL NON-STANDARDS  
ON REQUEST**

## DIN 7992 - HAMMERHEAD T BOLTS

**BOLTS ARE MANUFACTURED TO REQUIRED LENGTHS IN ACCORDANCE TO DIN 7992**



d	B	H	K	O	Q	R
mm ø	mm	mm	mm	mm	mm	mm
M24	100	18	18	24	65	1.6
M30	120	20	22	30	75	1.6
M36	140	25	25	36	85	2
M42	170	30	30	42	95	2
M48	200	30	35	48	110	2
M56	220	30	40	56	125	3
M64	240	30	50	64	140	3
M72 X 6	260	30	55	72	155	4
M80 X 6	290	30	60	80	170	4
M90 X 6	320	30	70	90	185	4
M100 X 6	350	30	75	100	205	5

**SLOTTED PLATES - PAGE 40**



**MATERIAL**

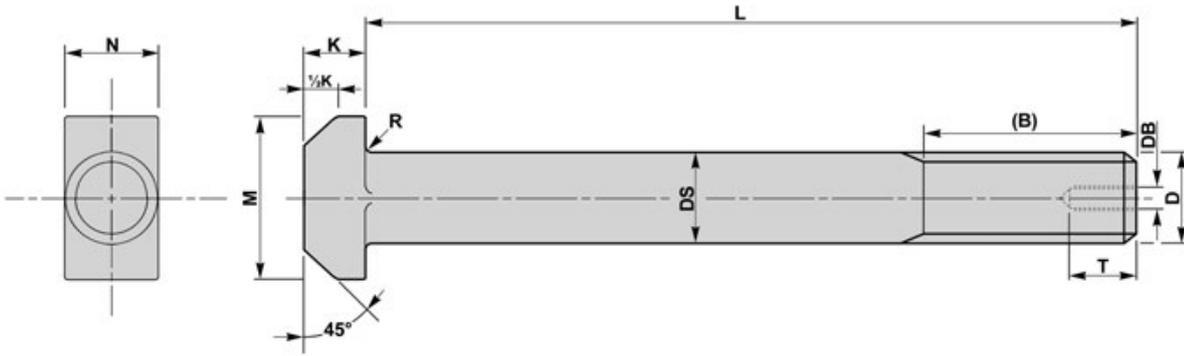
**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

## DIN 261 - HAMMERHEAD T BOLTS

**BOLTS ARE MANUFACTURED TO REQUIRED LENGTHS IN ACCORDANCE TO DIN 261**



d	PI	B2 ≤ 120	B3 ≤ 200	B4 > 200	db	ds	K	N	M	R min	T
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	min
M24	3	54	60	73	-	24	15	24	43	0.8	-
M30	3.5	66	72	85	-	30	19	30	54	1.0	-
M36	4	78	84	97	M12	36	23	36	66	1.0	22
M42	4.5	90	96	109	M12	42	26	42	80	1.2	22
M48	5	-	108	121	M12	48	30	48	88	1.6	22
M56	5.5	-	124	137	M16	56	35	56	102	2.0	26
M64	6	-	130	143	M16	64	40	64	115	2.0	26
M72	6	-	-	169	M16	72	45	72	128	2.0	26
M80	6	-	-	185	M20	80	50	80	140	2.0	33
M90	6	-	-	205	M20	90	55	90	155	2.5	33
M100	6	-	-	225	M20	100	62	100	170	2.5	33

**DIN 261 WITH REDUCED SHANK ALSO AVAILABLE ON REQUEST**

PI - Pitch of thread (coarse)

B2 - For overall length underhead up to and including 120mm

B3 - For overall length underhead up to and including 200mm

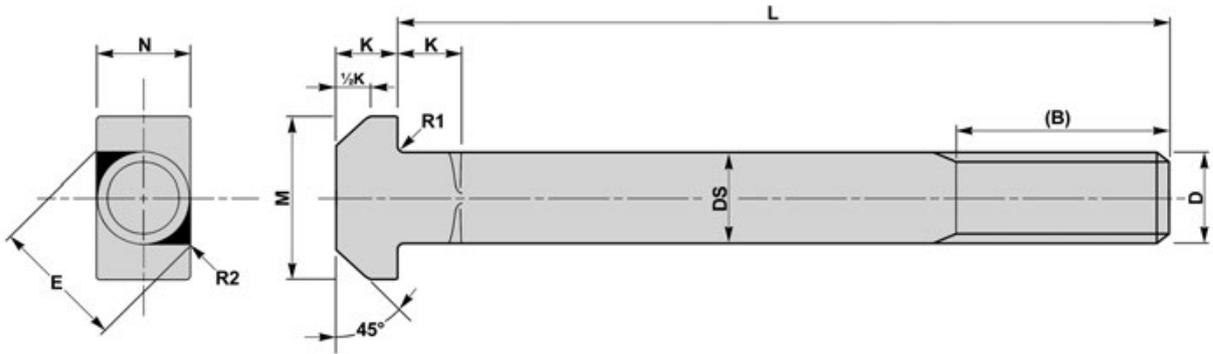
B4 - For overall length underhead exceeding 200mm

**SLOTTED PLATES  
PAGE 40**



## DIN 188 - HAMMERHEAD T BOLTS

**BOLTS ARE MANUFACTURED TO REQUIRED LENGTHS IN ACCORDANCE TO DIN 188**



d	PI	B2 ≤ 120	B3 ≤ 200	B4 > 200	ds	K	N	M	R1	R2 max
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
M24	3	54	60	-	24	15	24	43	1.6	3.6
M30	3.5	66	72	-	30	19	30	54	1.6	4.5
M36	4	78	84	97	36	23	36	66	2	5.4
M42	4.5	-	96	109	42	26	42	80	2	6.3
M48	5	-	108	121	48	30	48	88	2	7.2
M56	5.5	-	124	137	56	35	56	102	3	8.4
M64	6	-	130	143	64	40	64	115	3	9.6
M72	6	-	156	169	72	45	72	128	4	10.8
M80	6	-	172	185	80	50	80	140	4	12

**PI** - Pitch of thread (coarse)

**B2** - For overall length underhead up to and including 120mm

**B3** - For overall length underhead up to and including 200mm

**B4** - For overall length underhead exceeding 200mm

**SLOTTED PLATES  
 PAGE 40**

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

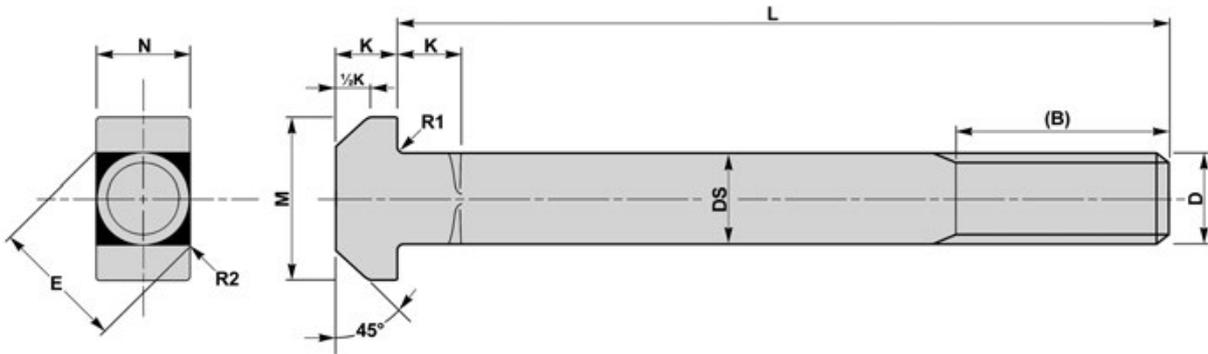
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## DIN 186 - HAMMERHEAD T BOLTS

**BOLTS ARE MANUFACTURED TO REQUIRED LENGTHS IN ACCORDANCE TO DIN 186**



### TYPE A - THREADED END

d	PI	ds	B2 ≤ 120	B3 ≤ 200	B4 > 200	E	K	N	M	RI	R2 max
mm	mm	mm	mm	mm	mm	min	mm	mm	mm	mm	mm
M24	3	24	54	60	73	29.48	15	24	43	1.6	3.6
M30	3.5	30	66	72	85	37.20	19	30	54	1.6	4.5
M36	4	36	78	84	97	44.57	23	36	66	2	5.4
M42	4.5	42	-	96	109	52.29	26	42	80	2	6.3
M48	5	48	-	108	128	60.00	30	48	88	2	7.2

**TYPE B - FULLY THREADED ALSO AVAILABLE ON REQUEST**

**SLOTTED PLATES - PAGE 40**

**PI - Pitch of thread (coarse)**

**B2 - For overall length underhead up to and including 120mm**

**B3 - For overall length underhead up to and including 200mm**

**B4 - For overall length underhead exceeding 200mm**

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

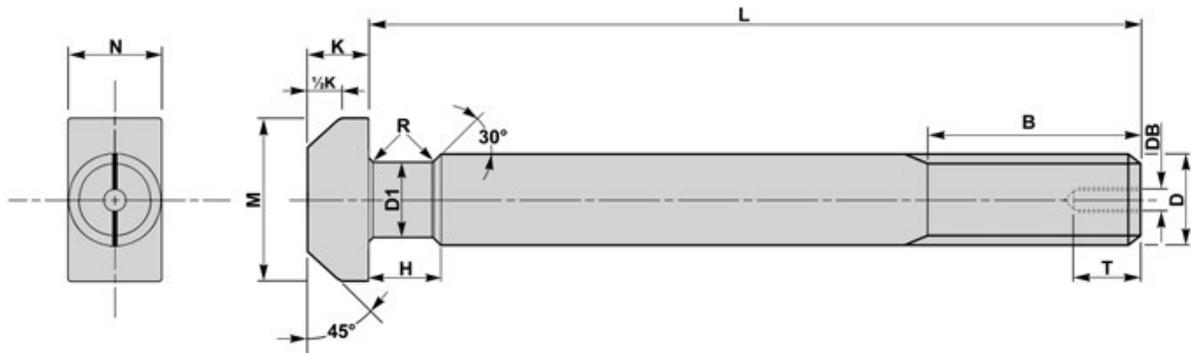
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## SN 425 - HAMMERHEAD T BOLTS

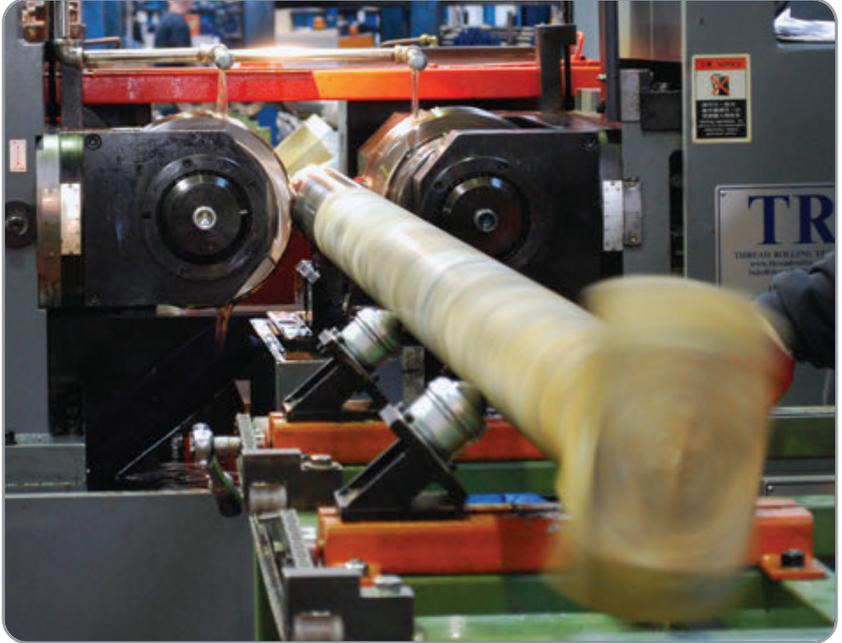
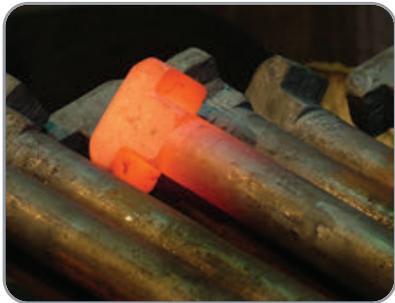
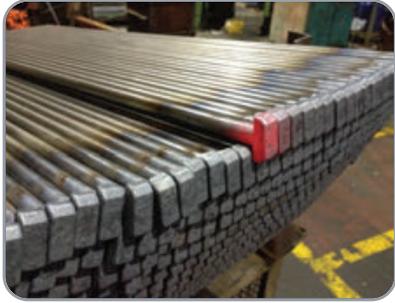
**BOLTS ARE MANUFACTURED TO SN 425. SIMILAR TO THOSE SPECIFIED IN DIN 261**



D	DI	B	H	DB	K	N	M	R	T
mm	mm	mm	mm	mm	mm	mm	mm	mm	max
M24	20	100	12	-	15	24	43	2	-
M30	26	120	15	-	19	30	54	2	-
M36	31	160	18	M12	23	36	66	3	23
M42	37	180	21	M12	26	42	80	3	23
M48	42	210	24	M12	30	48	88	3	23
M56	49	250	28	M16	35	56	102	4	30
M64	57	280	32	M16	40	64	115	4	30
M72	65	300	36	M16	45	72	128	4	30
M80	73	320	36	M20	50	80	140	5	33
M90	83	360	45	M20	55	90	155	5	33
M100	93	400	45	M20	62	100	170	5	33

**MANUFACTURED TO GRADE 5.6 AND GRADE 8.8 TO ISO 898-1**





HAMMERHEAD T BOLTS - GALLERY

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## FABRICATION SERVICES

Our skilled welders and fabrication experts can manufacture components to your requirements using the following processes:

- **Bending**
- **Cropping**
- **Grinding**
- **Laser Cutting**
- **Machining**
- **Punching**
- **Robot Welding**
- **Flash Butt Welding**



### Robot Welding

Brooks Forgings can now assist you further with your fabrication requirements. With the recent purchase of several Robotic Welding Cells we can offer our customers the most cost effective method of fabrication.

#### The advantages to robot welding:

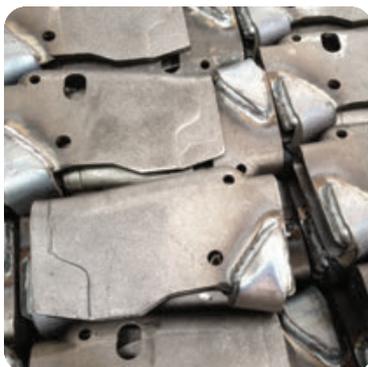
- Faster welding cycle times
- No breaks in production
- Better quality welded product
- Less wasted material
- Consistent weld seam
- Higher precision



### Flash Butt Welding

Our machines have a capacity of 6mm – 52mm in either square or round material.

The main advantages of Flash Butt welding is the speed and the overall strength of the process. No foreign weld material used meaning the product can be heat treated afterwards further increasing tensile strength. This process is regularly used where high strength is required, typically lifting links and chains.

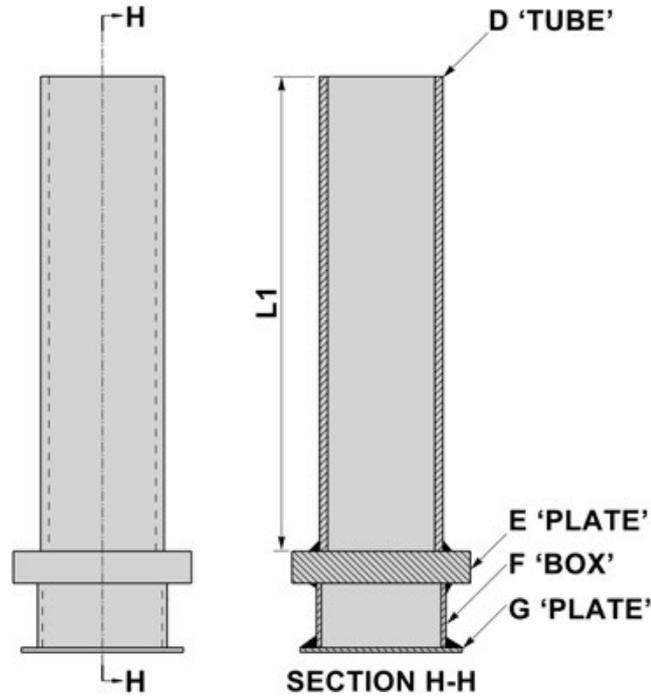


### Assembly

Normally this involves us supplying the labour, jiggging and assembly fixtures to put together components using our quick and experienced operators.

Operations can involve the use of air tools, presses and riveting machines in tandem with associated automated packaging lines. Items can be packed into your own designed cartons and bags or under plain packaging to suit your needs.

**BOLT TUBE ASSEMBLIES**



<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
mm	mm	mm	mm
48.3	80x80x10	70x70x30	80x80x3
48.3	80x80x15	70x70x35	80x80x3
76.1	110x110x20	80x80x40	100x100x3
76.1	110x110x25	90x90x50	110x100x3
76.1	110x110x25	90x90x50	110x110x3
76.1	130x130x25	100x100x60	120x120x3
101.6	160x160x30	120x120x70	140x140x3
101.6	180x180x35	130x130x70	150x150x3
101.6	250x250x35	130x130x90	150x150x3
101.6	250x250x35	140x140x100	160x160x3
101.6	300x300x40	150x150x120	180x180x3

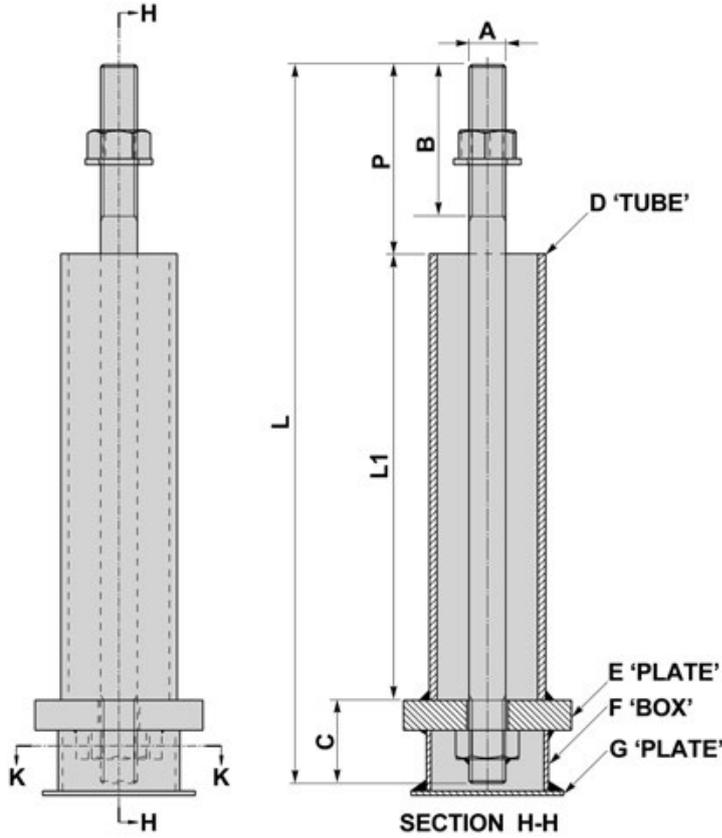


**TYPICAL SIZES SHOWN  
 MADE TO SUIT CUSTOMER  
 REQUIREMENTS**

**PLATES 'E' SUPPLIED WITH REQUIRED HOLES  
 SEE PAGES 39 & 40 FOR FULL RANGE OF PLATES**



**BOLT ASSEMBLIES - WITH TUBE, PLATE, LUGS & BOX**



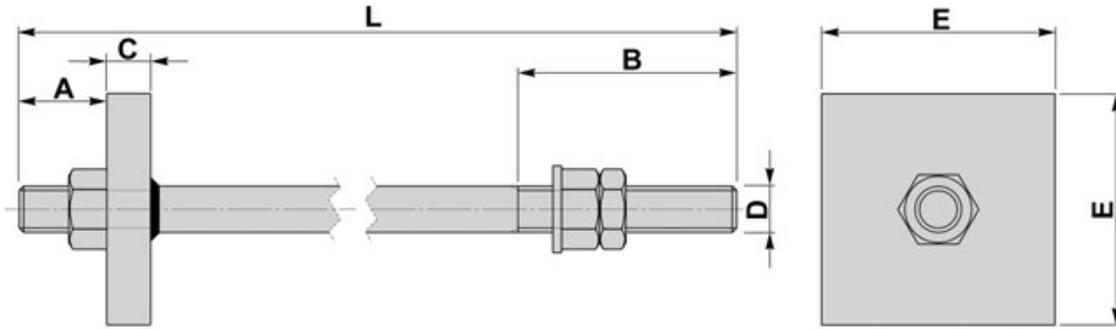
SECTION K-K

**COMPLETE WITH LUGS  
TO PREVENT ROTATION**

A	C	D	E	F	G	B	L	LI	P
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
M16	35	48.3	80x80x10	70x70x30	80x80x3	<b>TO SUIT CUSTOMER REQUIREMENTS</b>			
M20	45	48.3	80x80x15	70x70x35	80x80x3				
M24	55	76.1	110x110x20	80x80x40	100x100x3				
M27	65	76.1	110x110x25	90x90x50	110x100x3				
M30	70	76.1	110x110x25	90x90x50	110x110x3				
M36	80	76.1	130x130x25	100x100x60	120x120x3				
M42	95	101.6	160x160x30	120x120x70	140x140x3				
M48	100	101.6	180x180x35	130x130x70	150x150x3				
M52	115	101.6	250x250x35	130x130x90	150x150x3				
M56	120	101.6	250x250x35	140x140x100	160x160x3				
M64	135	101.6	300x300x40	150x150x120	180x180x3				

**QUALITY TO QC1, QC2 AND QC3 ON REQUEST**

**BOLT ASSEMBLIES - WITHOUT TUBE**



<b>D</b>	<b>A</b>	<b>C</b>	<b>E</b>	<b>L</b>	<b>B</b>
mm	mm	mm	mm	mm	mm
M16	45	15	80	<b>TO SUIT CUSTOMER REQUIREMENTS</b>	
M20	45	15	100		
M24	55	20	125		
M30	75	30	125		
M36	80	30	125		
M42	95	30	150		
M48	100	30	150		
M56	115	35	175		
M64	140	40	200		

**SIZES UP TO M100  
 EUROPEAN MATERIAL**

**MATERIAL**  
 CARBON STEELS  
 STAINLESS STEELS  
 ALLOY STEELS  
 B7, 4.6, 5.6, 8.8

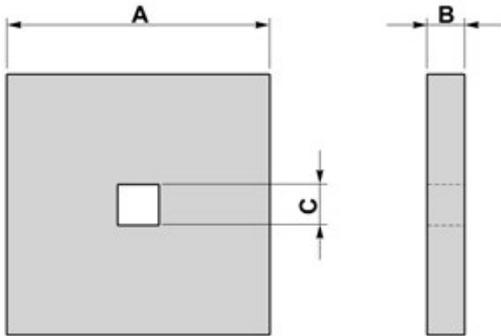
**FINISH**  
 SELF COLOUR  
 GALVANISED  
 ELECTROPLATED  
 SHERARDISED  
 PTFE COATING



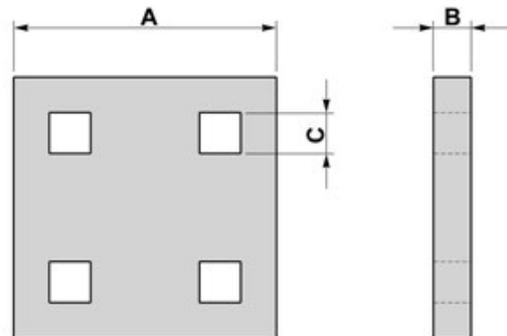
## WASHER PLATES

TYPE A TO TYPE D ARE DESIGNED TO BE USED WITH SQ SQ HOLDING DOWN BOLTS TO BS 7419

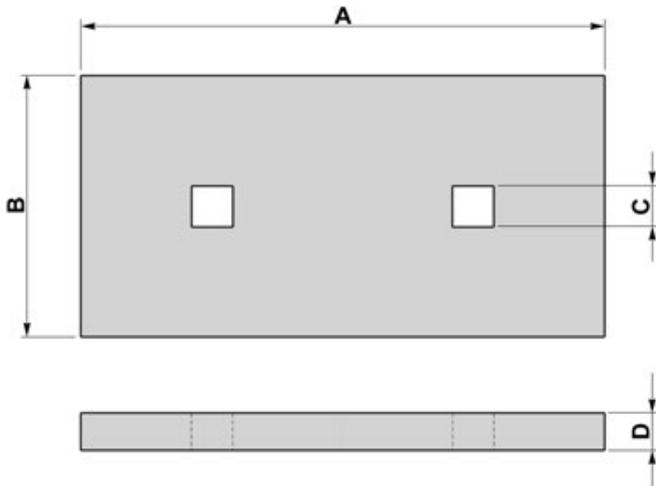
**TYPE A**



**TYPE B**

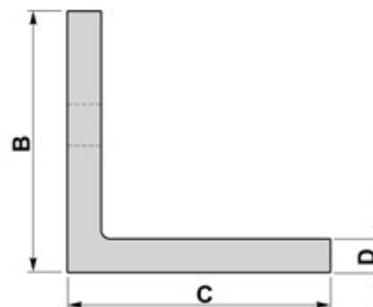
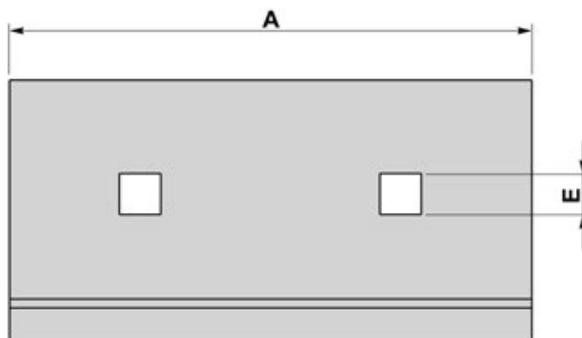


**TYPE C**



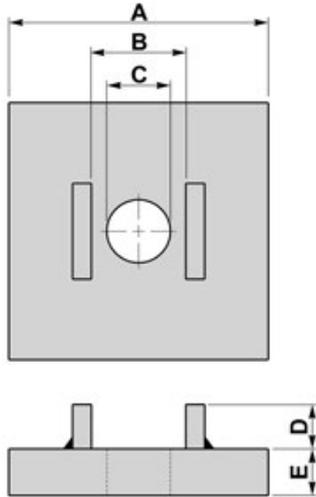
**PLATES AVAILABLE WITH  
ROUND OR SQUARE HOLES  
& LOCKING CAP IF  
REQUIRED FOR USE WITH  
HEXAGON BOLTS**

**TYPE D**



WASHER PLATES

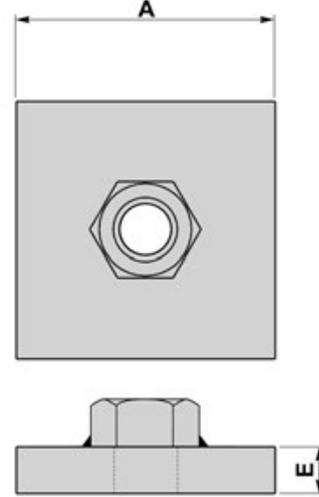
**TYPE E**



**TYPE E FOR USE WITH TIE RODS AND NUTS**



**TYPE H**

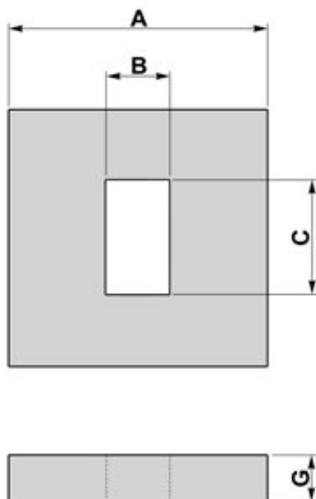


**TYPE H WITH WELDED NUT TO REQUIREMENTS**

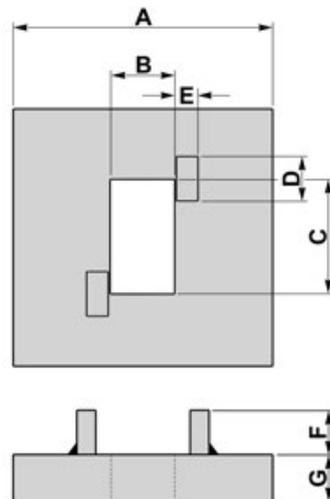


**TYPE F & TYPE G FOR REMOVABLE FOUNDATION SYSTEMS - SEE PAGE 25 FOR DETAILS**

**TYPE F**



**TYPE G**



## FOUNDATION ACCESSORIES

### WAXED CARDBOARD CONES

Waxed cardboard cones provide an easy way of sitting holding down bolts into the ground to fix steel frame buildings.

We can supply from stock on a next day basis direct to sites within the UK. Non-standard cones sizes can be made to order.

SIZE	LENGTH	TOP DIA	BOTTOM DIA
inches	mm	mm	mm
9	229	20	71
12	305	26	90
15	380	25	110
18	457	32	115
21	534	32	126
24	610	32.5	140
30	762	32.5	130



### CIRCULAR HOLLOW SECTION TUBES (CHS)

Available in various wall thicknesses and lengths, supplied to suit customer requirements.

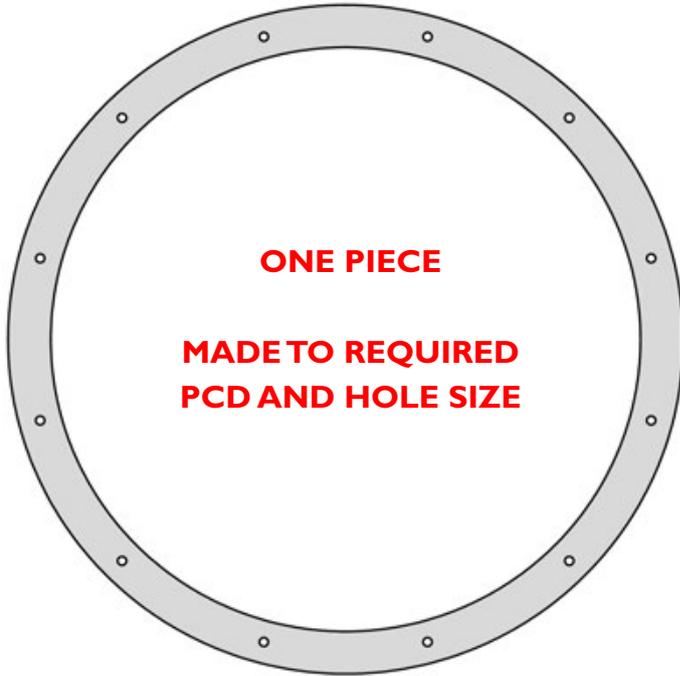
We have on-site robot welding facilities to weld CHS tube to washer plates and other materials and machining capacity to add additional holes where required.

TUBE SIZES	
mm	mm
48.3	139.7
60.3	168.3
76.1	193.7
88.9	219.1
101.6	291.1
114.3	---



**SQUARE HOLLOW SECTION ALSO AVAILABLE ON REQUEST**

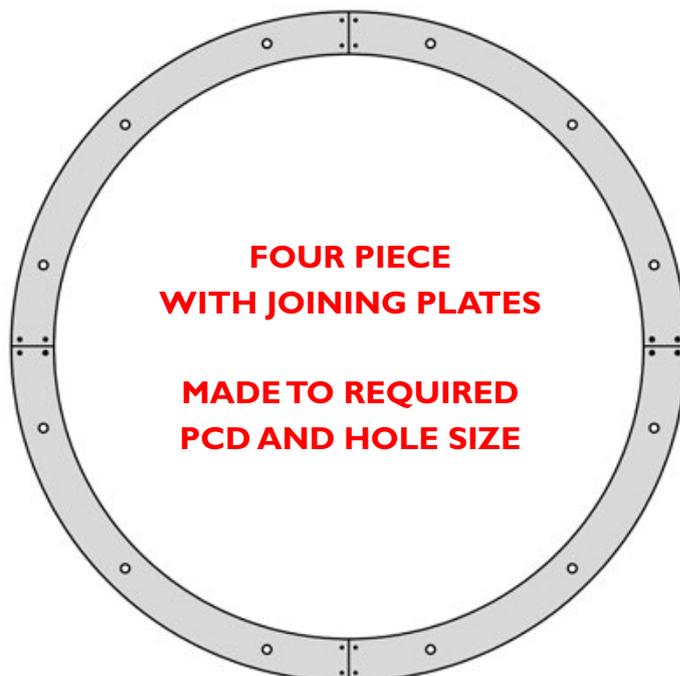
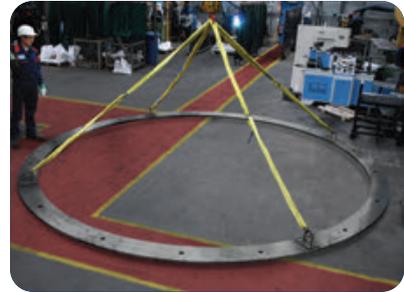
## RING PLATE PROFILES

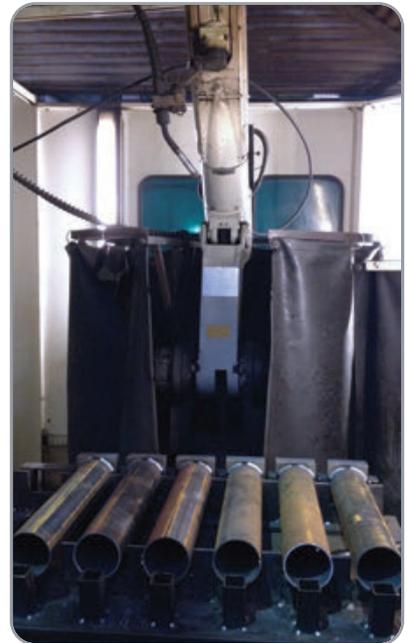


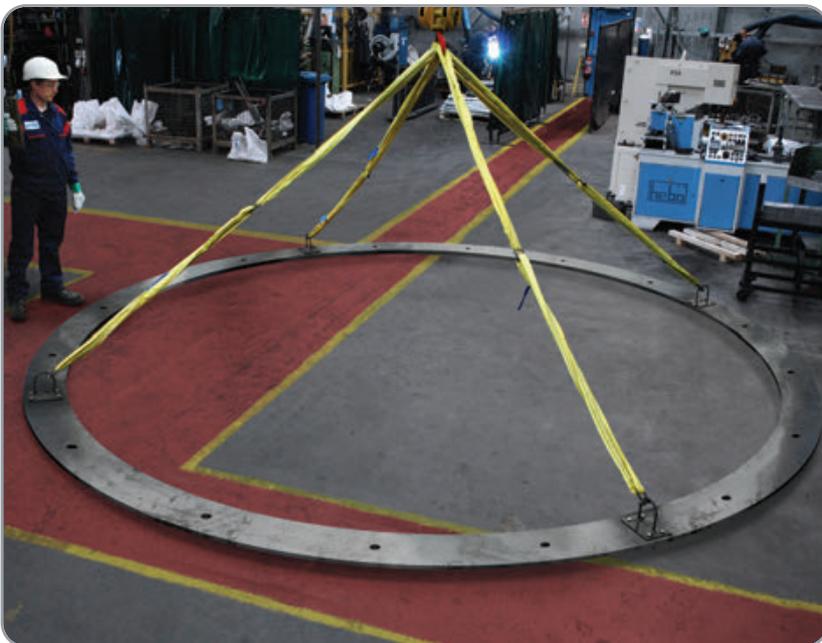
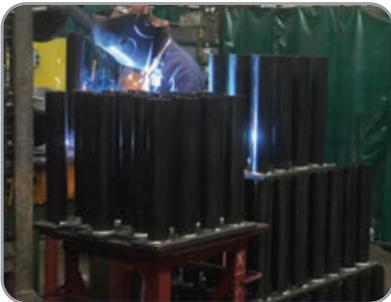
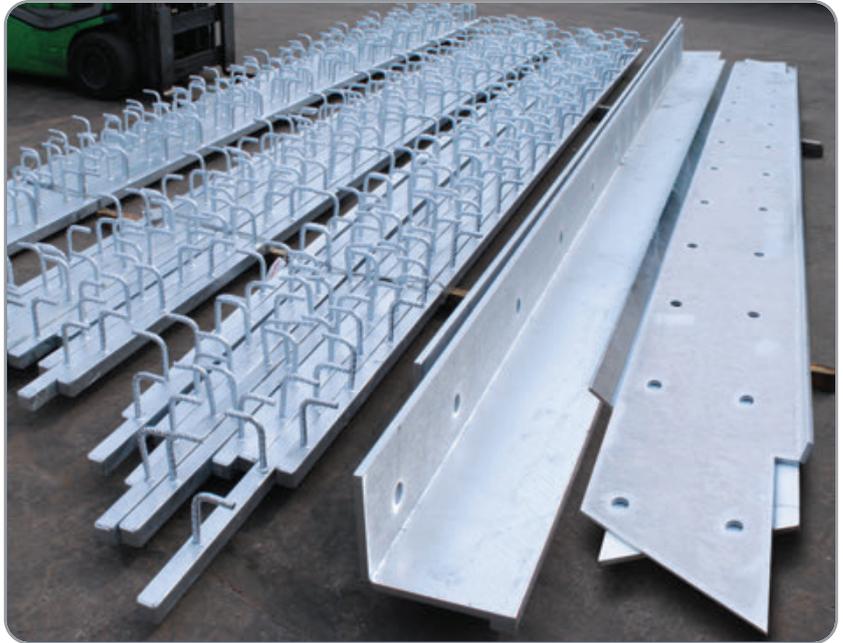
Ring plate profiles up to a maximum of 1500MM outer diameter can be supplied in one piece.

Profiles with an outer diameter greater than 1500MM will be supplied in four quarter pieces and joining plates.

Thicknesses, PCD and hole sizes to customer requirements.







**BOLT ASSEMBLIES - GALLERY**

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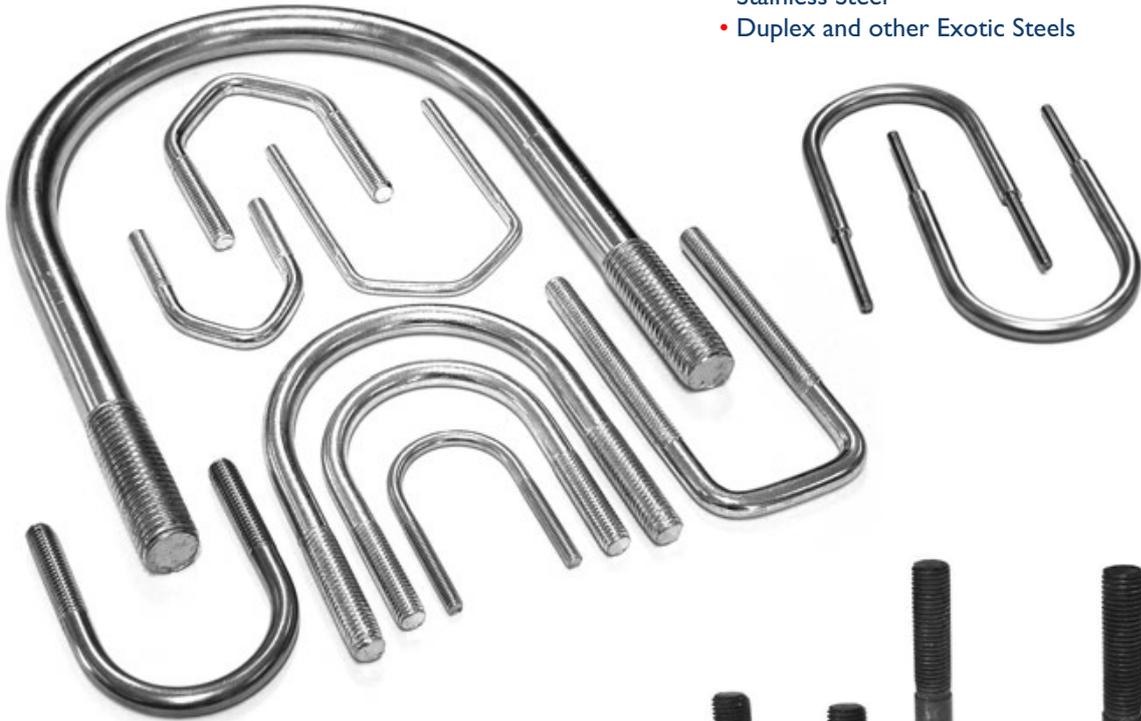
## U-BOLTS

Here at Brooks (Forgings) Ltd we stock one of the largest and most extensive ranges of standard U-Bolts in the UK.

We also **specialise in the manufacture of non-standard** U-Bolts producing products daily to our customers' own specifications.

**U-Bolts can be produced in a range of materials including:**

- Carbon Steel
- Alloy Steel
- Stainless Steel
- Duplex and other Exotic Steels



**Metric thread sizes from: M4 to M100 diameter.**  
**Imperial thread sizes from: 1/4" to 4".**  
**Thread forms: BSW, BSF, UNC, UNF.**  
**Leg lengths from: 25mm to 2500mm.**

**We supply various types of U-bolts including:**

- Grip BS3974
- Non Grip BS3974
- Square Back
- Flat Back
- Saddle Back
- Stepped U-Bolts
- N-Bolts

**U-bolt Finishes available include:**

- Electro Plated
- Galvanised
- Sherardised
- Plastic Coated
- Powder Coated
- Polished
- Chromed

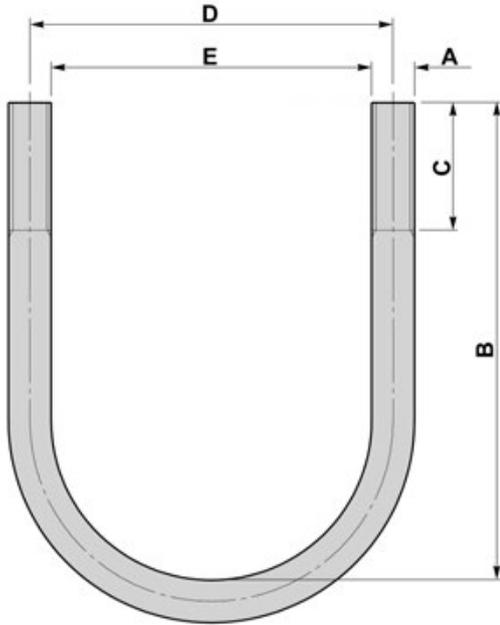
**Roll Thread and Cut Thread available to required specification.**

As we are ISO 9001 accredited, our Quality Control Department completes rigorous quality checks to ensure all manufactured products conform to your specific requirements. We have 20 Tonne tensile testing, hardness testing, latest coating and stress analysis software all available on-site. Brooks supply to the Structural Steel, Petrochemical, Marine and Pipe Fitting Industries to name just a selection.

**BS 3974 - U BOLTS - GRIP TYPE**

**BFF 24**

**- TO BS 3974 : PART I**



Nom Pipe Size	Pipe O.D	A	B	C	D	E
mm	mm	mm	mm	mm	mm	mm
15	21.3	M8	46	25	30	22
20	26.9	M8	56	25	35	27
25	33.7	M8	61	25	45	37
32	42.4	M8	71	25	55	47
40	48.3	M10	85	35	60	50
50	60.3	M10	95	35	75	65
65	76.1	M12	124	45	90	78
80	88.9	M16	142	50	105	89
100	114.3	M16	167	50	135	119
125	139.7	M16	192	50	160	144
150	168.3	M20	225	55	190	170
175	193.7	M20	250	55	215	195
200	219.1	M20	285	55	245	225
225	244.5	M20	300	55	270	250
250	273.0	M20	340	60	300	280
300	323.9	M20	390	60	350	330
350	355.6	M24	428	65	385	361
400	406.4	M24	488	65	435	411
450	457.0	M24	528	70	485	461
500	508.0	M24	588	70	540	516
550	559.0	M24	638	70	590	566
600	610.0	M24	688	70	640	616

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

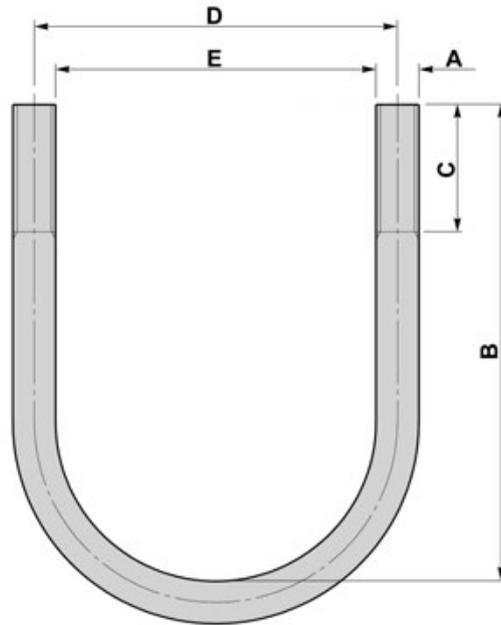
**NON STANDARDS MADE  
 TO SUIT CUSTOMER  
 REQUIREMENTS  
 M6 - M100**

**BS 3974 - U-BOLTS - GRIP TYPE**

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## BS 3974 - U BOLTS - NON GRIP TYPE

- TO BS 3974 : PART I



Nom Pipe Size	Pipe O.D	A	B	C	D	E
mm	mm	mm	mm	mm	mm	mm
15	21.3	M8	41	25	40	32
20	26.9	M8	51	30	45	37
25	33.7	M8	56	30	50	42
32	42.4	M8	66	30	60	52
40	48.3	M10	80	40	65	55
50	60.3	M10	95	40	80	70
65	76.1	M12	114	50	95	83
80	88.9	M16	132	55	110	94
100	114.3	M16	157	55	140	124
125	139.7	M16	182	55	165	149
150	168.3	M20	215	65	195	175
175	193.7	M20	240	65	220	200
200	219.1	M20	265	65	250	230
225	244.5	M20	290	65	275	255
250	273.0	M20	325	75	305	285
300	323.9	M20	375	75	355	335
350	355.6	M24	413	80	390	366
400	406.4	M24	463	80	440	416
450	457.0	M24	513	80	495	471
500	508.0	M24	563	80	545	521
550	559.0	M24	613	80	595	571
600	610.0	M24	663	80	645	621

**MATERIAL**

CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**

SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

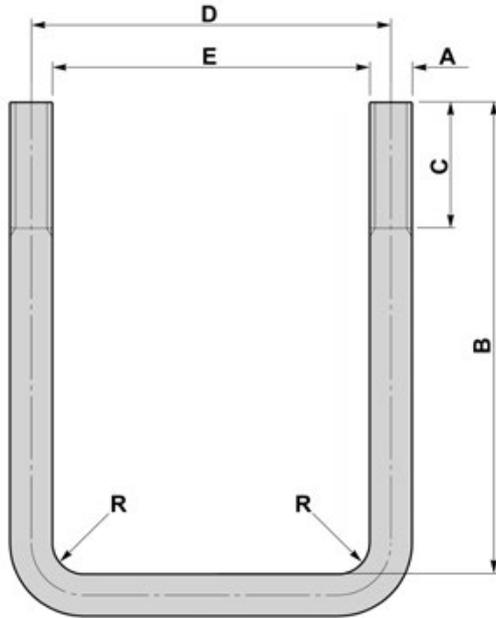
**NON STANDARDS MADE  
TO SUIT CUSTOMER  
REQUIREMENTS  
M6 - M100**

Call Us Today With Your Requirements  
**+44 (0)1384 563356**

**BROOKS** forgings  
 INDUSTRIAL COMPONENTS CATALOGUE

## U BOLTS - STRAIGHT BACK

**BFF 25**



**FLATTENED STRAIGHT  
 BACK VARIANT ALSO  
 AVAILABLE ON REQUEST**



<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>R</b>
Thread Diameter	Inside Length	Thread Length	Leg Centres	Between Legs	Inside Bend Radius
mm	mm	mm	mm	mm	mm

**MADE TO ORDER - DIMENSIONS TO CUSTOMER REQUIREMENTS**

**SIZES UP TO M100 AND 3000MM LENGTHS**

**MATERIAL**

**CARBON STEELS  
 STAINLESS STEELS  
 ALLOY STEELS  
 B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR  
 GALVANISED  
 ELECTROPLATED  
 SHERARDISED  
 PTFE COATING**

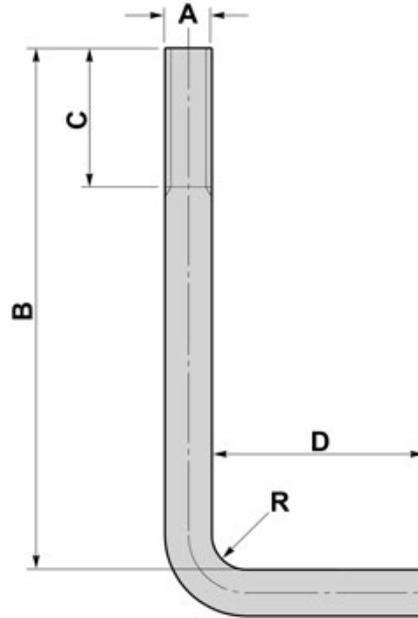
**NON STANDARDS MADE  
 TO SUIT CUSTOMER  
 REQUIREMENTS  
 M6 - M100**

U-BOLTS - STRAIGHT BACK

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## L BOLTS

**BFF 28**



A	B	C	D	R
Thread Diameter	Inside Length	Thread Length	Leg Length	Inside Bend Radius
mm	mm	mm	mm	mm

**MADE TO ORDER - DIMENSIONS TO CUSTOMER REQUIREMENTS**

**SIZES UP TO M100 AND 3000MM LENGTH**

### NON STANDARDS MADE TO SUIT CUSTOMER REQUIREMENTS

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

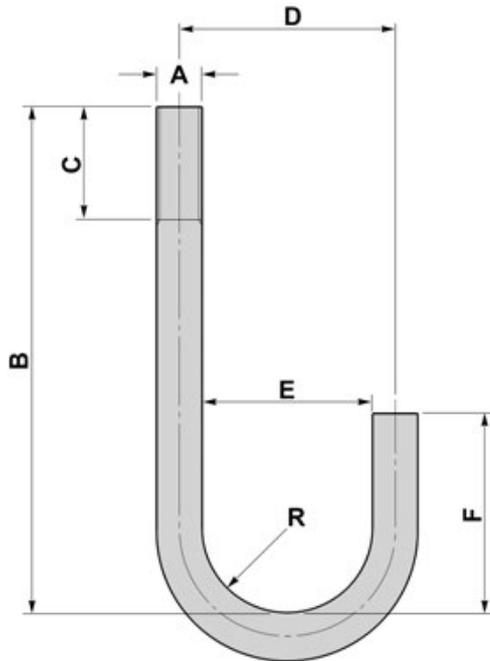
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



L-BOLTS

J BOLTS

**BFF 27**



A	B	C	D	E	F	R
Thread Diameter	Inside Length	Thread Length	Distance Centres	Between Legs	Short Leg Length	Inside Bend Radius
mm	mm	mm	mm	mm	mm	mm

**MADE TO ORDER - DIMENSIONS TO CUSTOMER REQUIREMENTS**

**SIZES UP TO M100 AND 3000MM LENGTHS**

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
 B7, 4.6, 5.6, 8.8

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS MADE  
 TO SUIT CUSTOMER  
 REQUIREMENTS  
 M6 - M100  
 LENGTHS UP TO 3000MM**







## SPECIAL BOLTS AND FASTENERS

We have extensive on-site manufacturing capabilities, enabling us to produce a vast range of special fasteners.



**FORGED LENGTHS UP TO 6000MM  
THREAD SIZES M6 - M100  
THREAD FORMS UNF, UNC, BSF & BSW**

We supply the following industries:

- Civil Engineering
- Offshore & Buoyancy
- Petrochemical
- Power Generation
- Naval & Marine
- Defence

## SPECIAL BOLTS AND FASTENERS

### Carbon & Alloy

BS 970  
080M40  
605M36  
708M40  
709M40  
817M40  
826M40  
2S97  
2S98  
4S99  
S154  
DUREHETE 900 (T21)  
DUREHETE 950 (T31)  
DUREHETE 1055 (T41)  
A193 B7  
A193 B7M  
A193 B16  
A193 B16A  
A320 L7  
A320 L7M  
A320 L43

DEF-STAN 07-261 PT4  
DEF-STAN 02-862 PT2

NES 862 PT2  
NES 862 PT4

### Super Alloys

NA 13 / MONEL ALLOY 400 ®  
NA 14 / INCONEL 600 ®  
NA 15 / INCOLOY 800 ®  
NA 16 / INCOLOY 825 ®  
NA 17 / INCOLOY DS ®  
NA 18 / MONEL ALLOY K500 ®  
NA 19 / NIMONIC 90 ®  
NA 20 / NIMONIC 80 A ®  
NA 21 / INCONEL 625 ®  
NIMONIC 75 ®  
INCONEL 718 ®  
ASTM A453 GRD 660A & B  
HASTELLOY B ®  
C276  
CARPENTER 20 ®  
ZIRCONIUM ®  
TITANIUM  
WASPALLOY ®  
NICKEL 200  
NIMONIC 75 ®

### Non Ferrous

BRASS CZ121  
NAVAL BRASS CZ112  
PHOSPHOR BRONZE PB102  
NICKEL ALUM BRONZE  
DGS 8452  
DGS 1043 GRD 1 & 2  
NES 833 PT2  
ALUMINIUM SIL BRONZE  
DGS 8453  
DGS 1044  
NES 834 PT2  
GUN METAL  
ALUMINIUM  
CUPRO NICKEL 70/30 &  
90/10  
COLSIBRO  
COPPER C101 / C103  
HIDURON 191 ®  
MARINEL ®

DEF-STAN 07-261 PT3  
DEF-STAN 07-261 PT5

NES 862 PT3  
NES 862 PT5

### Stainless

304 S11  
310 S31  
316 S11  
320 S31  
321 S31  
410 S21  
416 S21  
420 S37  
431 S29

B8, B8T, B8M  
B8 CLASS 2  
B8M CLASS 2

### Duplex

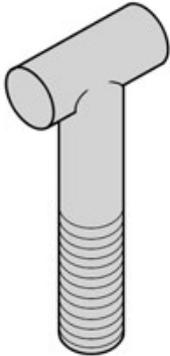
UNS 31803  
UNS 32550  
UNS 32750  
UNS 32760  
FERRALIUM 255 ®  
ZERON 25 ®  
ZERON 100 ®  
AVESTA S44 ®

17/4PH  
NITRONIC 50 & 60 ®

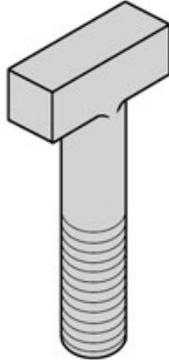




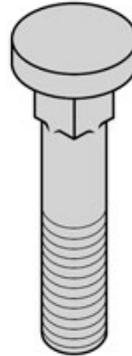
**EXAMPLES OF SPECIAL BOLTS**



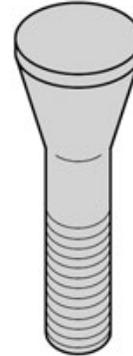
**TEE BOLT  
ROUND HEAD**



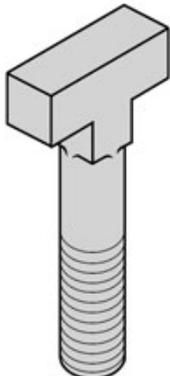
**TEE BOLT  
SQUARE HEAD**



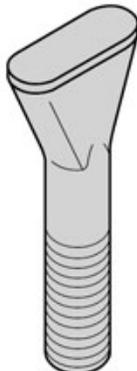
**CHEESE HEAD  
SQUARE BOLT**



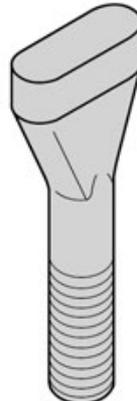
**ROUND  
TAPERED BOLT**



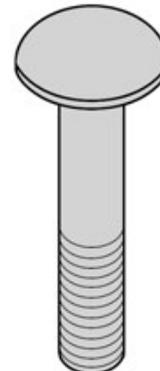
**TEE SQUARE  
BOLT**



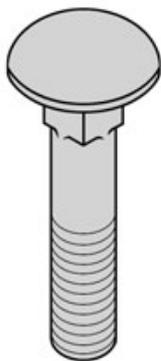
**TAPERED OVAL  
BOLT**



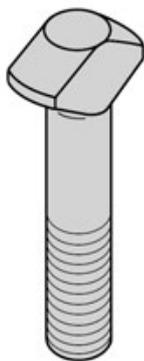
**RAISED TAPERED  
OVAL BOLT**



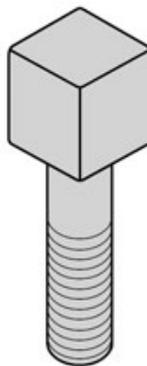
**CUP HEADED  
BOLT**



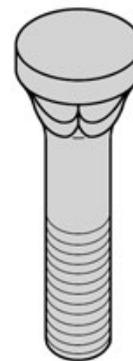
**CUP SQUARE  
BOLT**



**SPILL PLATE  
BOLT**



**HEAVY DUTY  
SQUARE BOLT**



**COUNTERSUNK  
SQUARE BOLT**

**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

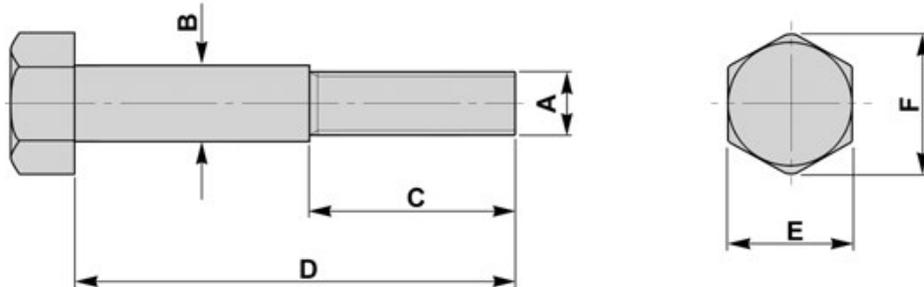
**NON STANDARDS  
MANUFACTURED TO SUIT  
CUSTOMER REQUIREMENTS**

EXAMPLES OF SPECIAL BOLTS

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## SHOULDER BOLTS

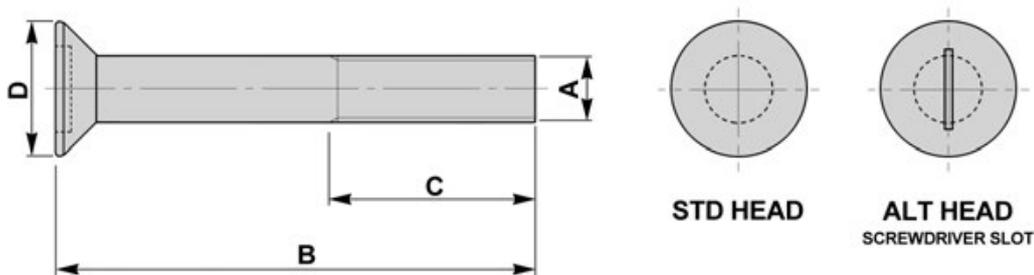
**BFF 17**



(A) M6 - M48 THREAD DIAMETER

## COUNTERSUNK BOLTS

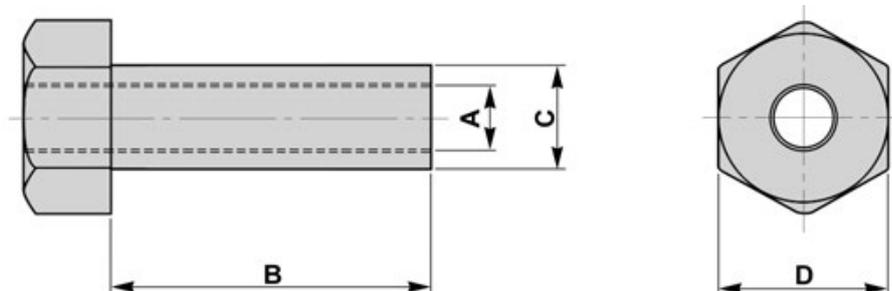
**BFF 18**



(A) M6 - M48 THREAD DIAMETER

## EXTENSION BOLTS

**BFF 19**



(A) M6 - M48 THREAD DIAMETER

**MATERIAL**

CARBON STEELS  
 STAINLESS STEELS  
 ALLOY STEELS  
 B7, 4.6, 5.6, 8.8

**FINISH**

SELF COLOUR  
 GALVANISED  
 ELECTROPLATED  
 SHERARDISED  
 PTFE COATING

**NON STANDARDS  
 MANUFACTURED TO SUIT  
 CUSTOMER REQUIREMENTS**

## EYEBOLTS



### BRITISH MADE NON STANDARD EYEBOLTS UP TO M100

At Brooks (Forgings) Ltd we manufacture one of the most extensive and diverse ranges of **Eyebolts** in Europe as well as holding supplies of 'Blank Forgings' ready for rapid conversion to customer specific requirements.

Our fully equipped Tool Room is supported by our Technical Department who has access to the latest computer aided design (CAD), machining (CAM), and forging simulation software.

This enables us to rapidly manufacture forging dies for specialist products and non-standard items to our customers' exact specifications.

**Products are supplied to:**

- DIN 444, DIN 580 and DIN 582
- BS 4278, BS 529 BS 3974 and BS 5655

**Eyebolts can be produced in a range of materials including:**

- Carbon Steel
- Alloy Steel
- Stainless Steel
- Duplex and other Exotic Steels

**Thread sizes are available from:**

- M6 to M100
- Imperial Thread Forms BSW, BSF, UNC, UNF are also available.

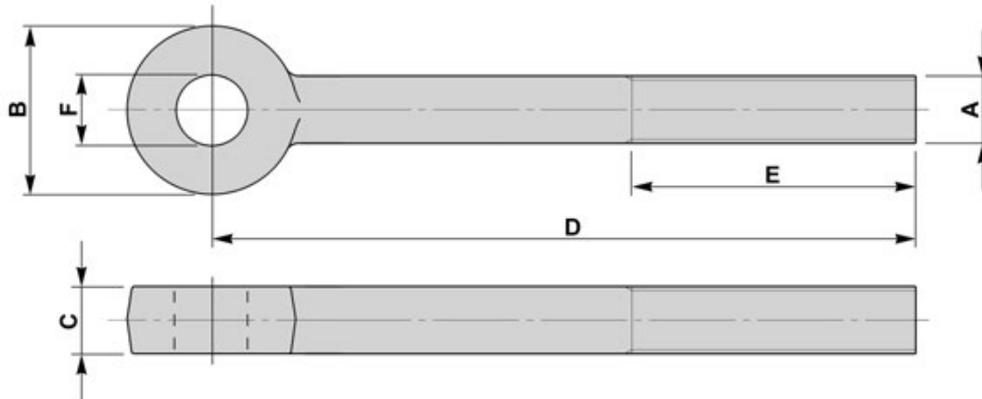
**Various finishes are also available including:**

- Electro Plated
- Galvanised
- Sherardised
- Plastic Coated
- Powder Coated
- Painted
- Shot Blast
- Polished



**PALM EYEBOLTS - STRAIGHT SIDES**

**BFE 11**



A		B	C	D		E		F
mm	inches	mm	mm	MIN mm	MAX mm	MIN mm	MAX mm	
M8	5/16	16	8	30	3000	15	1500	To suit customers requirements  Dimension "F" is generally drilled out to take corresponding dimension "A" of the same size
M10	3/8	25	10	35	3000	15	1500	
M12	1/2	25	13	38	3000	18	1500	
	---	32	12	45	3000	18	1500	
M16	5/8	32	16	45	5500	20	2000	
	5/8	38	16	45	5500	20	2000	
M20	3/4	42	20	55	5500	25	2000	
	3/4	50	20	60	5500	25	2000	
M24	1	51	26	65	5500	30	2000	
	---	51	24	65	5500	30	2000	
M30	1. 1/8	60	30	70	5500	35	2000	
M33	1. 1/4	65	33	90	5500	40	2000	
M39	1. 1/2	90	39	95	5500	45	2000	
M56	2. 1/4	115	56	120	1000	50	800	
M64	2. 1/2	130	64	140	1000	60	800	
M72	2. 3/4	150	72	165	1000	75	800	
M76	3	150	76	170	1000	85	800	

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
 B7, 4.6, 5.6, 8.8

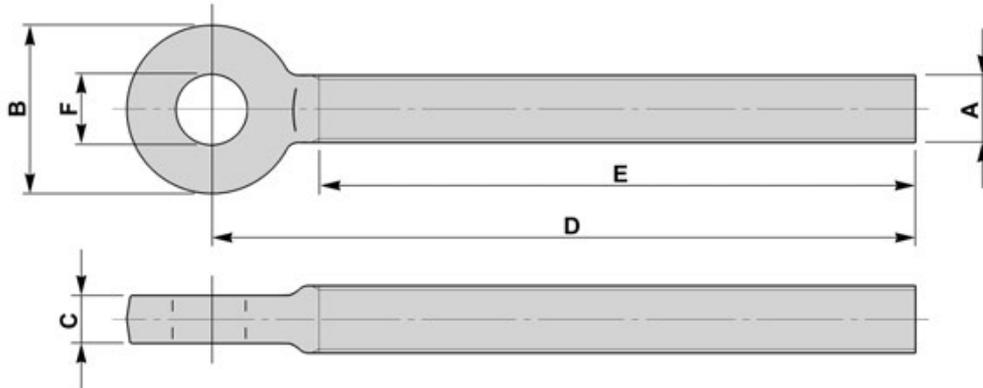
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## EYEBOLTS WITH REDUCED EYE THICKNESS

**BFE 10**



A		B	C		D		E		F
mm	inches	mm	MIN mm	MAX mm	MIN mm	MAX mm	MIN mm	MAX mm	
M8	5/16	19	5	7	30	800	15	200	To suit customers requirements  Dimension "F" is generally drilled out to take corresponding dimension "A" of the same size
M10	3/8	22	6	9	34	900	15	200	
	3/8	25	6	9	34	900	15	300	
M12	1/2	25	6	11	40	1000	15	300	
	1/2	32	6	11	40	1000	15	450	
M16	5/8	32	7	15	45	1300	20	450	
	5/8	38	7	15	45	1300	20	500	
M20	3/4	38	7	19	55	1500	25	500	
	3/4	42	7	19	55	1500	25	500	
	3/4	50	7	19	60	1500	25	500	
M22	7/8	50	10	21	70	1500	30	500	
M24	1	50	12	22	75	1500	30	650	
	-	62	12	22	80	1500	35	650	
M27	-	60	13	25	80	1500	35	800	
M30	1. 1/8	60	13	28	80	1500	38	1000	
M33	1. 1/4	65	14	32	85	1500	40	1000	
M36	1. 3/8	65	16	35	95	2000	40	1500	
M39	1. 1/2	89	18	38	100	2000	45	1500	
M42	1. 5/8	90	20	40	110	2000	50	1500	

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

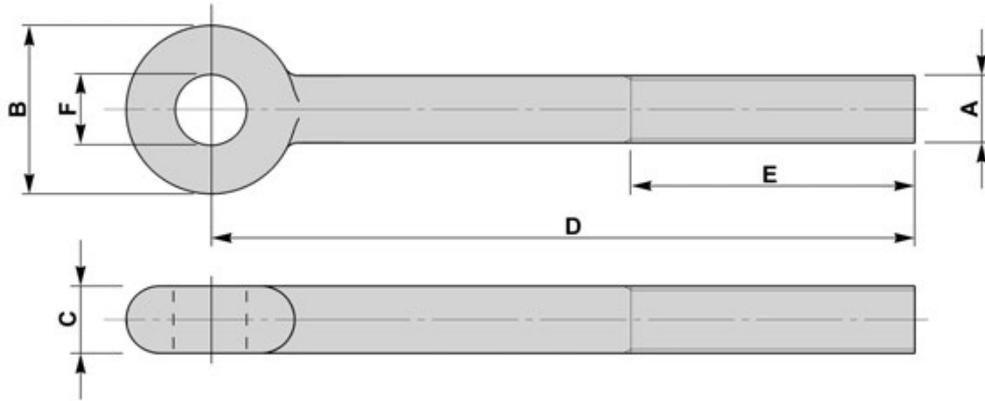
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## SHACKLE EYEBOLTS - CURVED SIDES

**BFE 12**



A		B	C	D		E		F
mm	inches	mm	MIN mm	MIN mm	MAX mm	MIN mm	MAX mm	
M6	1/4	16	6	30	3000	15	1500	To suit customers requirements  Dimension "F" is generally drilled out to take corresponding dimension "A" of the same size
M8	5/16	19	8	30	3000	15	1500	
M10	3/8	19	10	35	3000	15	1500	
	3/8	22	10	35	3000	15	1500	
M12	1/2	32	13	40	3000	18	1500	
M16	5/8	38	16	45	5500	20	2000	
M20	3/4	38	20	50	5500	25	2000	
M22	7/8	50	22	60	5500	25	2000	
M24	1	50	26	65	5500	30	2000	
M27	1.18	60	28	68	5500	30	2000	
M30	1.1/4	60	32	70	5500	35	2000	
M36	1.1/2	60	38	100	5500	45	2000	
M42	1.5/8	90	42	115	5500	48	2000	
M45	1.3/4	102	45	120	5500	50	2000	
M48	2	115	51	135	5500	60	2000	

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

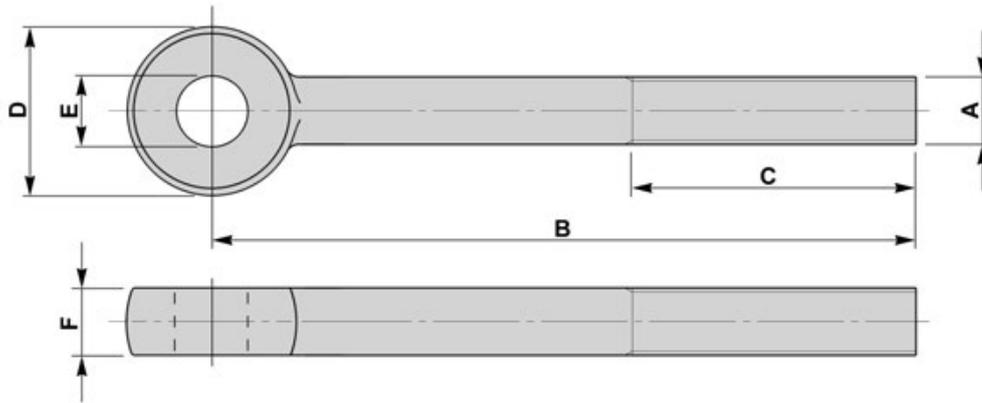
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## DIN 444 - EYEBOLTS - TYPE A

**BFE 13**



A	B		C	D		E	F	
	MIN mm	MAX mm		MIN mm	MAX mm		MIN mm	MAX mm
M6	35	90	18	12.9	14	6	8.52	9
M8	40	125	22	16.9	18	8	10.30	11
	126	140	28	16.9	18	8	10.30	11
M10	45	125	26	18.7	20	10	13.30	14
	126	150	32	18.7	20	10	13.30	14
M12	55	125	30	23.7	25	12	16.30	17
	126	200	36	23.7	25	12	16.30	17
	201	260	49	23.7	25	12	16.30	17
M16	70	125	38	30.4	32	16	18.16	19
	126	200	44	30.4	32	16	18.16	19
	201	260	57	30.4	32	16	18.16	19
M20	100	125	46	38.4	40	18	23.16	24
	126	200	52	38.4	40	18	23.16	24
	201	260	65	38.4	40	18	23.16	24
M24	100	125	54	43.4	45	22	27.16	28
	126	200	60	43.4	45	22	27.16	28
	201	260	73	43.4	45	22	27.16	28
M30	150	200	72	53.1	55	28	33.00	34
	201	300	85	53.1	55	28	33.00	34
M36	160	200	84	63.1	65	32	40.00	41
	201	300	97	63.1	65	32	40.00	41
M39	160	200	90	68.1	70	35	45.00	46
	201	300	103	68.1	70	35	45.00	46

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

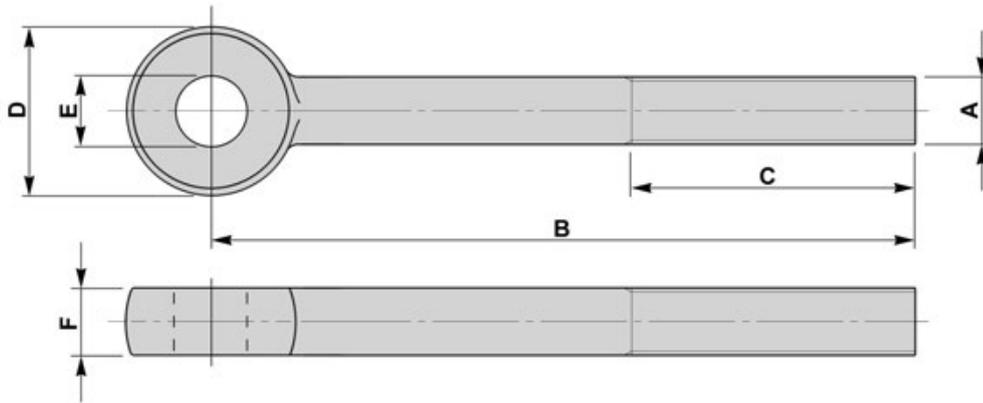
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## DIN 444 - EYEBOLTS - TYPE B & C

**BFE 14**



A	B		C	D		E	F	
	MIN mm	MAX mm		MIN mm	MAX mm		MIN mm	MAX mm
M6	35	90	18	13.57	14	6	6.85	7
M8	40	125	22	17.57	18	8	8.85	9
	126	140	28	17.57	18	8	8.85	9
M10	45	125	26	19.48	20	10	11.82	12
	126	150	32	19.48	20	10	11.82	12
M12	55	125	30	24.48	25	12	13.82	14
	126	200	36	24.48	25	12	13.82	14
	201	260	49	24.48	25	12	13.82	14
M16	70	125	38	31.38	32	16	16.82	17
	126	200	44	31.38	32	16	16.82	17
	201	260	57	31.38	32	16	16.82	17
M20	100	125	46	39.38	40	18	21.79	22
	126	200	52	39.38	40	18	21.79	22
	201	260	65	39.38	40	18	21.79	22
M24	100	125	54	44.38	45	22	24.79	25
	126	200	60	44.38	45	22	24.79	25
	201	260	73	44.38	45	22	24.79	25
M30	150	200	72	54.26	55	28	29.79	30
	201	300	85	54.26	55	28	29.79	30
M36	160	200	84	64.26	65	32	37.75	38
	201	300	97	64.26	65	32	37.75	38
M39	160	200	90	69.26	70	35	40.75	41
	201	300	103	69.26	70	35	40.75	41

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

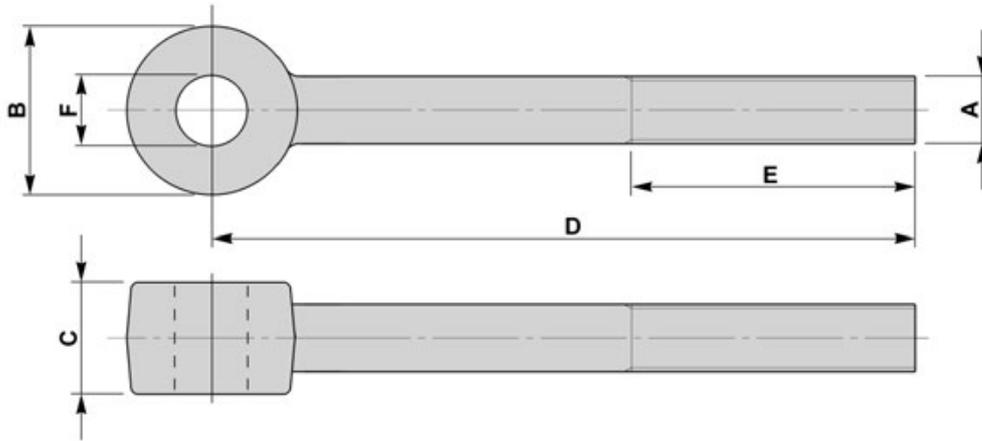
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## SWIVEL EYEBOLTS - INCREASED EYE THICKNESS

**BFE 15**



### THREADS M6 - M12 (1/4" - 1/2")

A		B	C	D		E		F
mm	inches	mm	MIN mm	MIN mm	MAX mm	MIN mm	MAX mm	
M6	1/4	19	8	30	160	15	140	To suit customers requirements  Dimension "F" is generally drilled out to take corresponding dimension "A" of the same size
		25	10	35	160	15	140	
		25	13	35	160	15	140	
M8	5/16	25	10	35	160	15	140	
		25	13	35	160	15	140	
		38	16	40	165	15	135	
		42	20	45	170	15	140	
M10	3/8	51	25	50	160	15	140	
		25	13	35	160	15	140	
		32	13	40	165	15	140	
		38	16	45	165	15	140	
		42	20	45	170	15	140	
M12	1/2	51	22	50	175	15	140	
		51	25	50	175	15	140	
		60	30	55	180	15	140	
		25	14	40	210	20	190	
		38	16	50	220	20	190	
		42	20	55	220	20	190	
		51	22	55	225	20	190	
51	25	55	225	20	190			
62	24	60	230	20	190			
60	30	60	230	20	190			

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

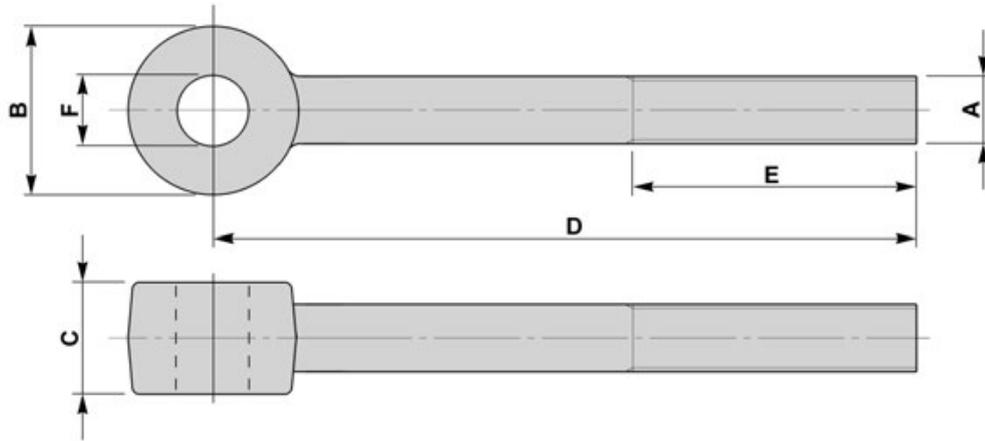
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

**SWIVEL EYEBOLTS - INCREASED EYE THICKNESS**

**BFE 15**



**THREADS M16 - M36 (5/8" - 1.3/8")**

A		B	C	D		E		F	
mm	inches	mm	MIN mm	MIN mm	MAX mm	MIN mm	MAX mm		
M16	5/8	35	17	45	1500	20	1400	To suit customers requirements  Dimension "F" is generally drilled out to take corresponding dimension "A" of the same size	
		38	19	50	270	20	240		
		42	20	50	270	20	240		
		51	25	55	275	20	240		
		62	24	60	280	20	240		
		60	30	60	280	20	240		
M20	3/4	45	25	52	1500	25	1400		
		51	25	55	275	25	240		
		62	24	60	280	25	240		
		60	30	60	280	25	240		
M24	---	60	32	60	280	25	240		
		I	51	28.5	60	1500	25		1400
			60	30	65	280	25		240
M30	1. 1/8	60	32	70	280	30	240		
		60	38	70	280	30	240		
M33	1. 1/4	65	38	75	280	35	240		
M36	1. 3/8	65	38	80	1500	40	1400		

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

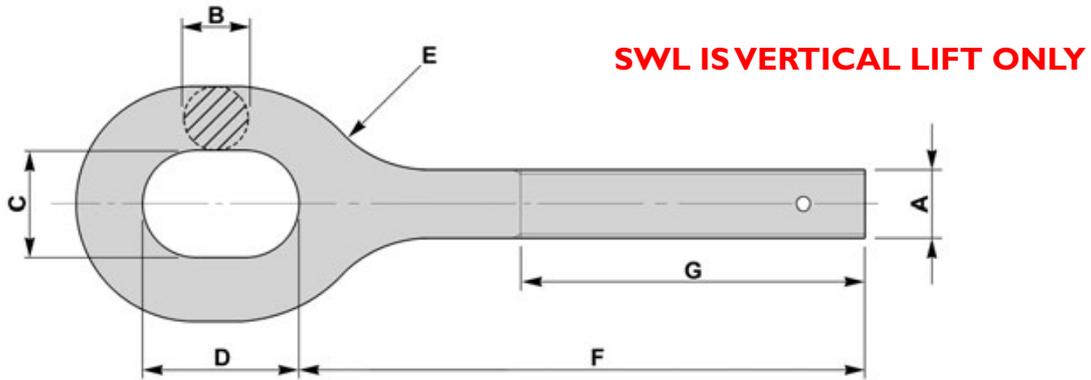
SWIVEL EYEBOLTS - INCREASED EYE THICKNESS

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**BS 529 - LIFT SUSPENSION EYEBOLTS - OVAL**

-TO BS 529 : PART 2

**BFE 16**



A		WIRE ROPE CIRC	SWL		PROOF LOAD		B	C	D	E	F	G	WEIGHT EACH
inches	mm	inches	cwt	kgs	cwt	kgs	inches	inches	inches	inches	inches	inches	kgs
3/8	(M10)	1	5	254	10	508	3/8	5/8	7/8	5/8	6 12	4. 1/2 9	0.16 0.25
1/2	(M12)	1. 1/4	8	406	16	812	1/2	3/4	1. 1/8	3/4	12 18 24	9 13. 1/2 18	0.43 0.59 0.76
5/8	(M16)	1. 1/2 - 1. 3/4	15	762	30	1524	5/8	1	1. 5/8	1	18 24 30	13. 1/2 18 22. 1/2	0.91 1.14 1.36
3/4	(M20)	2	20.5	1041	41	2082	3/4	1. 1/4	1. 3/4	1. 1/4	18 24 30	13. 1/2 18 22. 1/2	1.42 1.76 2.10
7/8	(M22)	2. 1/4 - 2. 1/2	33	1676	66	3352	7/8	1. 1/2	2. 1/4	1. 1/2	18 24 30	13. 1/2 18 22. 1/2	2.04 2.50 2.95
1	(M24)	2. 3/4	38	1930	76	3860	1	1. 5/8	2. 1/2	1. 5/8	18 24 30	13. 1/2 18 22. 1/2	2.84 3.40 3.97
1. 1/8	(M27)	3	48	2438	96	4876	1. 1/8	1. 3/4	2. 3/4	1. 3/4	18 24 30	13. 1/2 18 22. 1/2	3.86 4.65 5.45

( ) = METRIC THREADS - NON STANDARD

**MATERIAL**

**BS970 080A27 (EN5A)**

**FINISH**

**SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING**

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

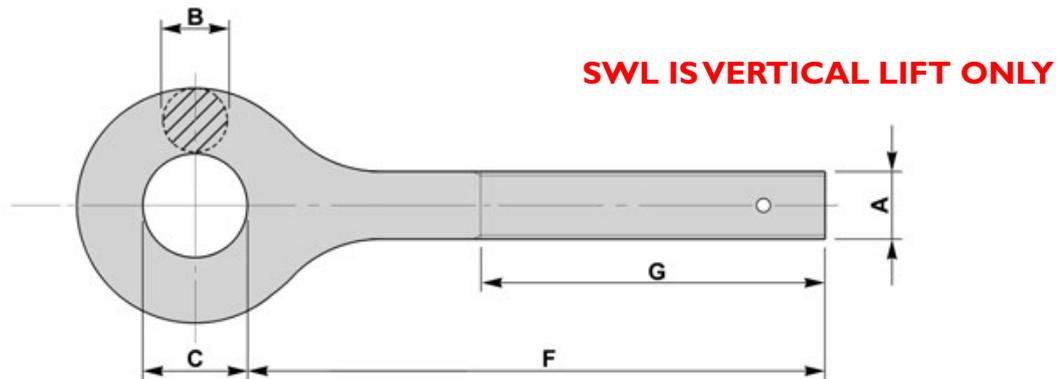
BS 529 - LIFT SUSPENSION EYEBOLTS - OVAL

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## BS 5655 - LIFT SUSPENSION EYEBOLTS - ROUND

**BFE 17**

- TO BS 5655 : PART 8



A	WIRE ROPE DIA	SWL	PROOF FORCE	MINIMUM BREAKING FORCE	B	C	F	G	WEIGHT EACH
mm	mm	tonnes	kn	kn	mm	mm	mm	mm	kgs
M10	6 - 6.5	0.20	4.12	20.60	10	15	150 300	115 230	0.13 0.22
M12	8	0.31	6.23	31.15	12	15	150 300	115 230	0.18 0.31
M16	10	0.49	9.73	48.65	15	21	300 450 600	230 345 460	0.64 0.88 1.11
M16	11	0.60	11.78	58.90	17	21	300 450 600	230 345 460	0.64 0.88 1.11
M20	13	0.83	16.45	82.25	20	24	450 600 750	345 460 575	1.45 1.82 2.15
M24	16	1.27	25.00	125.00	24	27	450 600 750	345 460 575	2.09 2.65 3.18
M30	19	1.79	35.17	175.85	29	34	450 600 750	345 460 575	3.49 4.32 5.15
M30	22	2.40	47.17	235.85	33	37	450 600 750	345 460 575	3.55 4.38 5.21

**MATERIAL**

**BS970 080A27 (EN5A)**

**FINISH**

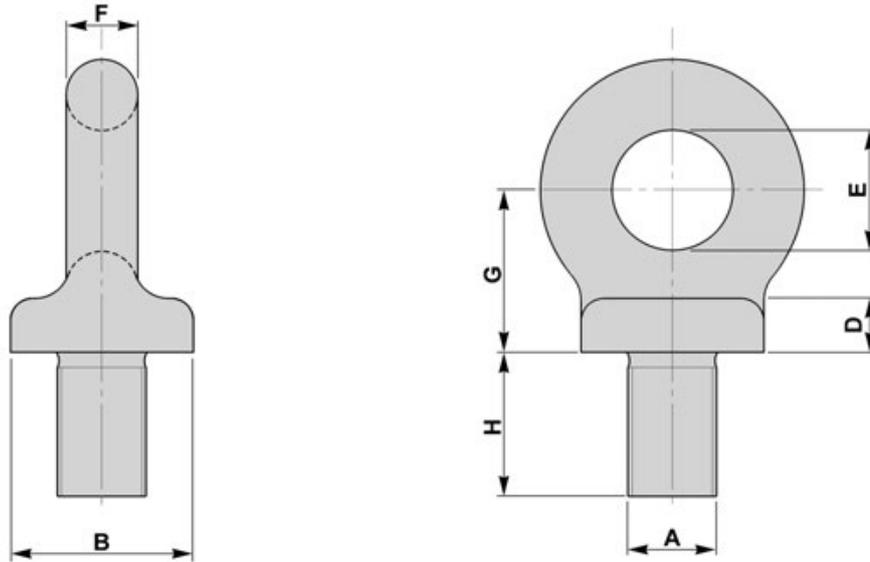
**SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING**

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

## BS 529 - COLLARED EYEBOLTS - IMPERIAL

- TO BS 529 : 1944 PART I

**BFE 18**



A	B	D	E	F	G	H	SWL		Weight Each
							TONNES	CWT	kgs
3/8	21	7	14	9	19	17	0	5	0.1
1/2	28	10	19	11	25	22	0	10	0.1
5/8	36	12	24	14	32	28	0	18	0.3
3/4	43	14	28	17	38	33	1	8	0.5
7/8	50	17	33	20	44	39	2	0	0.6
1	57	19	38	22	51	44	2	15	1.1
1. 1/8	64	21	42	25	57	50	3	10	1.6
1. 1/4	71	24	48	28	64	55	4	10	2.1
1. 3/8	85	28	57	33	76	67	5	10	3.6
1. 1/2	85	28	57	33	76	67	6	10	3.6
1. 3/4	101	33	67	39	89	77	9	0	5.6
2	115	38	76	44	102	89	12	0	9.1
2. 1/4	128	42	85	50	115	101	15	0	15.0
2. 1/2	143	48	95	55	127	111	20	0	17.7
3	172	57	115	67	152	133	30	0	30.4

**MATERIAL**  
BS970 080A27 (EN5A)  
STAINLESS STEELS  
ALLOY STEELS  
B7

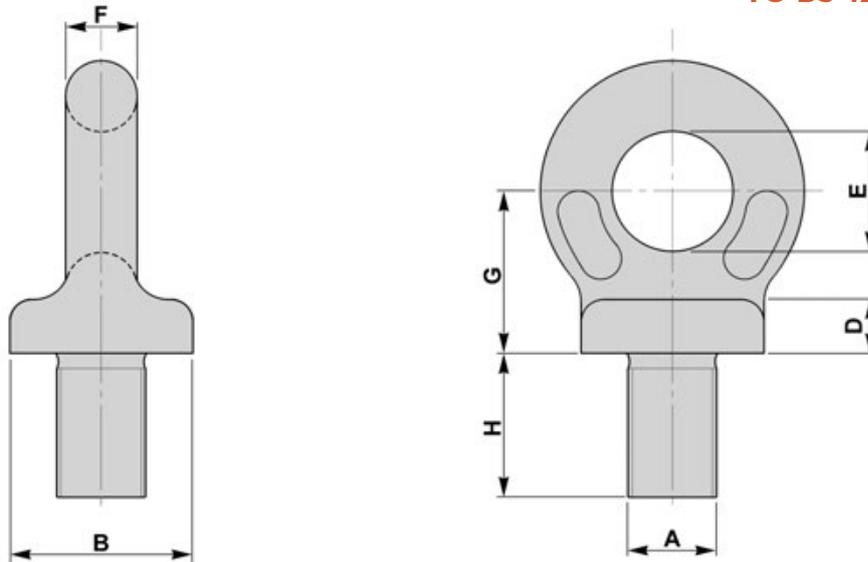
**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
CHEMICAL BLACK  
SHERARDISED

**SWL IS SHOWN FOR  
VERTICAL LIFT  
LONGER SHANK AVAILABLE  
UPON REQUEST**

**BS 4278 - COLLARED EYEBOLTS - METRIC**

**BFE 19**

**- TO BS 4278 TABLE I**



A	B	D	E	F	G	H	SWL 1968	SWL 1984	Weight Each
mm	mm	mm	mm	mm	mm	mm	tonnes	tonnes	kgs
M8	22	7	15	9	20	18	0.15	---	0.06
M10	22	7	15	9	20	18	0.25	---	0.07
M12	22	7	15	9	20	18	0.32	0.40	0.07
M14	29	10	20	12	26	23	0.50	---	0.15
M16	29	10	20	12	26	23	0.63	0.80	0.16
M18	36	12	24	14	32	28	1.00	---	0.28
M20	40	14	27	16	36	32	1.25	1.60	0.44
M22	45	15	30	18	40	35	1.60	---	0.56
M24	52	17	35	21	46	40	2.00	2.50	0.84
M27	58	20	39	23	52	46	2.50	---	1.14
M30	65	22	44	26	58	51	3.20	4.00	1.66
M33	72	24	48	29	64	56	4.00	---	2.24
M36	81	27	54	32	72	63	5.00	6.30	3.17
M39	90	30	60	36	80	70	6.30	---	3.92
M42	90	30	60	36	80	70	7.00	8.00	3.92
M45	101	34	68	40	90	79	8.00	---	6.00
M48	101	34	68	40	90	79	9.00	10.00	6.00
M52	115	38	76	46	102	89	10.00	12.50	9.00
M56	128	43	86	51	114	100	12.50	16.00	13.00
M64	144	48	96	58	128	112	16.00	20.00	17.50
M70	172	54	108	65	144	126	20.00	---	31.00
M72	172	54	108	65	144	126	22.00	25.00	31.00
M76	172	54	108	65	144	126	25.00	---	31.00

**MATERIAL**

**BS970 080A27 (EN5A)**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7**

**FINISH**

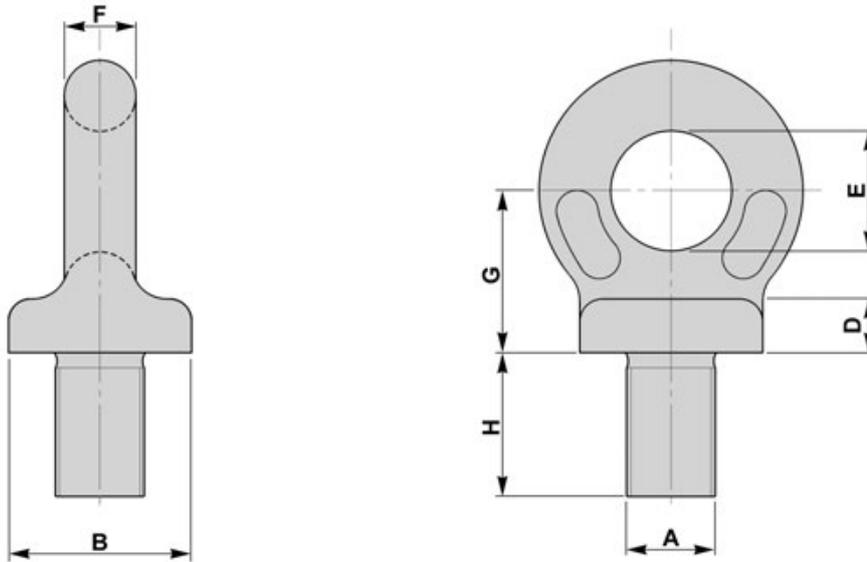
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**CHEMICAL BLACK**  
**SHERARDISED**

**SWL IS SHOWN FOR  
VERTICAL LIFT**

**LONGER SHANK AVAILABLE  
UPON REQUEST**

## BS 4278 - COLLARED EYEBOLTS - IMPERIAL

- TO BS 4278 TABLE 4



A	B	D	E	F	G	H	SWL	Weight Each
mm	mm	mm	mm	mm	mm	mm	tonnes	kgs
3/4	22	7	15	9	20	18	0.25	0.08
1/2	29	10	20	12	26	23	0.50	0.14
5/8	36	12	24	14	32	28	0.90	0.38
3/4	45	15	30	18	40	35	1.40	0.60
7/8	52	17	35	21	46	40	2.00	0.78
1	58	20	39	23	52	46	2.75	1.67
1. 1/8	65	22	44	26	58	51	3.50	1.78
1. 1/4	72	24	48	29	64	56	4.50	2.24
1. 1/2	86	29	57	33	76	67	6.50	3.17
1. 3/4	101	34	68	40	90	79	9.00	6.00
2	115	38	76	46	102	89	12.00	9.00
2. 1/4	128	43	86	51	114	100	15.00	15.00
2. 1/2	144	48	96	58	128	112	20.00	18.20
3	172	57	114	67	153	133	30.00	30.40

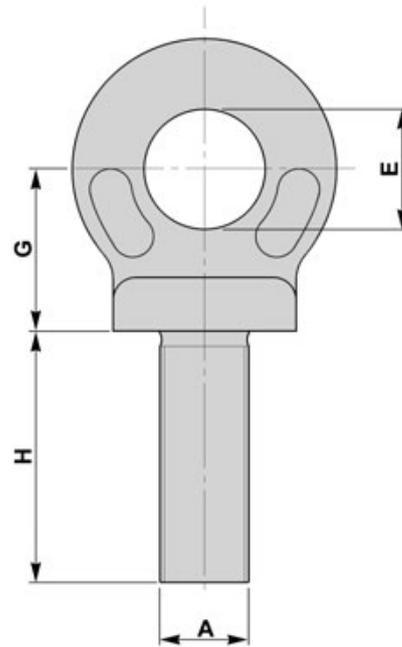
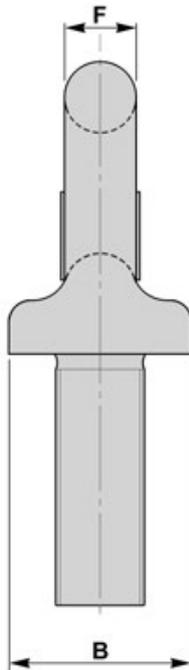
**MATERIAL**  
BS970 080A27 (EN5A)  
STAINLESS STEELS  
ALLOY STEELS  
B7

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
CHEMICAL BLACK  
SHERARDISED

**SWL IS SHOWN FOR  
VERTICAL LIFT**  
**LONGER SHANK AVAILABLE  
UPON REQUEST**

## LONG SHANK COLLARED EYEBOLTS - METRIC

- PRODUCED FROM BS 529 FORGINGS



A	B	E	F	G	H	SWL	Weight Each
mm	mm	mm	mm	mm	mm	tonnes	kgs
M10	22	15	9	20	178	0.25	0.2
M12	28	19	11	25	178	0.40	0.2
M14	36	24	14	32	178	0.50	0.5
M16	36	24	14	32	178	0.80	0.5
M18	43	29	17	38	178	1.00	0.8
M20	43	29	17	38	178	1.60	0.8
M22	50	33	20	44	178	1.60	1.0
M24	57	38	22	51	178	2.50	1.5
M30	71	48	28	63	178	4.00	2.9

**MATERIAL**

**BS970 080A27 (EN5A)**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**CHEMICAL BLACK**  
**SHERARDISED**

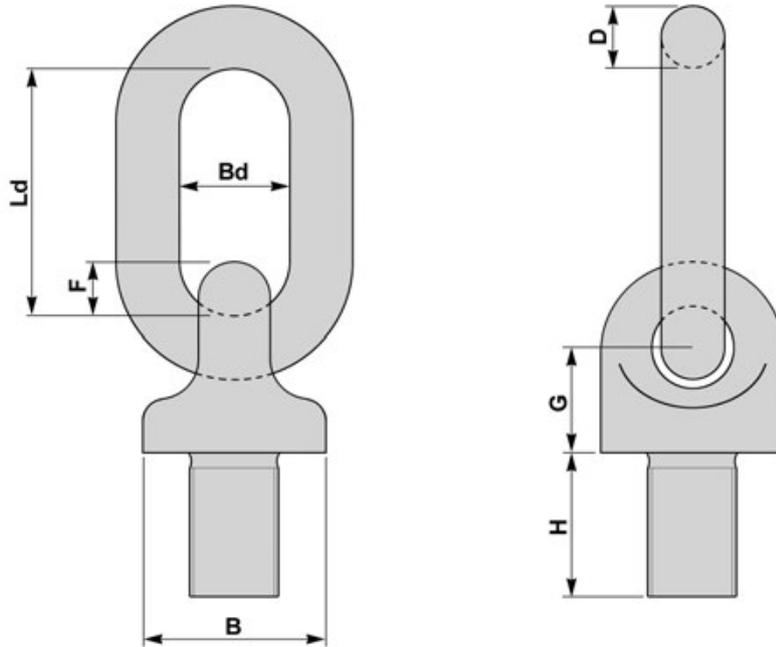
**SWL IS SHOWN FOR  
 VERTICAL LIFT**

LONG SHANK COLLARED EYEBOLTS - METRIC

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## EYEBOLTS WITH LINKS - METRIC

- PRODUCED FROM BS 4278 TABLE 2 FORGINGS



Thread Size	B	F	G	H	LINK			SWL	Weight Each
mm	mm	mm	mm	mm	D	Bd	Ld	tonnes	kgs
M8	39	12	20	27	13	24	53	0.10	0.40
M10	39	12	20	27	13	24	53	0.15	0.40
M12	39	12	20	27	13	24	53	0.20	0.40
M16	39	12	20	27	13	24	53	0.40	0.40
M20	39	12	20	27	13	24	53	1.00	0.50
M24	47	14	23	32	15	29	63	1.60	0.80
M30	60	18	30	41	19	37	80	2.50	1.50
M36	75	23	38	52	24	46	102	4.00	3.00
M42	94	29	47	65	30	58	126	4.50	5.50
M48	94	29	47	65	30	58	126	6.30	5.50

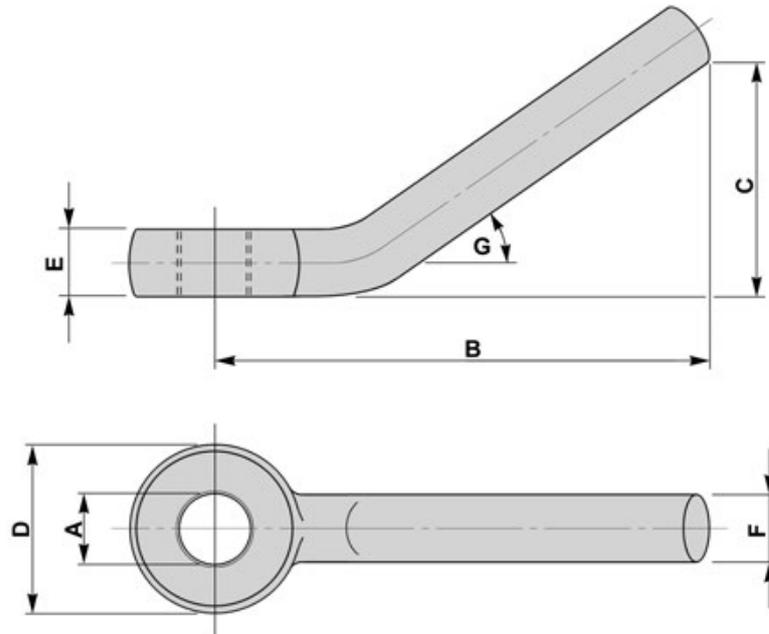
**MATERIAL**  
BS970 080A27 (EN5A)  
STAINLESS STEELS  
ALLOY STEELS  
B7

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
CHEMICAL BLACK  
SHERARDISED

**FOR LOADING AT ANGLES  
AND TRUNNION LIFTING  
SEE PAGE 167**

## SINGLE LEVER NUT - WRENCH HANDLE

**BFF 29**



A		B	C	D	E	F	Weight Each
mm	inches	mm	mm	mm	mm	mm	kgs
M6	1/4	80	25	22	10	10	0.08
M8	5/16	80	25	22	10	10	0.08
M10	3/8	100	35	32	13	13	0.15
M12	1/2	110	40	38	16	16	0.28
M16	5/8	120	56	40	20	16	0.33
M20	3/4	130	56	44	25	20	0.53
M22	7/8	145	60	44	25	20	0.54
M24	1	150	60	51	29	24	0.83
M27	---	160	60	60	30	30	1.65
M30	1.1/8	160	60	60	30	30	1.65
M33	1.1/4	160	60	65	38	36	2.50
M36	1.1/2	160	60	65	38	36	2.45

**MATERIAL**

BS970 080A27 (ENSA)  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

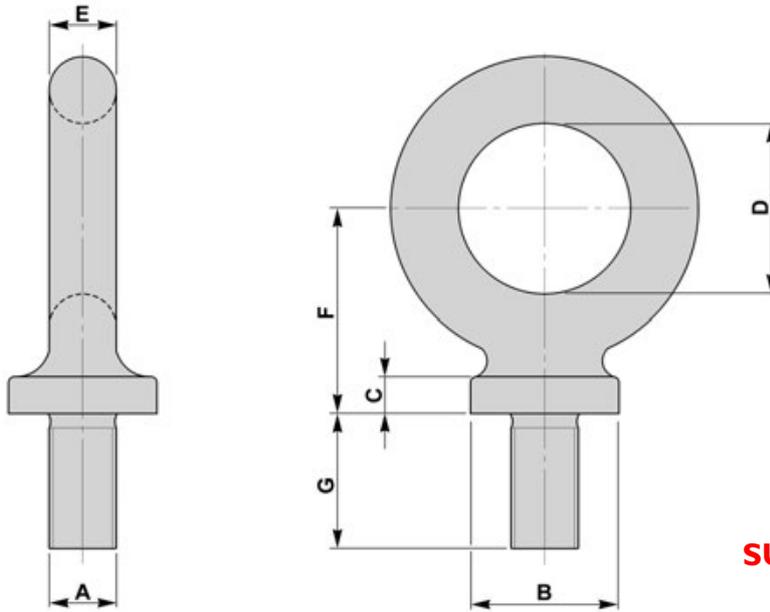
**FINISH**

SELF COLOUR  
GALVANISED  
ELECTROPLATED  
CHEMICAL BLACK  
PTFE COATING

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

## DYNAMO EYEBOLTS - COMMERCIAL PATTERN

**BFE 20**



**MATERIAL**

**BS970 080A27 (EN5A)**

**STAINLESS STEELS**

**ALLOY STEELS**

**B7**

**FINISH**

**SELF COLOUR**

**GALVANISED**

**ELECTROPLATED**

**SHERARDISED**

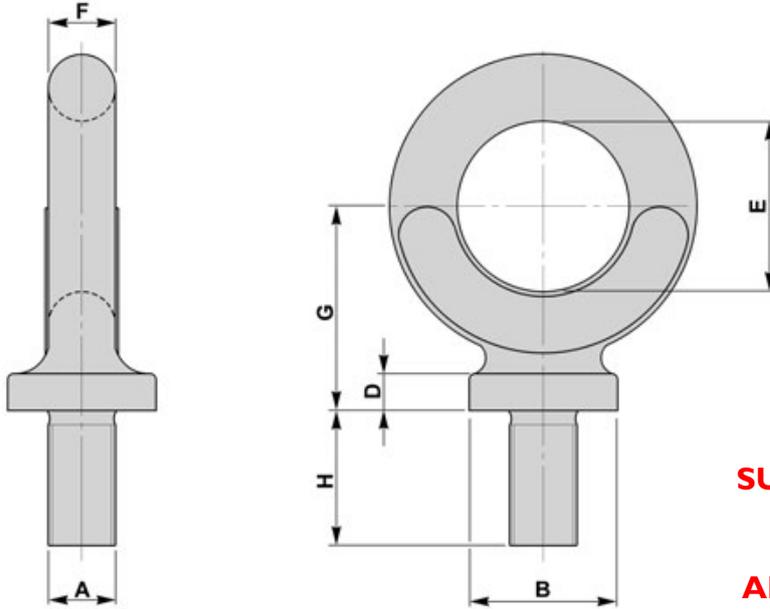
**PTFE COATING**

**SUITABLE FOR VERTICAL  
LIFTS ONLY**

A	B	C	D	E	F	G	G	SWL	Weight Each	
Metric Imperial	DIA		DIA	DIA		STD Shank	Long Shank	Vertical	STD	LONG
inches	mm	mm	mm	mm	mm	mm	mm	kg/CWT	kg	kg
M6	19	6	22	10	27	19	101	100	0.08	0.10
1/4	3/4	1/4	7/8	3/8	1. 1/16	3/4	4	2	0.08	0.10
M8	19	6	22	10	27	19	101	150	0.08	0.10
5/16	3/4	1/4	7/8	3/8	1. 1/16	3/4	4	3	0.08	0.10
M10	19	6	22	10	27	19	101	250	0.08	0.10
3/8	3/4	1/4	7/8	3/8	1.1/16	3/4	4	5	0.08	0.10
M12	25	8	28	11	35	26	101	320	0.14	0.30
1/2	1	5/16	1. 1/8	7/16	1. 3/8	1	4	10	0.14	0.30
M16	28	10	32	13	41	28	115	630	0.24	0.45
5/8	1. 1/8	3/8	1. 1/4	1/2	1. 5/8	1. 1/8	4. 1/2	16	0.24	0.45
M20	36	13	40	17	54	32	127	1250	0.40	0.70
3/4	1. 3/8	1/2	1. 5/8	11/16	2. 1/8	1. 1/4	5	24	0.40	0.70
M22	38	13	44	17	57	41	127	1600	0.62	1.00
7/8	1. 1/2	1/2	1. 3/4	11/16	2. 1/4	1. 5/8	5	32	0.62	1.00
M24	41	13	51	21	64	45	127	2000	0.80	1.10
1	1. 5/8	1/2	2	13/16	2. 1/2	1. 3/4	5	44	0.80	1.10
M27	54	16	60	26	73	51	152	2500	1.76	2.20
1. 1/8	2. 1/8	5/8	2. 3/8	1	2. 7/8	2	6	56	1.76	2.20
M30	54	16	60	26	73	51	152	3200	1.70	2.20
1. 1/4	2. 1/8	5/8	2. 3/8	1	2. 7/8	2	6	70	1.70	2.20
M33	57	18	76	28	89	57	152	4000	2.60	3.20
1. 3/8	2. 1/4	11/16	3	1. 1/8	3. 1/2	2. 1/4	6	85	2.60	3.20
M36	57	18	76	28	89	57	152	5000	2.65	3.50
1. 1/2	2. 1/4	11/16	3	1. 1/8	3. 1/2	2. 1/4	6	100	2.65	3.50

**BS 4278 - TABLE 3 & 6 - DYNAMO EYEBOLTS**

**BFE 21**



**MATERIAL**

**BS970 080A27 (EN5A)**

**STAINLESS STEELS**

**ALLOY STEELS**

**B7**

**FINISH**

**SELF COLOUR**

**GALVANISED**

**ELECTROPLATED**

**SHERARDISED**

**PTFE COATING**

**SUITABLE FOR VERTICAL  
LIFTS ONLY**

**ANGLE LIFTS MUST USE  
BS4278 TABLE I**

**BS 4278 - TABLE 3**

<b>A</b>	<b>B</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>SWL</b>	<b>Weight Each</b>
mm	tonnes	kgs						
M12	17	5	22	9	27	18	0.32	0.08
M16	23	6	29	11	34	23	0.63	0.14
M20	32	9	40	15	47	32	1.25	0.40
M24	40	12	51	19	60	40	2.00	0.78
M30	51	14	64	24	76	51	3.20	1.78
M36	63	18	79	30	95	63	5.00	2.44
M42	70	20	88	33	105	70	6.30	4.10
M48	79	22	99	37	118	79	8.00	7.70
M52	89	26	112	42	134	89	10.00	10.00

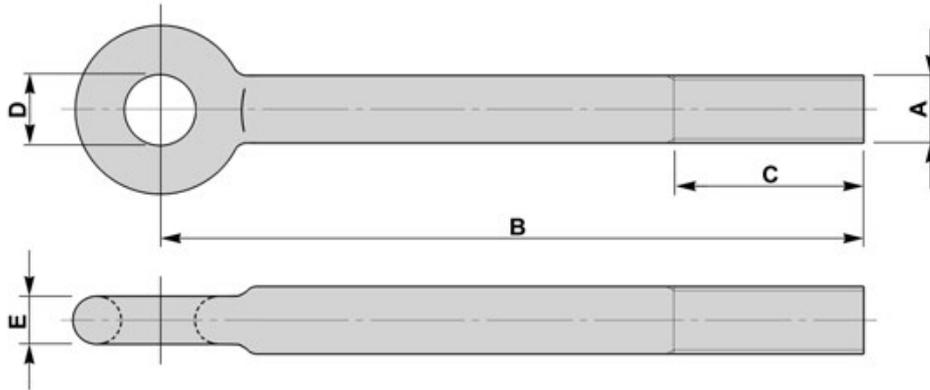
**BS 4278 - TABLE 6**

<b>A</b>	<b>B</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>SWL</b>	<b>Weight Each</b>
inches	mm	mm	mm	mm	mm	mm	tonnes	kgs
3/8	17	5	22	9	27	18	0.25	0.08
1/2	23	6	29	11	34	23	0.50	0.08
5/8	28	8	35	14	42	28	0.90	0.14
3/4	32	9	40	15	47	32	1.25	0.40
7/8	35	10	44	17	53	35	1.60	0.60
1.	40	12	51	19	60	40	2.00	0.78
1. 1/4	51	14	64	24	76	51	3.20	1.90
1. 1/2	63	18	79	30	95	63	5.00	2.44
1. 3/4	79	22	99	37	118	79	8.00	7.70
2	89	26	112	42	134	89	10.00	10.00

**BS 3974 - SLING ROD EYEBOLTS - INTEGRAL FORGED EYE**

- TO BS 3974 : 1974 PART I

**BFE 22**



A	B*	C*	D	E	SWL	Weight Each
mm	mm	mm	mm	mm	kgs	kgs
M8	300	200	14	6	230	0.13
M10	300	200	16	7	360	0.21
M12	300	200	18	9	530	0.32
M16	300	200	22	12	1010	0.55
M20	300	200	26	14	1580	0.89
M24	300	200	30	17	2280	1.25
M30	300	200	36	21	3650	1.93
M36	300	200	42	26	5340	2.90
M42	300	200	48	30	7400	4.05

**\* DENOTES STANDARD SIZES, SHORTER LENGTHS ALSO AVAILABLE. LONGER LENGTHS OF SHANK AVAILABLE UP TO 3000MM. FORGED IN ONE PIECE THEREFORE REMOVING THE NEED FOR TIE BARS AND TURNBUCKLES.**

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

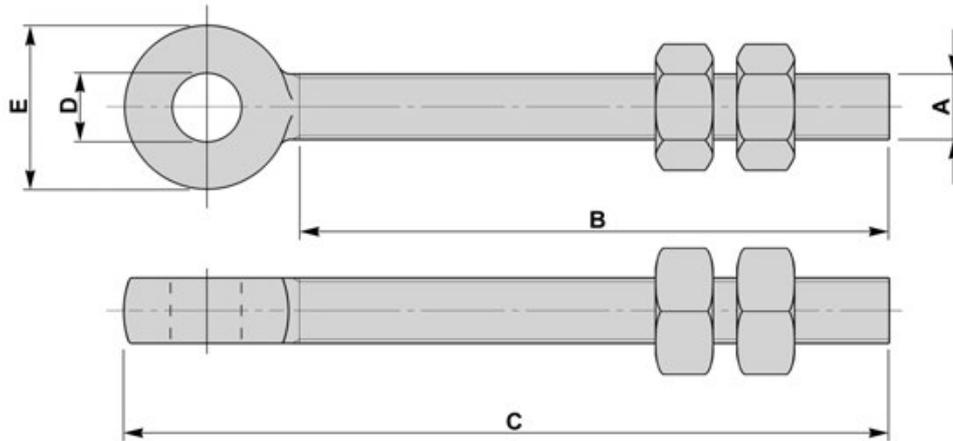
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## ADJUSTABLE EYEBOLTS

### BFG 1



Stock Code	A	B	C	D	E
mm	mm	mm	mm	mm	mm
35/1	M12	100	130	14	30
35/2	M16	100	138	18	38
35/3	M16	152	190	18	38
35/4	M20	115	159	21	45
35/5	M20	115	159	24	45
35/6	M20	152	197	21	45
35/7	M20	152	197	24	45
35/8	M20	204	248	24	45
35/9	M20	254	299	21	45
35/10	M20	254	299	24	45
35/11	M24	152	202	27	50
35/12	M24	200	250	27	50
35/13	M24	254	304	27	50
35/14	M30	152	212	33	60

**MATERIAL**  
CARBON STEELS

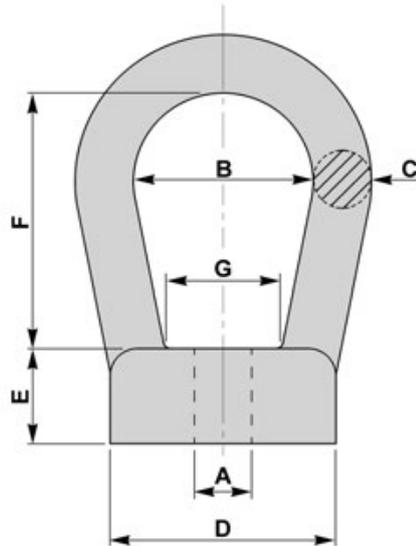
**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
CHEMICAL BLACK

**SUPPLIED WITH 2 NUTS**  
**NON STANDARDS**  
**AVAILABLE ON REQUEST**

## BS 3974 - BOW NUTS

- TO BS 3974 : 1974 PART I

**BFE 23**



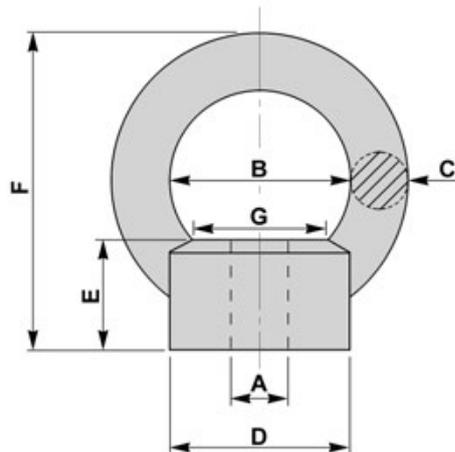
A		B	C	D	E	F	G	SWL METRIC	SWL IMPERIAL
METRIC	IMPERIAL	mm	mm	mm	mm	mm	mm	kgs	kgs
M8	1/4	25	10	32	16	41	18	230	---
M10	3/8	25	10	32	16	41	18	360	250
M12	1/2	30	12	38	18	43	20	530	500
M16	5/8	30	12	38	18	43	20	1010	800
M18	3/4	40	14	45	25	63	25	1290	1200
M20	---	40	14	45	25	63	25	1580	---
M22	7/8	50	17	50	28	79	30	1930	1600
M24	1	50	17	50	28	79	30	2280	2200
M30	1. 1/8	75	26	70	38	82	46	3650	---
M33	1. 1/4	75	26	70	38	82	46	4490	3500
M36	1. 1/2	75	26	70	38	82	46	5340	4750
M42	1. 3/4	100	30	80	45	105	59	7400	---

**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

EYE NUTS

**BFE 24**



A		B	C	D	E	F	G	SWL METRIC	SWL IMPERIAL
METRIC	IMPERIAL	mm	mm	mm	mm	mm	mm	kgs	cwt
M8	---	44	13	19	22	78	22	200	---
M10	3/8	44	13	19	22	78	22	300	5
M12	1/2	44	13	19	22	78	22	500	10
M14	---	44	13	19	22	78	22	500	---
M16	5/8	44	13	19	22	78	22	800	16
M18	---	48	16	29	26	86	26	1000	---
M20	3/4	48	16	29	26	86	26	1200	24
M22	7/8	48	16	29	26	86	26	1600	32
M24	1	54	19	35	38	105	38	2200	44

**MATERIAL**

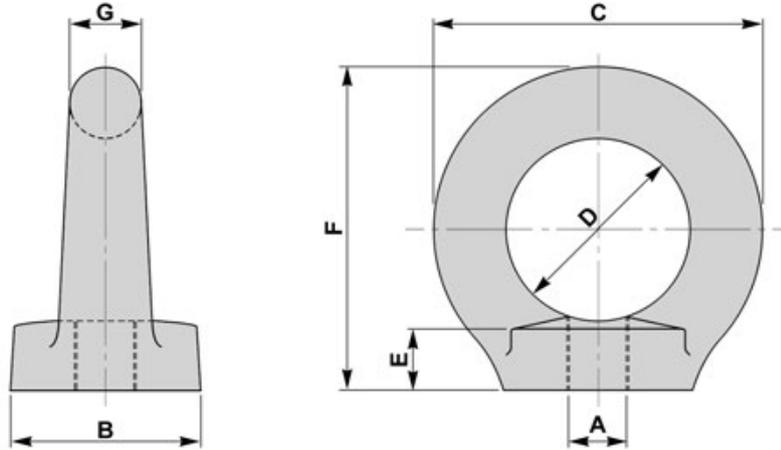
**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

## DIN 582 - EYENUTS

**BFE 25**



A	B	C	D	E	F	G	SWL	Weight Each
mm	mm	mm	mm	mm	mm	mm	kgs	kgs
(M6)	20	36	20	8.5	36	8	70	0.05
M8	20	36	20	8.5	36	8	140	0.05
M10	25	45	25	10	45	10	230	0.09
M12	30	54	30	11	53	12	340	0.15
(M14)	35	63	35	13	62	14	490	0.24
M16	35	63	35	13	62	14	700	0.24
M20	40	72	40	16	71	16	1200	0.36
(M22)	45	81	45	18	81	18	1500	0.58
M24	50	90	50	20	90	20	1800	0.72
(M27)	50	90	50	20	90	20	2500	0.72
M30	65	108	60	25	109	24	3200	1.32
(M33)	65	108	60	25	109	24	4300	1.32
M36	75	126	70	30	128	28	4600	2.08
(M39)	75	126	70	30	128	28	6100	2.08
M42	85	144	80	35	147	32	6300	3.11
(M45)	85	144	80	35	147	32	8000	3.04
M48	100	166	90	40	168	38	8600	5.02
(M52)	100	166	90	40	168	38	9900	5.02
M56	110	184	100	45	187	42	11500	6.69
M64	120	206	110	50	208	48	16000	9.30

( ) = NON STANDARD SIZES

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7**

**FINISH**

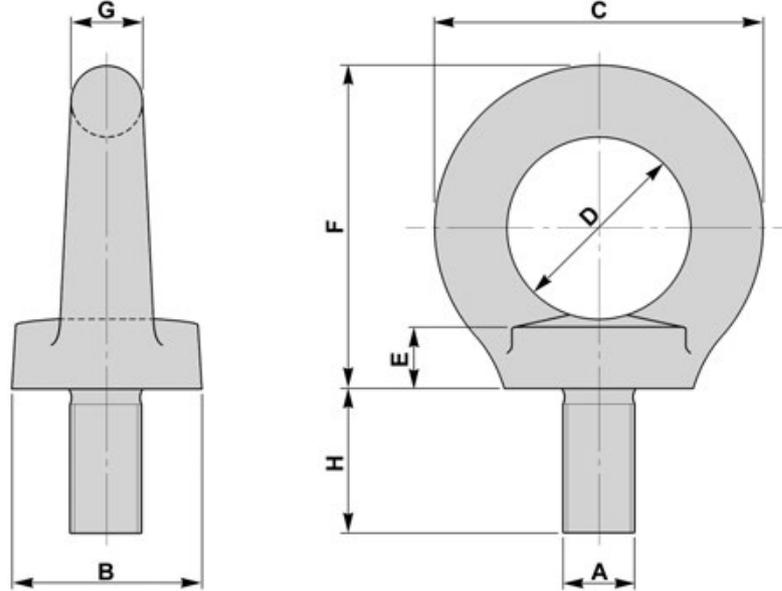
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**SWL SHOWN FOR VERTICAL LIFT**

**ITEMS SUPPLIED UNTESTED UNLESS REQUESTED**

DIN 580 - EYEBOLTS

**BFE 26**



A	B	C	D	E	F	G	H	SWL	Weight Each
mm	mm	mm	mm	mm	mm	mm	mm	kgs	kgs
M6	17	28	16	6	31	6	13	70	0.06
M8	20	36	20	6	36	8	15	140	0.08
M10	25	45	25	8	45	10	18	230	0.11
M12	30	54	30	10	53	12	22	340	0.18
M14	35	63	35	12	62	14	28	490	0.29
M16	35	63	35	12	62	14	28	700	0.29
M20	40	72	40	14	71	16	30	1200	0.45
M22	45	81	45	16	80	18	35	1500	0.67
M24	50	90	50	16	90	20	38	1800	0.87
M27	50	90	50	18	90	20	38	2500	0.88
M30	65	108	60	18	109	24	45	3200	1.66
M33	65	108	60	22	109	24	45	4300	1.72
M36	75	126	70	22	128	28	55	4600	2.65
M39	75	126	70	26	128	28	55	6100	2.80
M42	85	144	80	30	147	32	65	7000	4.03
M45	85	144	80	30	147	32	65	8000	4.25
M48	100	166	90	35	168	36	70	8600	6.38
M52	100	166	90	35	168	36	70	9900	6.66
M56	110	184	100	38	187	42	80	11500	8.80
M64	120	206	110	42	208	48	90	16000	12.40

**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

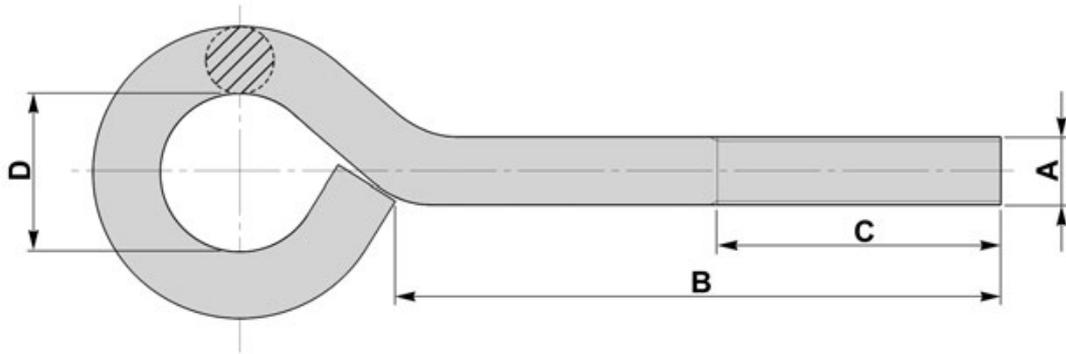
**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

**SWL SHOWN FOR  
VERTICAL LIFT**  
**ITEMS SUPPLIED UNTESTED  
UNLESS REQUESTED**

## CURLED EYEBOLTS - ROUND TYPE

**BFE 27**

### ROUND TYPE

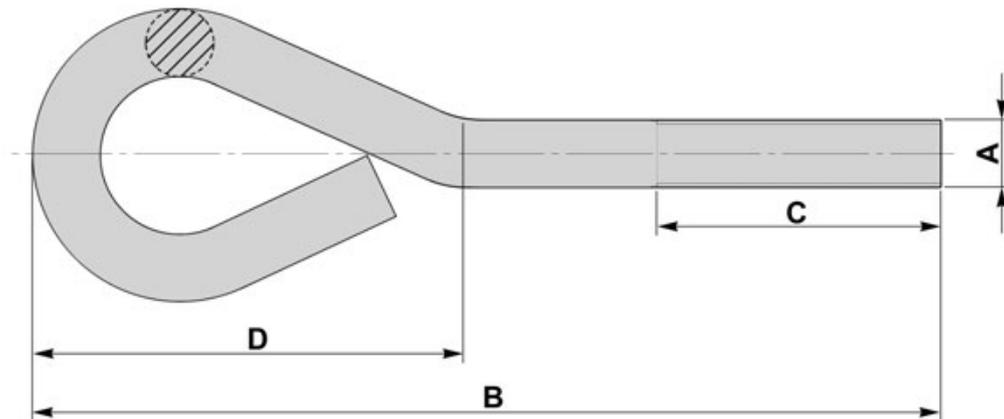


THREADS M6 - M100 (1/4" - 4")

## CURLED EYEBOLTS - PEAR TYPE

**BFE 28**

### PEAR TYPE



THREADS M6 - M100 (1/4" - 4")

#### MATERIAL

CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

#### FINISH

SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

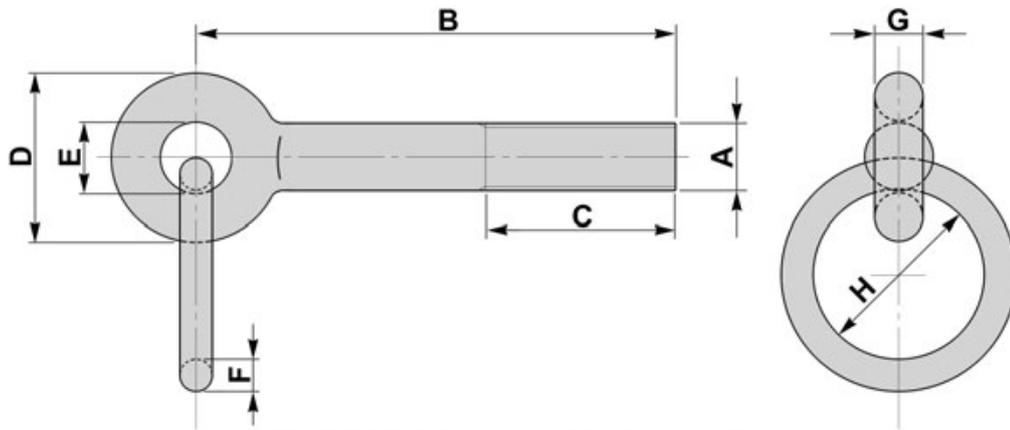
**ALSO AVAILABLE WELDED**

**SHANK LENGTH 5000MM MAX**

**DIMENSIONS TO SUIT  
CUSTOMER REQUIREMENTS**

## RING EYEBOLTS

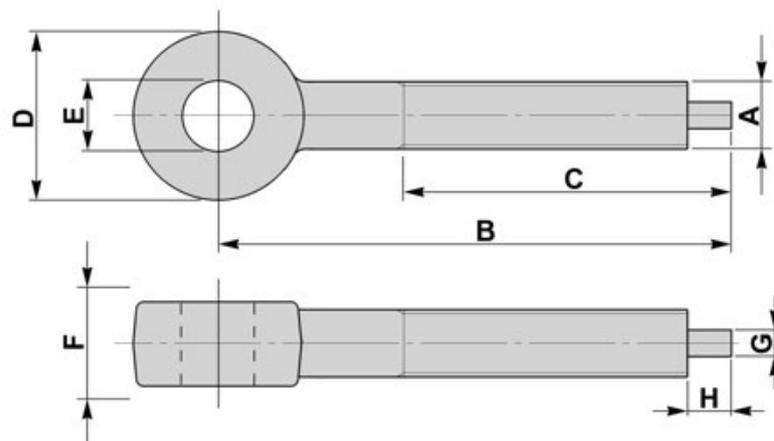
**BFE 29**



THREADS M6 - M100 (1/4" - 4")

## NIB END EYEBOLTS

**BFE 30**



THREADS M6 - M100 (1/4" - 4")

**MATERIAL**

CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

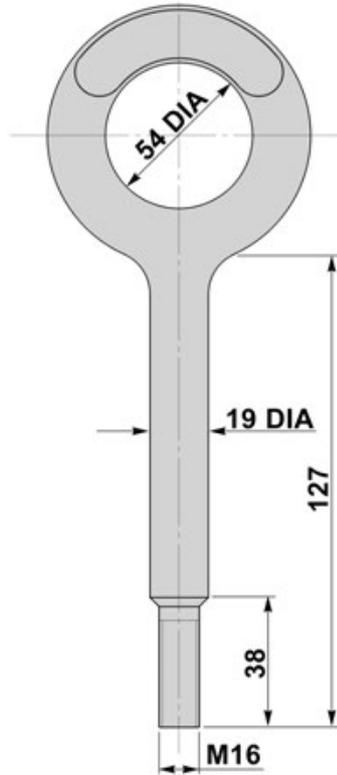
**FINISH**

SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

SCAFFOLD RESTRAINT EYEBOLTS

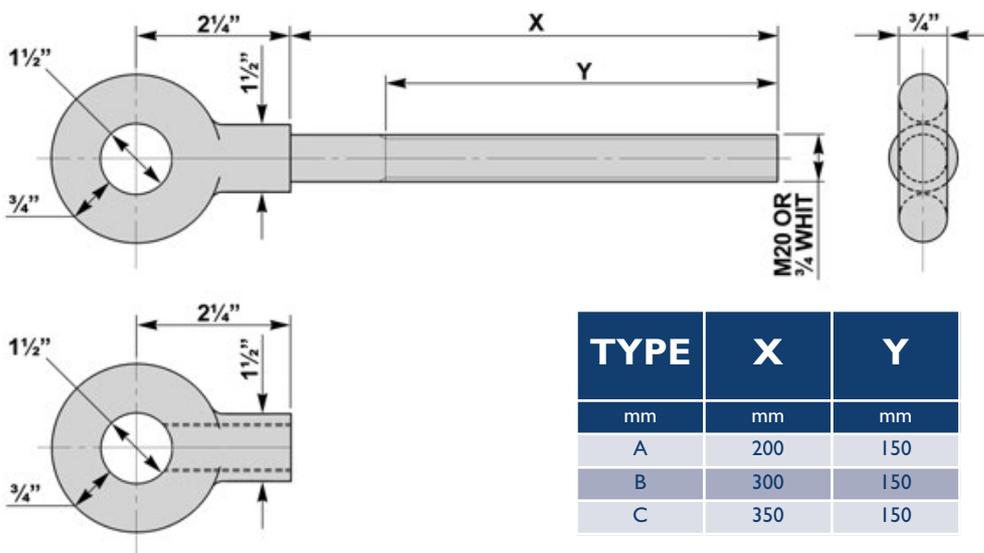
BFE 32



BS 1320 - EYEBOLTS & EYENUTS

BFE 33

BFE 34

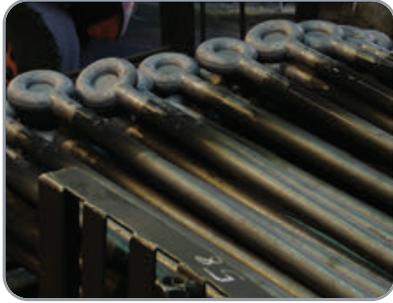


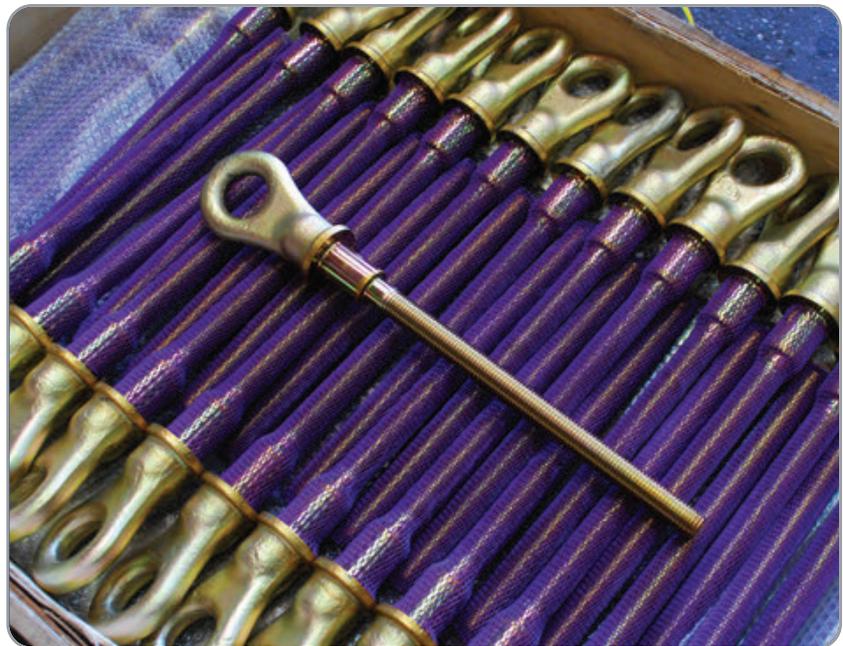
TYPE	X	Y
mm	mm	mm
A	200	150
B	300	150
C	350	150

**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS

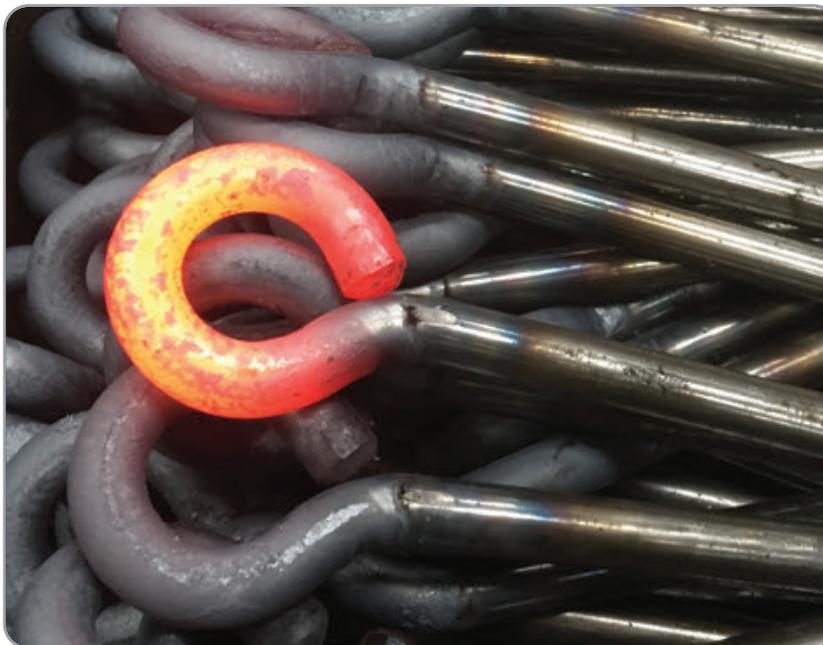
**FINISH**  
GALVANISED  
ELECTRO POLISHED  
PLASTIC COATING

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**









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**BROOKS** forgings  
INDUSTRIAL COMPONENTS CATALOGUE

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At Brooks (Forgings) Ltd we specialise in the manufacture of non-standard Shackles, produced to our clients' exact specifications.

We have gained valuable experience over the years by supplying to the Petrochemical, Defence, Mining, and Lifting Tackle industries to name just a small selection. We work in partnership with our clients suggesting and recommending ways to maximise the most cost effective method of production and to reduce lead times.



**We can manufacture up to a maximum body diameter of 100mm (4" Dia) using the following processes:**

- Drop Forging
- Upset Forging
- Hot Bending
- Fabrication
- Machining

**Shackles can be produced in a range of materials including:**

- Carbon Steel
- Alloy Steel
- Stainless Steel
- Duplex and other Exotic Steels

**Manufactured using:**

- Round Material
- Square Material

**Various finishes are also available including:**

- Electro Plated
- Galvanised
- Chromed
- Powder Coated
- Painted
- Polished
- Self Colour
- Bright Zinc Plated

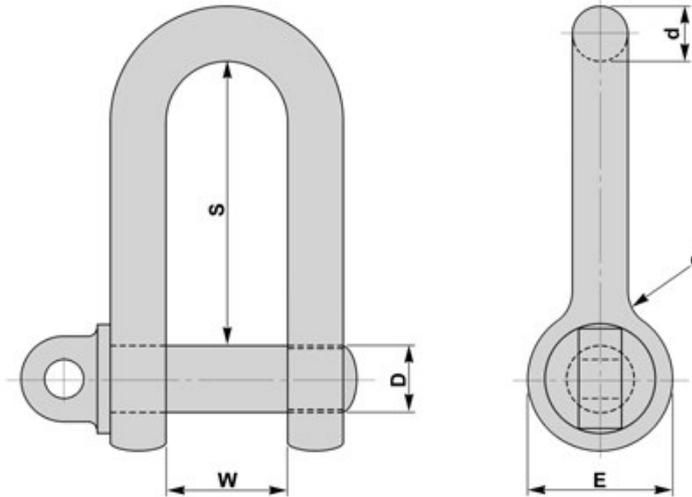
Our fully equipped Tool Room is supported by our Technical Department who has access to the latest computer aided design (CAD), machining (CAM), and forging simulation software.

This enables us to rapidly manufacture forging dies for specialist products and non-standard items to our customers' exact specifications.

## BS 3032 - D SHACKLES - SMALL

- TO BS 3032 : 1958 TABLE I

**BFL 10**



SWL		d	D	W	S	E	Weight Each
Tons	cwt	inches	inches	inches	inches	inches	kgs
---	6	1/4	3/8	3/8	7/8	3/4	0.1
---	12	3/8	1/2	5/8	1. 3/8	1	0.1
1	0	1/2	5/8	7/8	1. 7/8	1. 1/4	0.3
1	15	5/8	3/4	1	2. 1/4	1. 1/2	0.6
2	10	3/4	7/8	1. 1/4	2. 3/4	1. 3/4	1.0
3	10	7/8	1	1. 3/8	3. 1/4	2	1.5
4	10	1	1. 1/8	1. 1/2	3. 5/8	2. 1/4	2.3
5	10	1. 1/8	1. 1/4	1. 3/4	4. 1/8	2. 1/2	3.3
7	0	1. 1/4	1. 3/8	1. 7/8	4. 1/2	2. 3/4	4.5
8	0	1. 3/8	1. 1/2	2. 1/8	5	3	6.0
10	15	1. 1/2	1. 3/4	2. 3/8	5. 1/2	3. 1/2	8.6
13	0	1. 5/8	1. 7/8	2. 1/2	5. 7/8	3. 3/4	9.5
14	15	1. 3/4	2	2. 3/4	6. 3/8	4	12.5
16	15	1. 7/8	2. 1/8	2. 7/8	6. 3/4	4. 1/4	15.3
19	0	2	2. 1/4	3	7. 1/4	4. 1/2	18.4
20	0	2. 1/8	2. 3/8	3. 1/4	7. 3/4	4. 3/4	22.3
25	0	2. 3/8	2. 3/4	3. 5/8	8. 5/8	5. 1/2	30.9
30	0	2. 1/2	2. 7/8	3. 7/8	9	5. 3/4	35.9
35	0	2. 3/4	3. 1/8	4. 1/4	10	6. 1/4	48.1
40	0	2. 7/8	3. 1/4	4. 3/8	10. 3/8	6. 1/2	54.9
50	0	3. 1/4	3. 3/4	5	10. 3/4	7. 1/2	79.0
65	0	3. 5/8	4. 1/4	5. 1/2	13. 1/8	8. 1/2	109.9
80	0	4	4. 5/8	6. 1/8	14. 1/2	9. 1/4	147.6

**MATERIAL**

**BS 970 150M19 (EN14A)**

**STAINLESS STEELS**

**B7**

**FINISH**

**SELF COLOUR**

**GALVANISED**

**ELECTROPLATED**

**SHERARDISED**

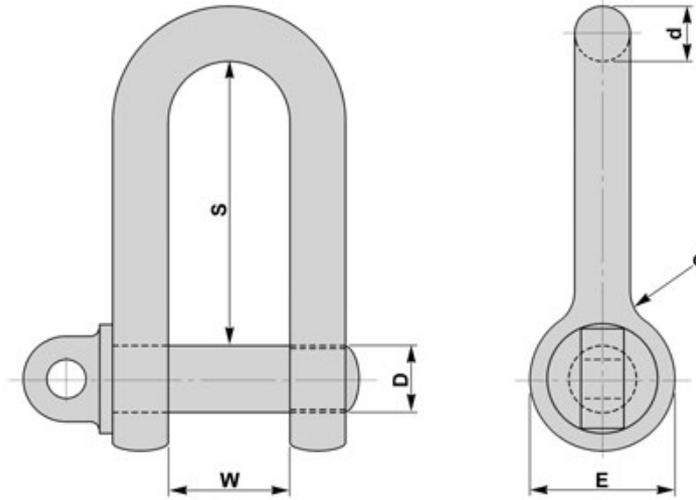
**CHEMICAL BLACK**

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

## BS 3032 - D SHACKLES - LARGE

**BFL 11**

- TO BS 3032 : 1958 TABLE 2



SWL		d	D	W	S	E	Weight Each
Tons	cwt	inches	inches	inches	inches	inches	kgs
---	5	1/4	3/8	1/2	1	3/4	0.1
---	10	3/8	1/2	3/4	1. 1/2	1	0.1
---	15	1/2	5/8	1. 1/8	2. 1/8	1. 1/4	0.3
1	10	5/8	3/4	1. 1/4	2. 1/2	1. 1/2	0.6
2	0	3/4	7/8	1. 1/2	2. 7/8	1. 3/4	0.9
3	0	7/8	1	1. 3/4	3. 1/4	2	1.6
3	15	1	1. 1/8	2	3. 3/4	2. 1/4	2.3
5	0	1. 1/8	1. 1/4	2. 1/8	4. 1/8	2. 1/2	3.3
6	0	1. 1/4	1. 3/8	2. 3/8	4. 1/2	2. 3/4	4.5
7	0	1. 3/8	1. 1/2	2. 5/8	5	3	6.1
9	10	1. 1/2	1. 3/4	2. 3/4	5. 3/8	3. 1/2	8.7
11	5	1. 5/8	1. 7/8	3	5. 3/4	3. 3/4	10.0
13	0	1. 3/4	2	3. 1/4	6. 1/8	4	12.5
14	5	1. 7/8	2. 1/8	3. 5/8	7	4. 1/4	15.3
16	5	2	2. 1/4	3. 7/8	7. 3/8	4. 1/2	18.5
18	0	2. 1/8	2. 3/8	4. 1/8	7. 3/4	4. 3/4	20.0
20	0	2. 1/4	2. 1/2	4. 1/4	8. 1/4	5	22.2
25	0	2. 1/2	2. 7/8	4. 3/4	9. 1/4	5. 3/4	35.8
30	0	2. 3/4	3. 1/8	5. 1/4	10. 1/4	6. 1/4	39.0
35	0	3	3. 3/8	5. 3/4	11	6. 3/4	62.7
40	0	3. 1/8	3. 1/2	5. 7/8	11. 1/2	7	70.8
50	0	3. 1/2	4	6. 3/4	13	8	99.4
65	0	4	4. 1/2	7. 1/2	14. 3/4	9	148.5
80	0	4. 1/2	5	8. 5/8	16. 1/2	10	211.6

**MATERIAL**

**BS 970 150M19 (EN14A)**  
**STAINLESS STEELS**  
**B7**

**FINISH**

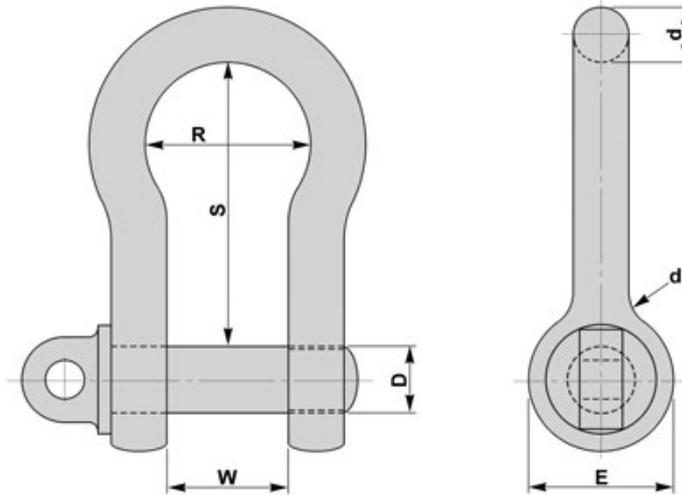
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**CHEMICAL BLACK**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## BS 3032 - BOW SHACKLES - LARGE

- TO BS 3032 : 1958 TABLE 3

**BFL 12**



SWL		d	D	W	R	S	E	Weight Each
Tons	cwt	inches	inches	inches	inches	inches	inches	kgs
---	3	1/4	3/8	1/2	3/4	1. 1/8	3/4	0.1
---	9	3/8	1/2	5/8	1	1. 5/8	1	0.1
---	15	1/2	5/8	7/8	1. 1/4	2. 1/8	1. 1/4	0.3
1	5	5/8	3/4	1. 1/8	1. 5/8	2. 3/4	1. 1/2	0.6
2	0	3/4	7/8	1. 3/8	2	3. 3/8	1. 3/4	1.0
2	15	7/8	1	1. 5/8	2. 1/4	3. 7/8	2	1.6
3	15	1	1. 1/8	1. 3/4	2. 1/2	4. 1/4	2. 1/4	2.4
4	15	1. 1/8	1. 1/4	2	2. 7/8	4. 7/8	2. 1/2	3.4
5	15	1. 1/4	1. 3/8	2. 1/4	3. 1/4	5. 3/8	2. 3/4	4.8
7	5	1. 3/8	1. 1/2	2. 1/2	3. 1/2	6	3	6.2
8	10	1. 1/2	1. 3/4	2. 3/4	3. 7/8	6. 5/8	3. 1/2	9.1
9	10	1. 5/8	1. 7/8	3	4. 3/8	7. 3/8	3. 3/4	10.4
11	10	1. 3/4	2	3. 3/8	4. 3/4	8. 1/8	4	13.1
13	0	1. 7/8	2. 1/8	3. 5/8	5. 1/8	8. 3/4	4. 1/4	15.9
15	0	2	2. 1/4	3. 7/8	5. 1/2	9. 3/8	4. 1/2	19.5
18	10	2. 1/4	2. 1/2	4. 1/8	6	10. 1/8	5	27.7
20	0	2. 3/8	2. 5/8	4. 3/8	6. 3/8	10. 3/4	5. 1/4	32.7
25	0	2. 5/8	2. 7/8	4. 3/4	7	11. 7/8	5. 3/4	44.0
30	0	2. 7/8	3. 1/8	5. 1/4	7. 3/4	13	6. 1/4	57.7
35	0	3. 1/8	3. 3/8	5. 3/4	8. 3/8	14. 1/8	6. 3/4	74.0
40	0	3. 3/8	3. 5/8	6. 1/4	9	15. 1/4	7. 1/4	93.1
50	0	3. 3/4	4	6. 3/4	10	16. 7/8	8	128.0
65	0	4. 1/4	4. 5/8	7. 3/4	11. 1/4	19	9. 1/4	186.1
80	0	4. 5/8	5	8. 1/2	12. 1/8	21	10	239.7

**MATERIAL**

BS 970 150M19 (EN14A)  
STAINLESS STEELS  
B7

**FINISH**

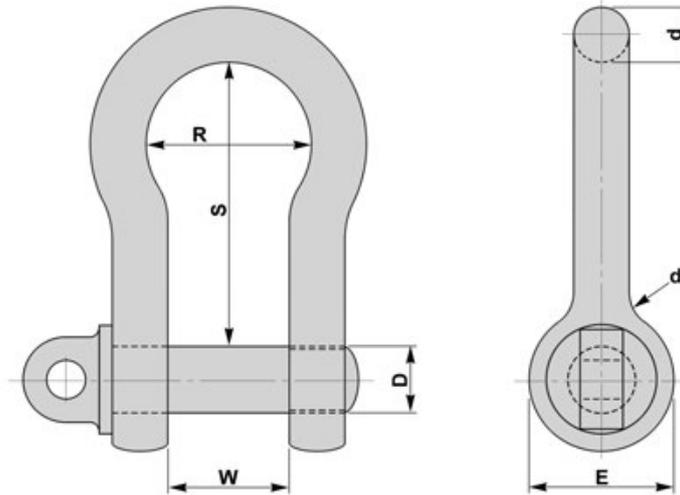
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
CHEMICAL BLACK

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

## BS 3032 - BOW SHACKLES - SMALL

**BFL 13**

- TO BS 3032 : 1958 TABLE 4



SWL		d	D	W	R	S	E	Weight Each
Tons	cwt	inches	inches	inches	inches	inches	inches	kgs
---	4	1/4	3/8	1/2	5/8	1	3/4	0.1
---	10	3/8	1/2	5/8	7/8	1. 1/2	1	0.1
1	0	1/2	5/8	7/8	1. 1/8	2	1. 1/4	0.3
1	10	5/8	3/4	1. 1/8	1. 1/2	2. 1/2	1. 1/2	0.7
2	0	3/4	7/8	1. 3/8	1. 3/4	3	1. 3/4	1.0
3	0	7/8	1	1. 1/2	2	3. 1/2	2	1.6
4	0	1	1. 1/8	1. 3/4	2. 3/8	4	2. 1/4	2.4
5	0	1. 1/8	1. 1/4	2	2. 5/8	4. 1/2	2. 1/2	3.3
6	5	1. 1/4	1. 3/8	2. 1/4	3	5	2. 3/4	4.6
7	10	1. 3/8	1. 1/2	2. 3/8	3. 1/4	5. 1/2	3	6.3
9	5	1. 1/2	1. 3/4	2. 5/8	3. 1/2	6	3. 1/2	8.8
10	10	1. 5/8	1. 7/8	2. 7/8	3. 7/8	6. 1/2	3. 3/4	10.1
12	10	1. 3/4	2	3. 1/8	4. 1/8	7	4	13.0
14	5	1. 7/8	2. 1/8	3. 3/8	4. 1/2	7. 1/2	4. 1/4	15.4
16	10	2	2. 1/4	3. 5/8	4. 3/4	8	4. 1/2	18.8
18	10	2. 1/8	2. 3/8	3. 3/4	5	8. 1/2	4. 3/4	22.7
20	0	2. 1/4	2. 1/2	4. 1/8	5. 3/8	9	5	26.8
25	0	2. 1/2	2. 3/4	4. 1/2	6	10	5. 1/2	36.7
30	0	2. 3/4	3. 1/8	5	6. 5/8	11	6. 1/4	49.0
35	0	3	3. 3/8	5. 3/8	7. 1/4	12	6. 3/4	63.6
40	0	3. 1/8	3. 1/2	5. 5/8	7. 1/2	12. 1/2	7	71.7
50	0	3. 1/2	3. 7/8	6. 1/4	8. 3/8	14	7. 3/4	101.2
65	0	4	4. 1/2	7. 1/4	9. 5/8	16	9	150.7
80	0	4. 1/2	5	8. 1/8	10. 3/4	18	10	214.7

**MATERIAL**

**BS 970 150M19 (EN14A)**  
**STAINLESS STEELS**  
**B7**

**FINISH**

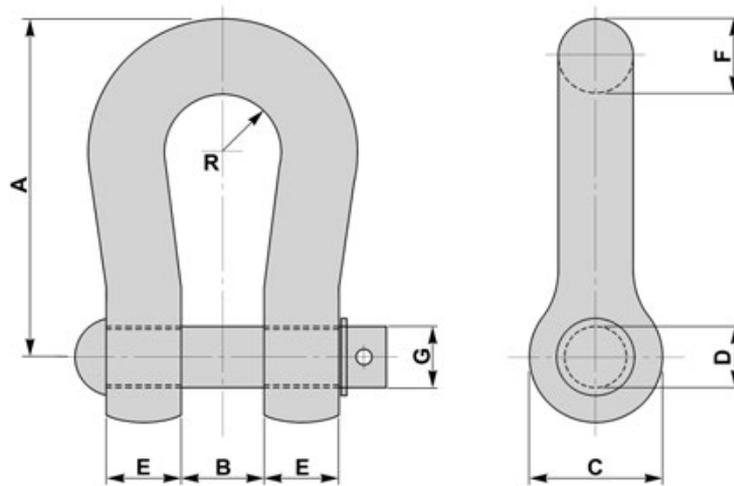
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**CHEMICAL BLACK**

**NON STANDARDS**  
**AVAILABLE TO SUIT**  
**CUSTOMER REQUIREMENTS**

## BS 3288 - SHACKLES FOR OVERHEAD POWER LINES

- TO BS 3288 : 1990 PART 2

**BFL 14**



REF NUMBER	MIN FAILING LOAD	A	B	C	D	E	F	R	G DIA	PIN LENGTH	BOLT LENGTH
	kn	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
15/29	70	86	19	35	18	9.5	16	16	M16	60	70
28/29	125	95	21	54	22	13	19	19	M20	65	85
42/29	190	105	27	51	24	22	22	17	M22	95	115
42/103	190	105	28	51	27	22	22	17	SAG ADJUSTER PIN		
67/103	300	115	27	60	29	25	25	20	M27	105	120
15/129	70	109	22	44	18	19	19	19	M16	90	90
42/129	190	124	28	57	32	22	22	17	M30	100	120
28/108	125	104	38	45	24	20	20	19	M22	105	125

**AVAILABLE WITH PIN OR HEXAGON BOLT**

**MATERIAL**

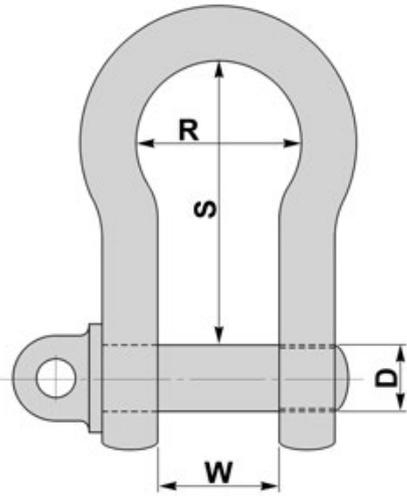
**CARBON STEELS**

**FINISH**

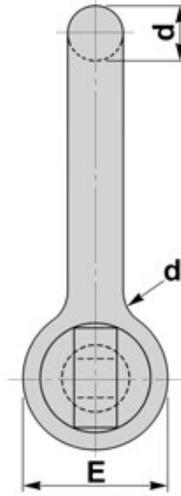
**GALVANISED**

**NON STANDARDS  
AVAILABLE TO SUIT  
CUSTOMER REQUIREMENTS**

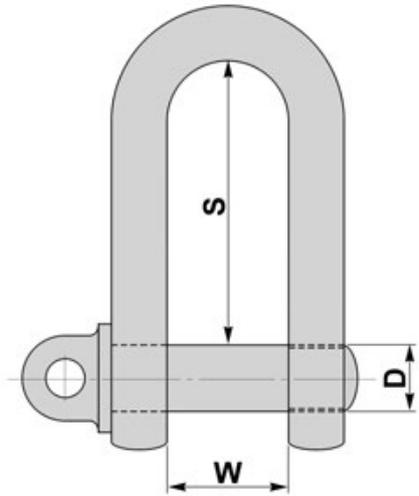
SPECIAL SHACKLES



**BOWTYPE**  
TO BS 3032 : 1958



TO BS 6994 : 1988

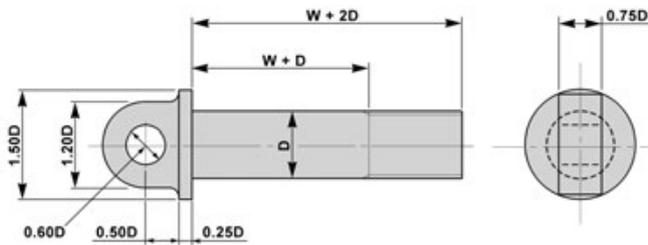


**DEE TYPE**  
TO BS 3288 : 1990

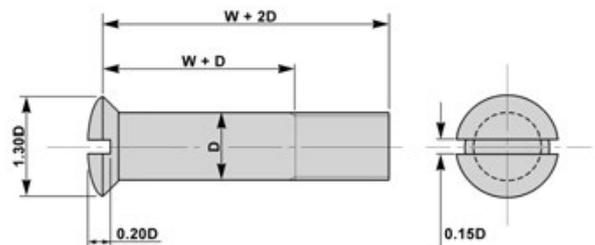
TO U.S. FEDERAL SPECIFICATION RR-C-271B

ANCHOR SHACKLES    GRAB SHACKLES    MOORING SHACKLES  
CHAIN SHACKLES    KENTER SHACKLES

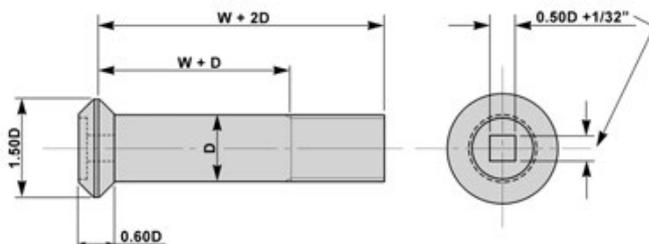
ALTERNATIVE SHACKLE PINS



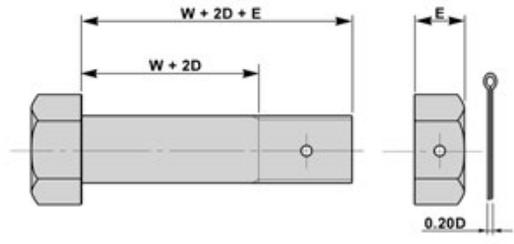
**TYPE A**



**TYPE C**

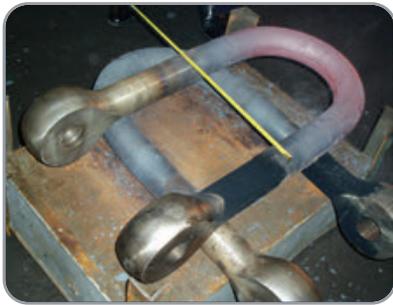
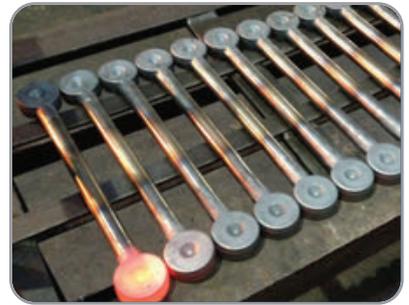
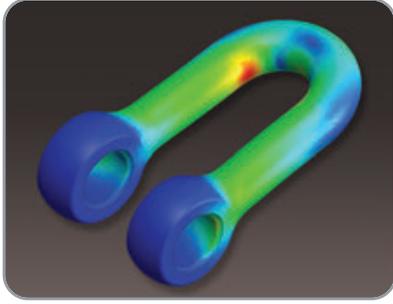


**TYPE D**



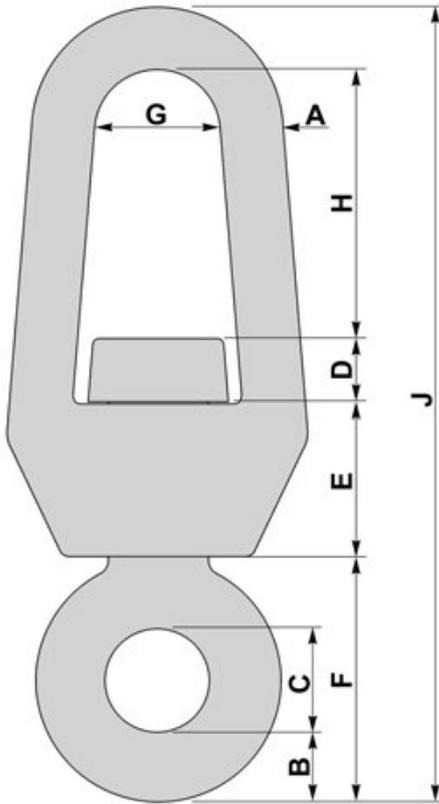
**TYPE E**





## SWIVELS

**BFL 17**



### PLAIN BEARING AND BALL BEARING SWIVELS

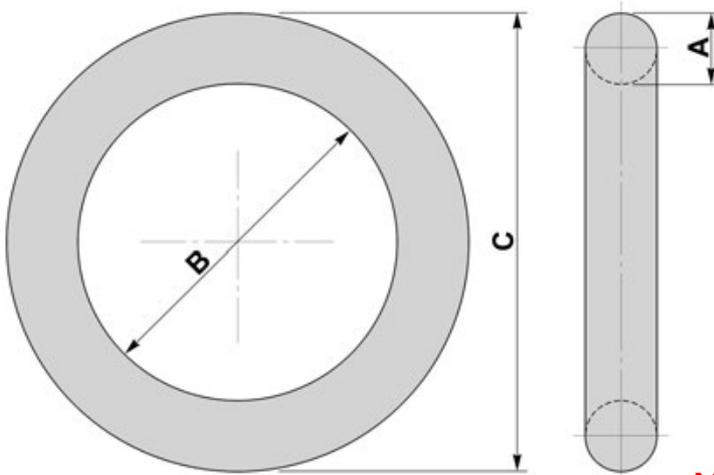
FOR USE WITH CHAIN AND WIRE ROPE

SWL FROM 50 KG TO 30,000 KG

**MANUFACTURED TO SUIT CUSTOMER REQUIREMENTS**

## RINGS - ROLLED & FLASH BUTT WELDED

**BFL 18**



MATERIAL DIAMETERS  
6MM TO 100MM

INTERNAL DIAMETERS  
38MM TO 500MM

HOT ROLLED &  
FLASH BUTT WELDED

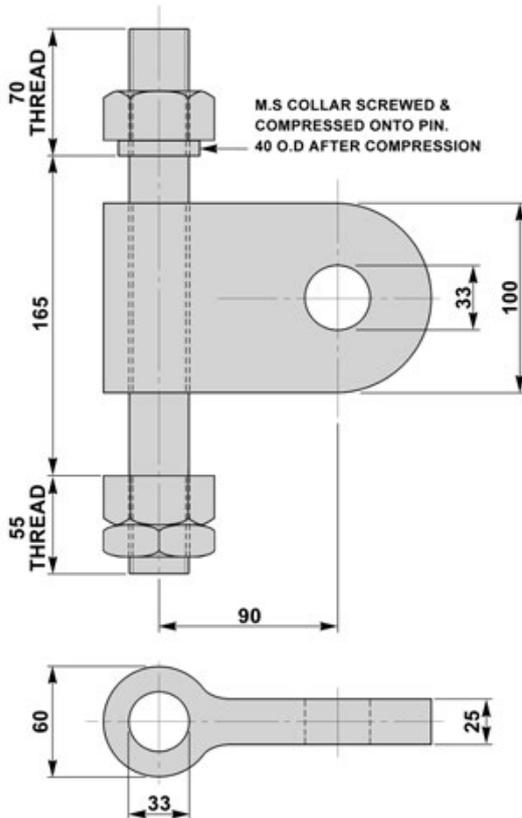
**MANUFACTURED TO SUIT CUSTOMER REQUIREMENTS**

## OVERHEAD POWER LINE FITTINGS

**BFL 15**

- TO BS 3288 : 1990 PART 2

### SUSPENSION SWIVELS



**SUSPENSION SWIVELS FOR  
CONDUCTOR CROSSARM AND  
EARTHWIRE PEAKS 400 kN LOAD**

**ALSO AVAILABLE WITH HEXAGON  
BOLTS AND PLAIN PIN**

**SMALLER SWIVEL (125 kN) ALSO  
AVAILABLE**

**GALVANISED FINISH**

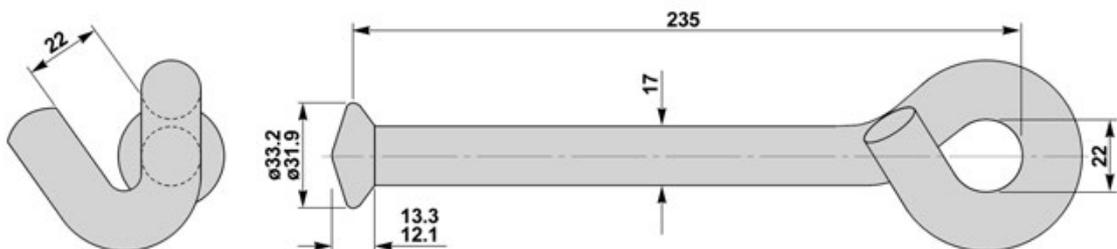
**CAN BE SUPPLIED WITH HOLE  
DIAMETERS TO SUIT CUSTOMER**

**PLEASE SEE PAGE 93 FOR BS 3288 SHACKLES**

## BS 3288 - BALL ENDED HOOKS

**BFL 16**

- TO BS 3288 : 1990 PART 2

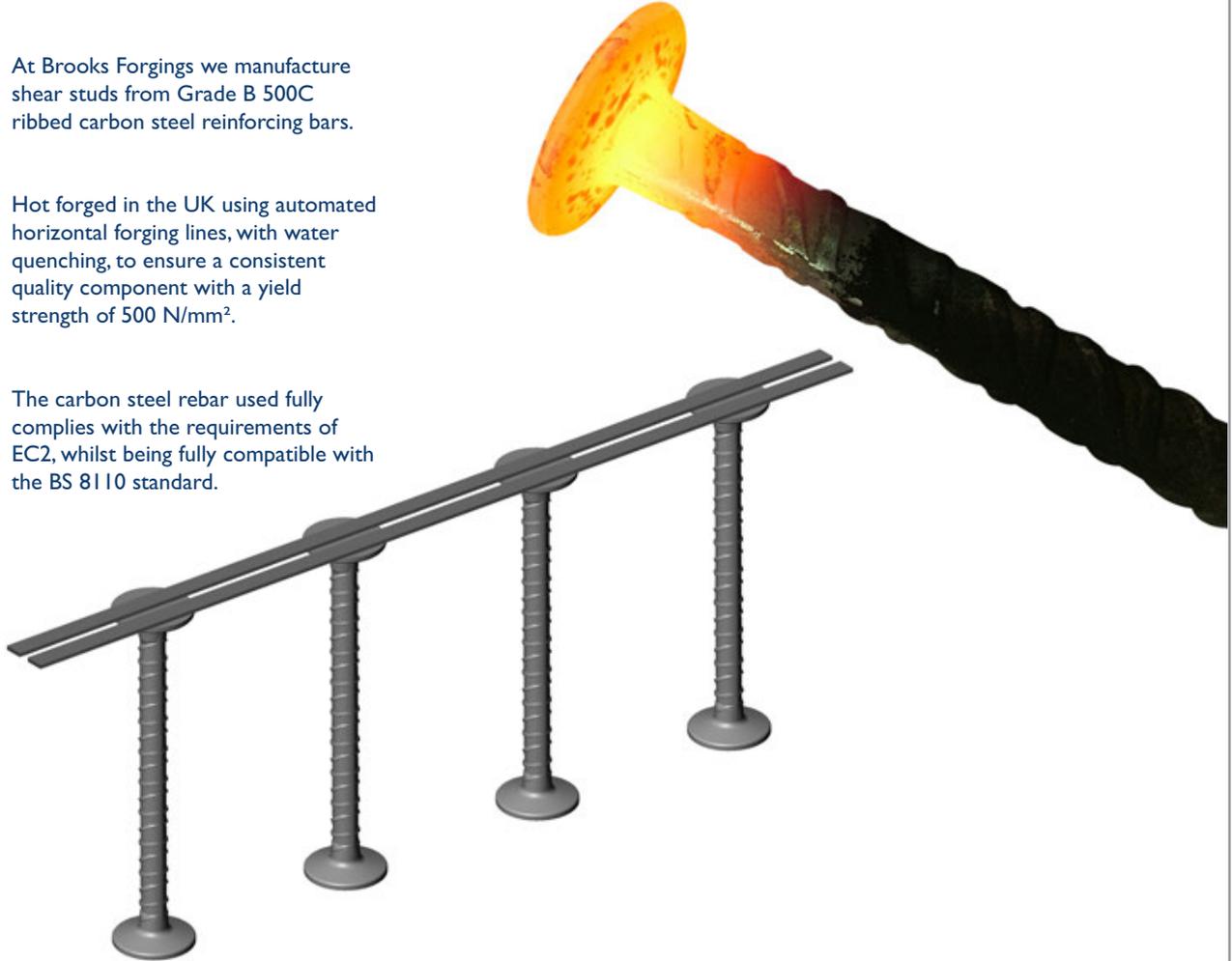


## SHEAR STUDS

At Brooks Forgings we manufacture shear studs from Grade B 500C ribbed carbon steel reinforcing bars.

Hot forged in the UK using automated horizontal forging lines, with water quenching, to ensure a consistent quality component with a yield strength of 500 N/mm<sup>2</sup>.

The carbon steel rebar used fully complies with the requirements of EC2, whilst being fully compatible with the BS 8110 standard.



Studs are available in shaft diameters from 10mm to 30mm. Larger diameters can be manufactured on request.

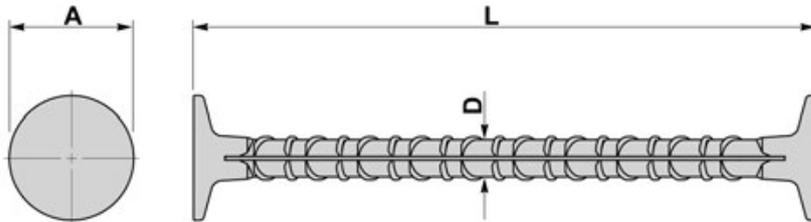
By using on-site fabrication facilities studs can be supplied welded to non-structural rails. Spacing and lengths to customer requirements.

**HOT FORGED AND WATER  
QUENCHED STUDS**

**LENGTHS TO REQUIREMENTS  
LARGER DIAMETERS ON REQUEST**



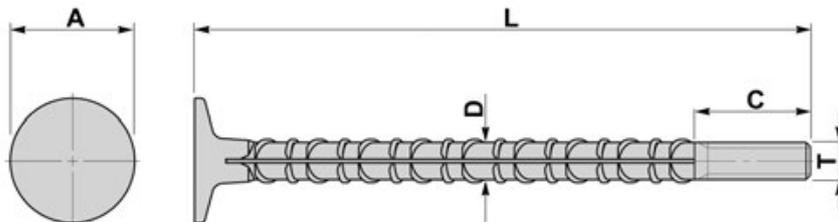
## DOUBLE HEADED SHEAR STUDS



D	A	L
mm	mm	mm
10	30	STUD LENGTHS TO CUSTOMER REQUIREMENTS
12	36	
16	48	
20	60	
25	75	



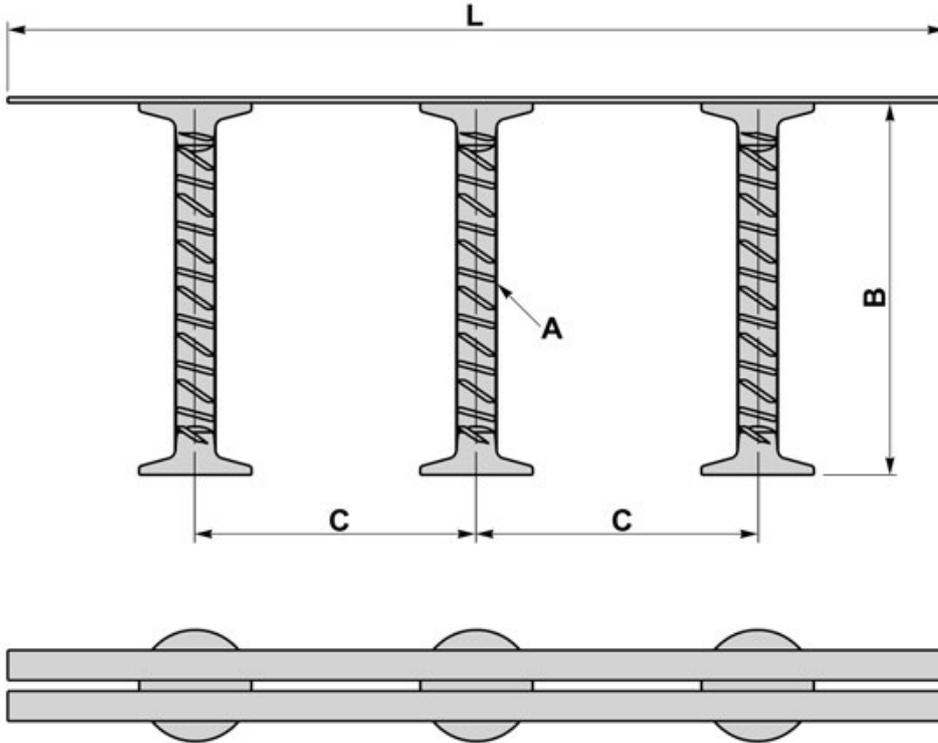
## THREADED SHEAR STUDS



D REBAR DIAMETER	A	C	L
mm	mm	mm	mm
10	30	THREAD LENGTHS TO CUSTOMER REQUIREMENTS	STUD LENGTHS TO CUSTOMER REQUIREMENTS
12	36		
16	48		
20	60		
25	75		



## SHEAR RAILS



A REBAR DIAMETER	B	C	L
mm	mm	mm	mm
10	STUD LENGTHS TO CUSTOMER REQUIREMENTS	STUD SPACING TO CUSTOMER REQUIREMENTS	RAIL LENGTHS TO CUSTOMER REQUIREMENTS
12			
16			
20			
25			
32*			

\*32mm diameter on special request.



**MADE TO SUIT  
CUSTOMER  
REQUIREMENTS**

Call Us Today With Your Requirements  
**+44 (0)1384 563356**

**BROOKS** forgings  
INDUSTRIAL COMPONENTS CATALOGUE

## THREADED REBAR

Alongside our on-site hot forging processes we also have the facilities to thread and bend rebar for foundation applications.

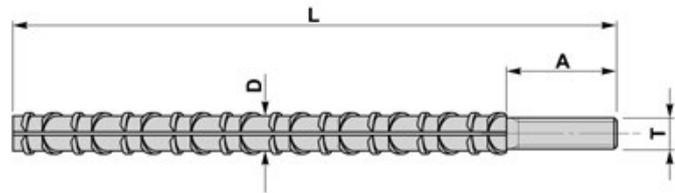
All processes are carried out in accordance to BS ISO 9001:2000.



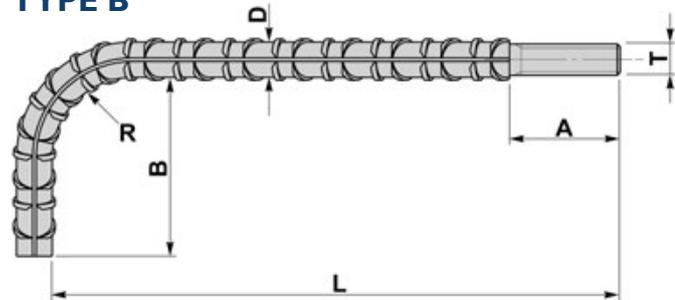
**PLAIN BENT REBAR  
ALSO AVAILABLE  
ON REQUEST**



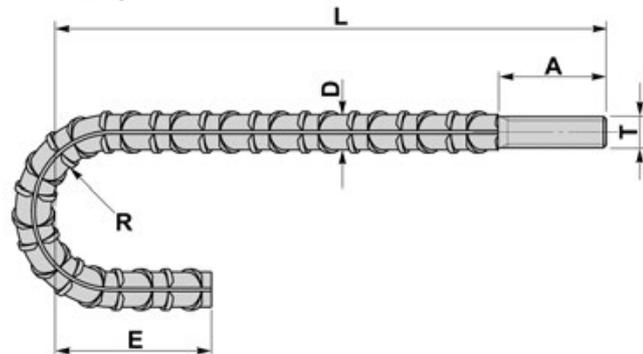
**TYPE A**



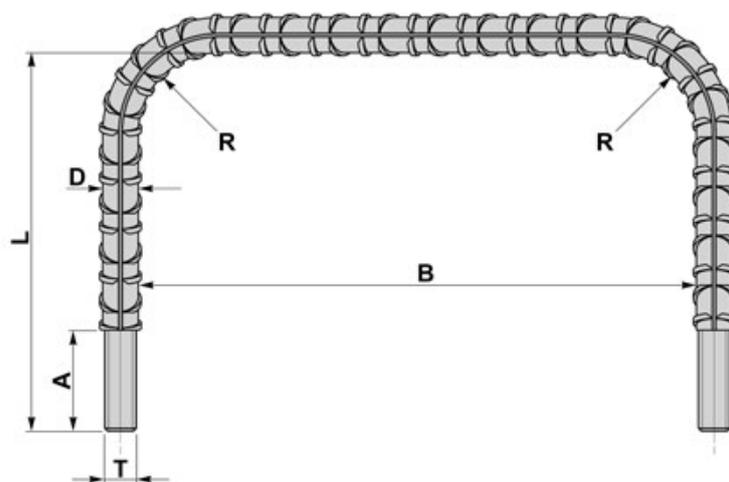
**TYPE B**



**TYPE C**



**TYPE D**



THREADED REBAR

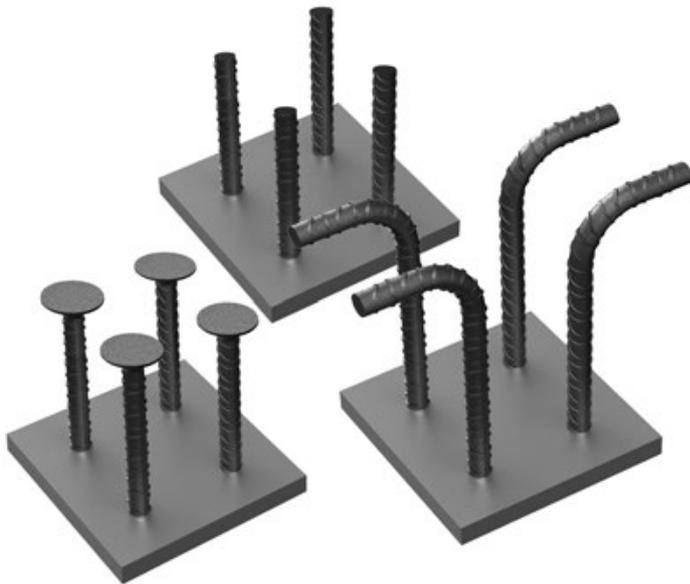
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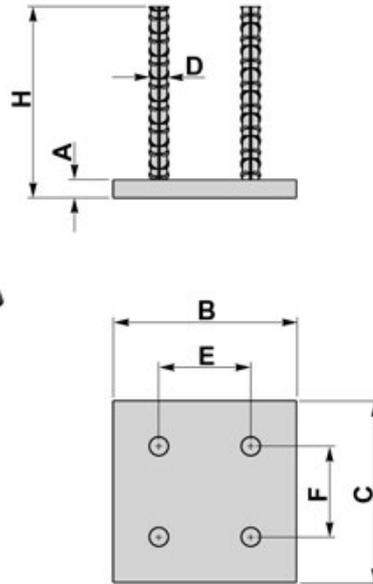
## REBAR FASTENING PLATES

Fastening plates are commonly used in construction structure welding, transferring loads to the concrete via rebar studs.

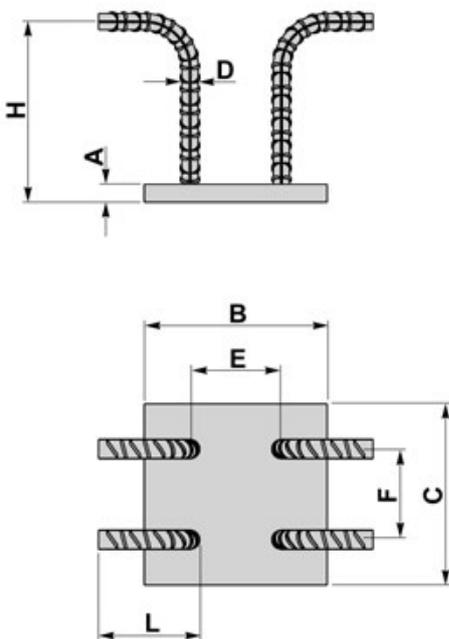
The examples shown can be made to suit customer requirements using on site fabrication processes.



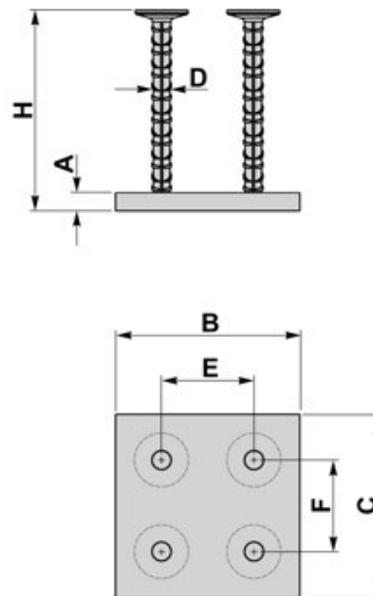
### TYPE A



### TYPE B

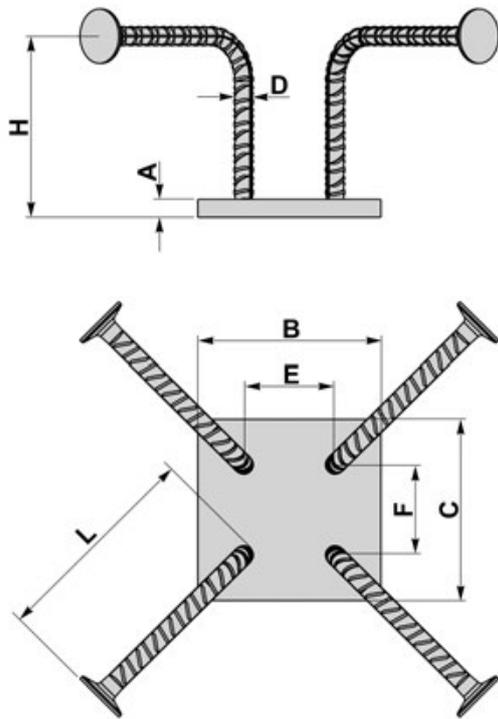


### TYPE C

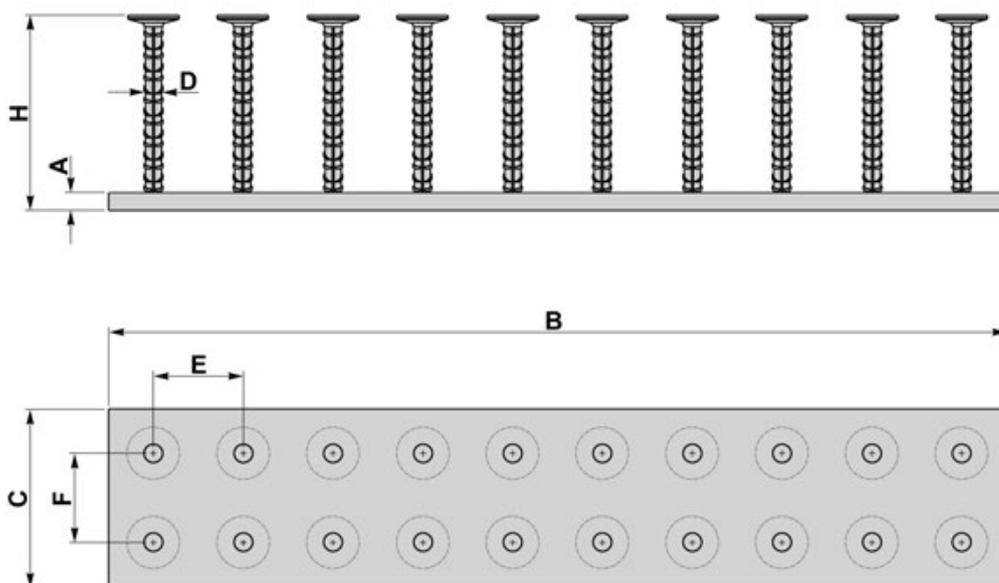


## REBAR FASTENING PLATES

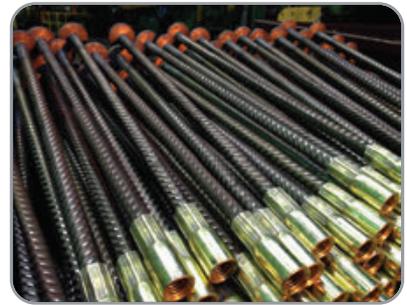
### TYPE D

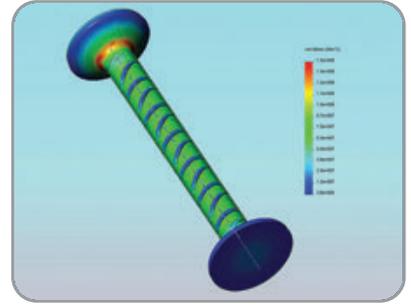


### TYPE E



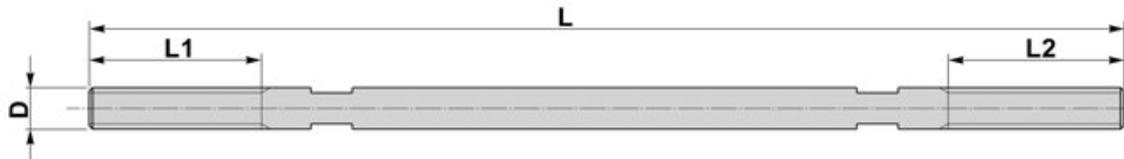
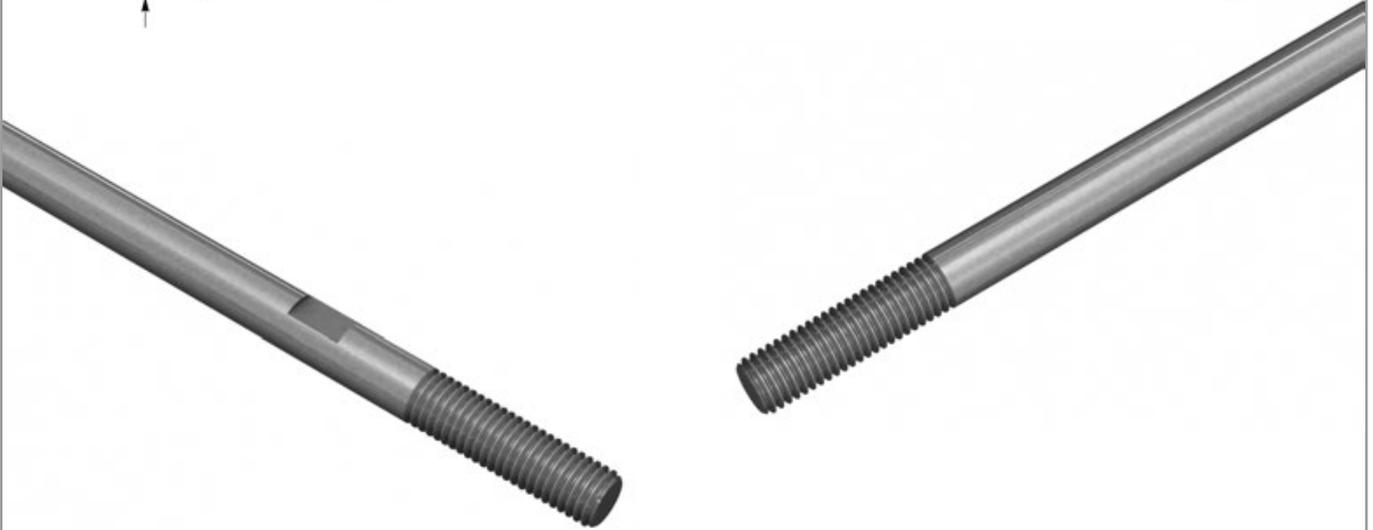
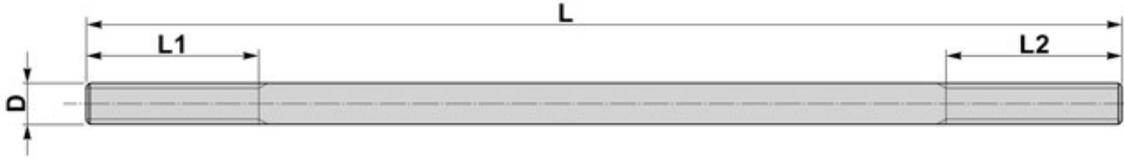
**PLAIN & BENT REBAR ALSO AVAILABLE ON REQUEST**





## TIE BARS

**BFF 20**



**THREADS M8 - M100**

**BAR LENGTHS UP TO 6 METRES**

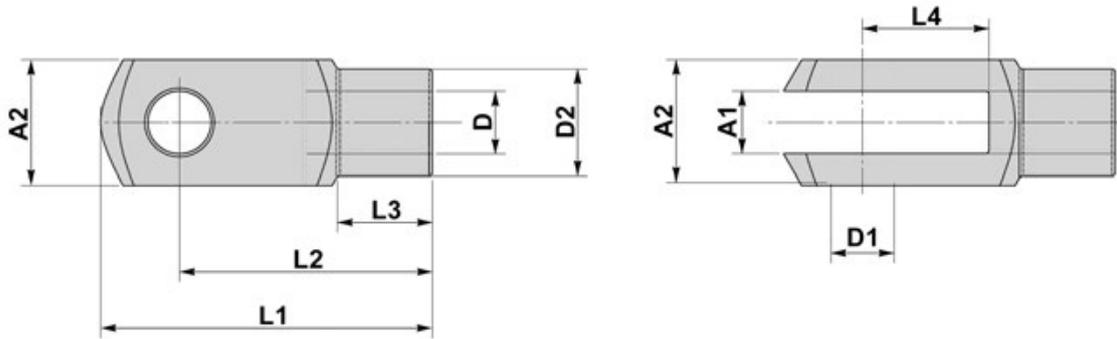
**MADE TO SUIT CUSTOMER REQUIREMENTS**



TIE BARS

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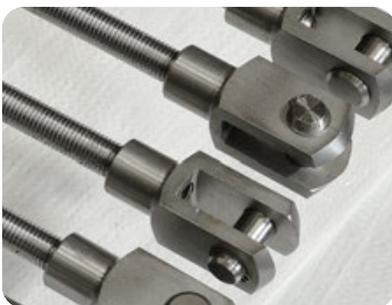
## BASIC CLEVIS



D	A1	A2	D1	D2	L1	L2	L3	L4
Thread	mm	mm	mm	mm	mm	mm	mm	mm
M8	8	16	8	14	42	32	12	16
M10	10	20	10	18	52	40	15	20
M12	12	24	12	20	62	48	18	24
M16	16	32	16	26	83	64	24	32
M20	20	40	20	34	105	80	30	40
M24	25	50	25	42	132	100	36	50
M30	30	60	30	52	160	120	42	60
M36	35	70	35	60	188	144	54	72
M42	42	85	42	70	232	168	63.5	84

Available in both Right and Left Hand thread.

\*Other sizes available to order.



### MATERIAL

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

### FINISH

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

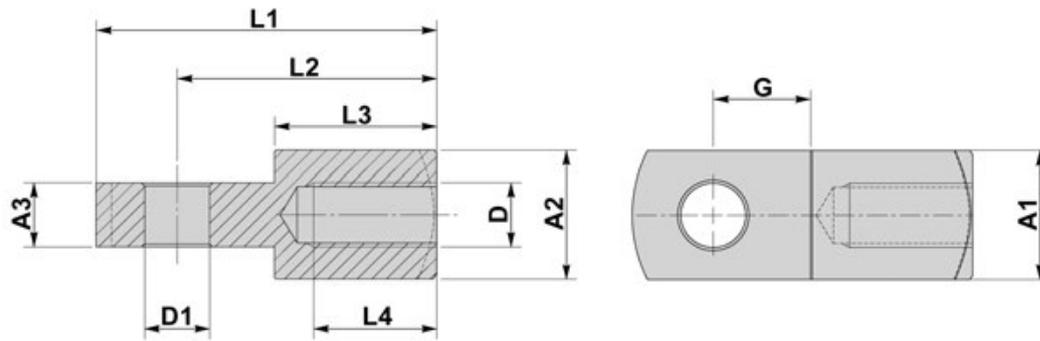
### TECHNICAL INFORMATION

**M8 - M16: DIN 71 752 / DIN ISO 8140**

**M18 - M42: Similar to DIN 71 752 / DIN ISO 8140**  
and according to CETOP standard.



## BASIC SPADE CONNECTORS



D	A1	A2	A3	D1	G	L1	L2	L3
Thread	mm	mm	mm	mm	mm	mm	mm	mm
M8	16	16	8	8	12	42	32	20
M10	20	20	10	10	15	52	40	25
M12	24	24	12	12	18	62	48	30
M16	32	32	16	16	24	83	64	40
M20	40	40	20	20	30	105	80	50

Available in both Right and Left Hand thread.

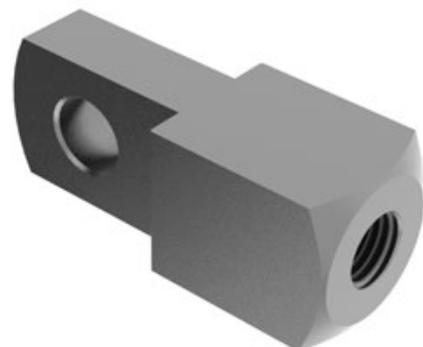
\*Other sizes available to order.

**MATERIAL**

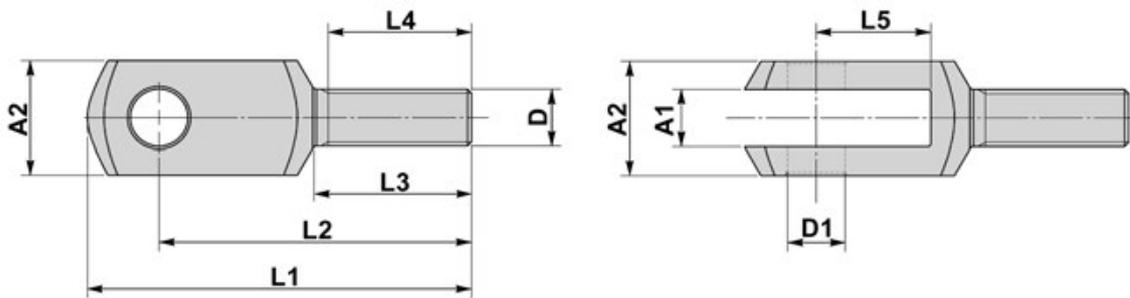
**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## BASIC CLEVIS - EXTERNAL THREAD



D	A1	A2	D1	L1	L2	L3	L4	L5
Thread	mm	mm	mm	mm	mm	mm	mm	mm
M8	8	16	8	57	47	25	20	16
M10	10	20	10	69	57	30	25	20
M12	12	24	12	82	68	35	30	24
M14	14	27	14	94	78	40	35	28
M16	16	32	16	108	89	45	40	32
M20	20	40	20	134	109	55	50	40

Available in both Right and Left Hand thread.

\*Other sizes available to order.

### TECHNICAL INFORMATION

Similar to DIN 71 752 / DIN ISO 8140 and according to CETOP standard.

#### MATERIAL

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

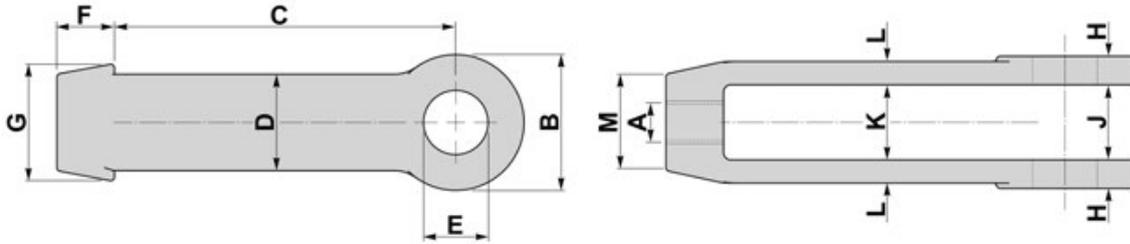
#### FINISH

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## CLEVIS TYPE I - FORGED

**BFF 22**



Size	A		B	C	D	E	F	G	H*	J*	K	L
reference	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2	M10	3/8	38	95	27	12	16	33	8	21	21	6.5
2	M12	1/2	38	95	27	14	16	33	8	21	21	6.5
2	M16	5/8	38	95	27	18	16	33	8	21	21	6.5
2.5	M20	3/4	63	103	32	22	28	45	9	31	31	9
2.5	M22	7/8	63	103	32	24	28	45	9	31	31	9
3	M24	1	76	129	38	26	32	56	12	41	41	12
3	M30	1. 1/8	76	129	38	32	32	56	12	41	41	12
3	M33	1. 1/4	76	129	38	36	32	56	12	41	41	12
3.5	M36	1. 1/2	89	152	44	39	41	65	20	48	56	12
4	M42	1. 5/8	102	152	50	45	44	79	22	56	66	12
5	M48	2	127	178	64	51	57	86	28	58	70	16
6	M56	2. 1/4	152	203	76	60	70	118	33	75	89	19
6	M64	2. 1/2	152	203	76	68	70	118	33	75	89	19
6	M72	2. 3/4	152	203	76	76	70	118	33	75	89	19
6	M76	3	152	203	76	76	70	118	33	75	89	19



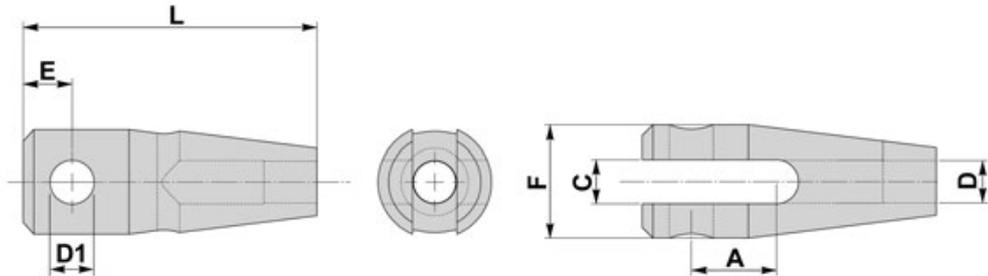
**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**

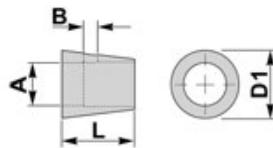
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

## CLEVIS TYPE 2 - MACHINED



D	D1	C	A	E	F	L	ADJ
Thread	mm	mm	mm	mm	mm	mm	mm
M10 X 1.50	10	10	20	11.2	25	68.7	20
M12 X 1.75	12	12	24	13.8	32	82.8	24
M16 X 2.00	16	15	32	18.4	40	109.9	32
M20 X 2.50	20	19	40	23.0	50	137.5	40
M24 X 3.00	24	24	48	27.6	60	165.6	48
M27 X 3.00	27	26	54	31.1	70	185.9	54
M30 X 3.50	30	29	60	34.5	75	206.5	60
M33 X 3.50	33	32	66	38.0	80	227.3	66
M36 X 4.00	36	34	72	41.4	90	247.4	72
M39 X 4.00	39	38	78	44.9	100	268.7	78

## TAPERED LOCK NUTS



A	B	L	D1
Thread	mm	mm	mm
M10 X 1.50	3.5	17.0	15
M12 X 1.75	3.5	20.4	19
M16 X 2.00	3.5	27.2	25
M20 X 2.50	3.5	34.0	30
M24 X 3.00	4.0	40.8	36
M27 X 3.00	4.0	45.9	42
M30 X 3.50	4.0	51.0	45
M33 X 3.50	5.0	56.1	48
M36 X 4.00	5.0	61.2	54
M39 X 4.00	5.0	66.3	60



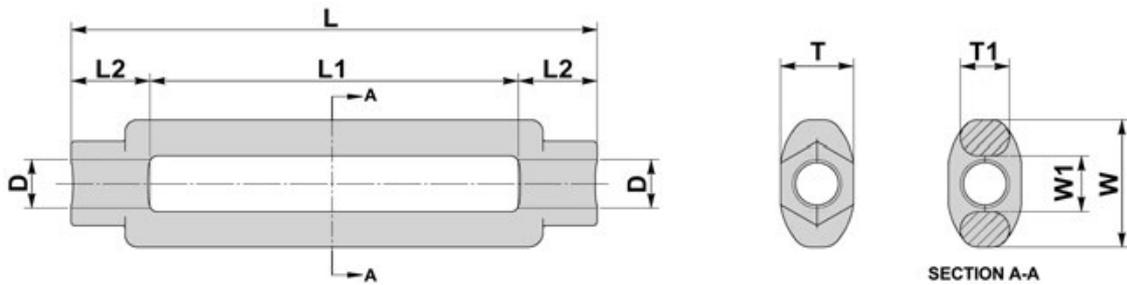
**MATERIAL**  
**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

**FINISH**  
**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

## HEXAGON TURNBUCKLE - OPEN BODY

- SIMILAR TO BS 4429

**BFF 23**



D	L	T1	T	L1	L2	W	W1
Thread	mm	mm	mm	mm	mm	mm	mm
M10	184	10	16.7	150	17	28	12
M12	190	12	18.7	150	20	31	15
M16	202	16	23.7	150	26	41	19
M20	214	20	29.7	150	32	49	23
M24	228	24	35.4	150	39	59	29
M30	256	30	45.4	150	53	67	35
(M36)	276	39	59.3	150	63	85	45
(M42)	276	39	59.3	150	63	85	45

( ) = NON STANDARDS PRODUCED FROM 39MM FORGINGS

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

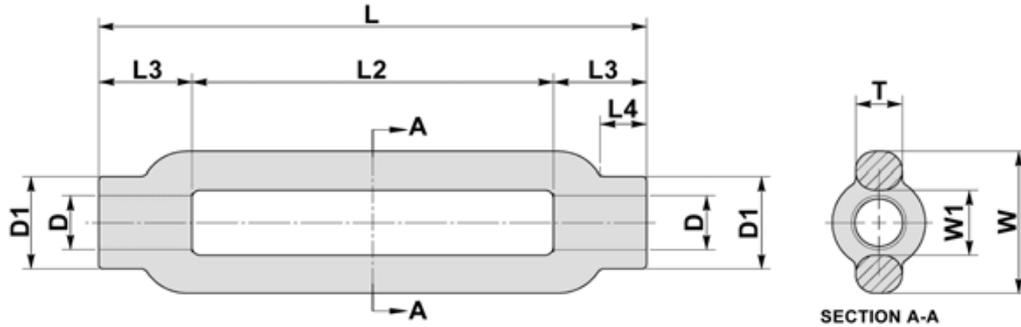
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## ROUND TURNBUCKLE - OPEN BODY

- TO DIN 1480



D	L	L2	L3	L4	W	W1	T	D1
Thread	mm	mm	mm	mm	mm	mm	mm	mm
M6	110	86	12	6	19	9	6	12
M8	110	80	15	8	23	11	8	15
M10	125	89	18	9	30	14	9	18
M12	125	83	21	11	34	16	11	21
M16	170	116	27	14	42	20	14	27
M20	200	132	34	17	52	24	17	34
M24	255	177	39	20	60	28	20	39
M30	255	165	45	23	74	34	23	45
M36	295	185	55	28	86	40	28	55
M42	330	204	63	32	104	50	32	63
M48	355	199	78	39	135	65	40	80
M56	355	199	78	39	135	65	40	80

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

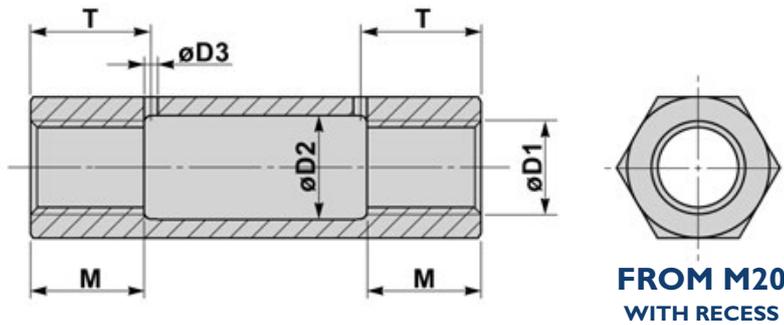
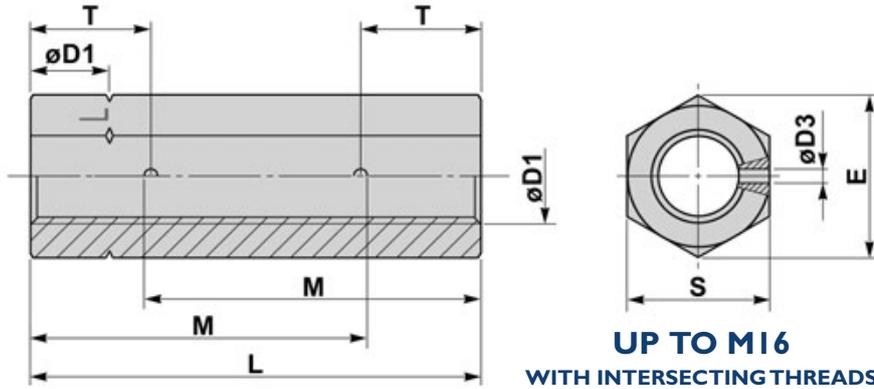
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## HEXAGON TURNBUCKLE - CLOSED BODY

- THREADED LH / RH
- TO DIN 1479



D1	D2	D3	L	M	S	E	T	ADJ
Thread	mm	mm	mm	mm	MAX mm	MAX mm	mm	mm
M6	---	4	30	22.5	10	11.05	9.5	15
M8	---	4	35	25	13	14.38	12	15
M10	---	4	45	33	16	17.77	14	21
M12	---	4	55	40	18	20.03	17	25
M16	---	4	75	55	24	26.75	22	35
M20	21	4	95	24	30	32.95	26	47
M24	26	4	115	29	36	39.55	31	57
M30	32	4	125	30	46	50.85	38	53

**MATERIAL**

CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

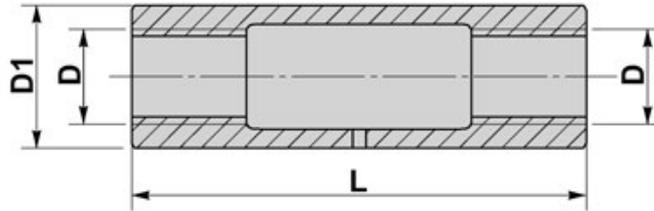
**FINISH**

SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING



## ROUND TURNBUCKLE - CLOSED BODY

- THREADED LH / RH



D	L	D1
Thread	mm	mm
M12	70	18
M16	85	22
M20	144	29
M24	155	35
M30	170	43
M36	180	52
M42	195	60
M48	210	68
M56	230	80
M64	240	91
M76	268	108
M90	290	129
M100	315	143



**MATERIAL**  
 CARBON STEELS  
 STAINLESS STEELS  
 ALLOY STEELS  
 B7, 4.6, 5.6, 8.8

**FINISH**  
 SELF COLOUR  
 GALVANISED  
 ELECTROPLATED  
 SHERARDISED  
 PTFE COATING

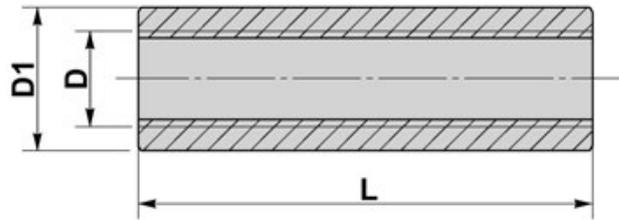
ROUND TURNBUCKLE - CLOSED BODY

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## HEXAGON COUPLERS

- THREADED LH OR RH

**BFF 21**



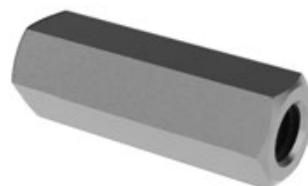
D	DI (A/F)	L
Thread	mm	mm
M6	10	18
M8	13	24
M10	17	30
M12	19	36
M16	24	48
M20	30	60
M24	36	72
M27	41	81
M30	46	90
M36	55	108
M42	65	150
M48	80	150
M52	80	150
M56	85	150
M64	95	150
M72	SIZES ADVISED AT TIME OF ENQUIRY	200
M76		200

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

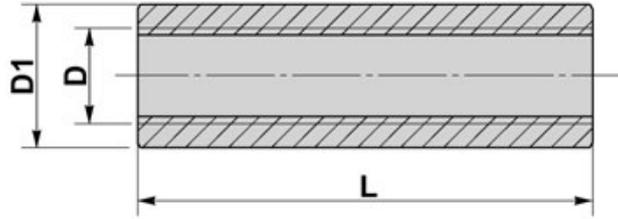
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## ROUND COUPLERS

- THREADED LH OR RH



D	L	D1
Thread	mm	mm
M12	37	18
M16	45	22
M20	53	29
M24	64	35
M30	75	43
M36	89	52
M42	100	60
M48	115	68
M56	135	80
M64	145	91
M76	165	108
M90	195	129
M100	215	143

**MATERIAL**

**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

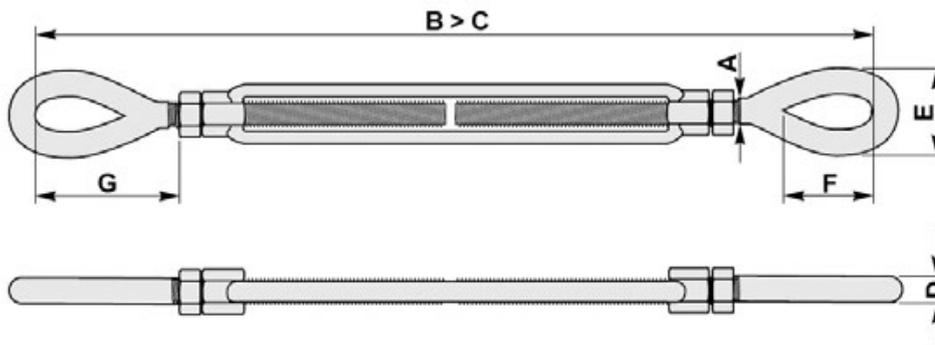
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**



## EYE TO EYE TURNBUCKLES - GALVANISED

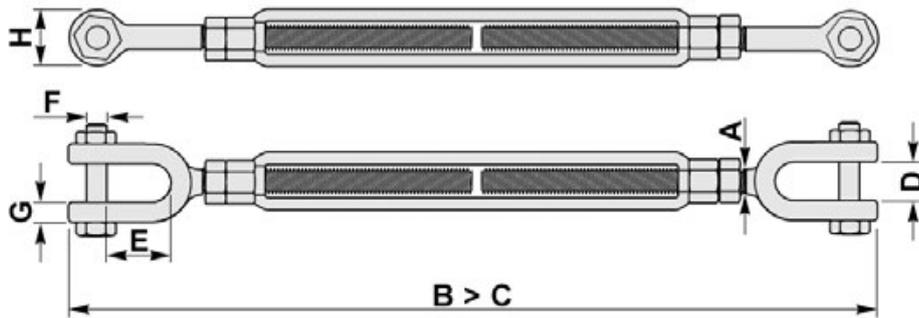
- FORMERLY U.S. FEDERAL SPECIFICATION



Thread Size A	Take Up	B	C	D	E	F	G	SWL	Weight Each
	inches								
3/8	6	302	454	9	13	28	65	0.54	0.32
1/2	6	338	490	12	18	36	80	1.00	0.66
1/2	9	414	642	12	18	36	80	1.00	0.76
1/2	12	490	795	12	18	36	80	1.00	0.91
5/8	6	394	546	14	21	43	98	1.59	1.07
5/8	9	470	698	14	21	43	98	1.59	1.31
5/8	12	546	851	14	21	43	98	1.59	1.71
5/8	18	701	1150	14	21	43	98	1.59	1.86
3/4	6	432	584	17	25	53	113	2.36	1.65
3/4	9	508	736	17	25	53	113	2.36	1.95
3/4	12	584	883	17	25	53	113	2.36	2.30
3/4	18	737	1194	17	25	53	113	2.36	2.85
7/8	12	625	854	20	31	59	118	3.27	3.33
7/8	18	778	1121	20	31	59	118	3.27	4.24
1	6	524	676	22	36	74	155	4.54	3.87
1	12	676	981	22	36	74	155	4.54	5.09
1	18	829	1286	22	36	74	155	4.54	6.00
1	24	980	1592	22	36	74	155	4.54	7.52
1. 1/4	12	760	1055	29	45	88	197	6.90	8.12
1. 1/4	18	912	1370	29	45	88	197	6.90	10.40
1. 1/4	24	1064	1665	29	45	88	197	6.90	12.10
1. 1/2	12	823	1129	32	54	105	215	9.71	12.70
1. 1/2	18	975	1434	32	54	105	215	9.71	15.10
1. 1/2	24	1128	1738	32	54	105	215	9.71	17.10
1. 3/4	18	1060	1533	38	60	119	254	12.70	23.10
1. 3/4	24	1213	1838	38	69	119	254	12.70	26.30
2	24	1315	2011	45	69	146	308	16.78	40.70
2. 1/2	24	1486	2098	51	79	165	344	27.22	64.00
2. 3/4	24	1562	2171	57	83	178	381	34.02	88.00

## JAW TO JAW TURNBUCKLES - GALVANISED

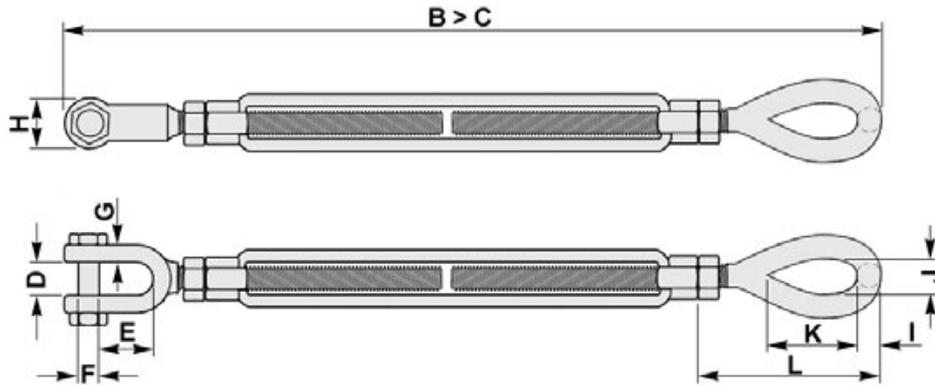
- FORMERLY U.S. FEDERAL SPECIFICATION



Thread Size A	Take Up	B	C	D	E	F	G	H	SWL	Weight Each
	inches	min	max	mm	mm	mm	mm	mm	Tonnes	kgs
3/8	6	302	454	13	22	8	8	21	0.54	0.37
1/2	6	338	490	16	26	9.5	10	25	1.00	0.73
1/2	9	414	642	16	26	9.5	10	25	1.00	0.79
1/2	12	490	795	16	26	9.5	10	25	1.00	0.96
5/8	6	394	546	18	33	13	13	33	1.59	1.37
5/8	9	470	698	18	33	13	13	33	1.59	1.31
5/8	12	546	851	18	33	13	13	33	1.59	1.53
5/8	18	701	1150	18	33	13	13	33	1.59	1.86
3/4	6	432	584	23	38	15.5	16	41	2.36	1.86
3/4	9	508	736	23	38	15.5	16	41	2.36	2.31
3/4	12	584	883	23	38	15.5	16	41	2.36	2.56
3/4	18	737	1194	23	38	15.5	16	41	2.36	3.11
7/8	12	625	854	27	44	19	18	48	3.27	3.71
7/8	18	778	1121	27	44	19	18	48	3.27	4.14
1	6	524	676	30	52	22	20	54	4.54	4.29
1	12	676	981	30	52	22	20	54	4.54	5.07
1	18	829	1286	30	52	22	20	54	4.54	6.62
1	24	980	1592	30	52	22	20	54	4.54	7.85
1. 1/4	12	760	1055	44	73	29	25	67	6.90	9.48
1. 1/4	18	912	1370	44	73	29	25	67	6.90	11.60
1. 1/4	24	1064	1665	44	73	29	25	67	6.90	13.00
1. 1/2	12	823	1129	52	70	35	27	80	9.71	13.60
1. 1/2	18	975	1434	52	70	35	27	80	9.71	14.30
1. 1/2	24	1128	1738	52	70	35	27	80	9.71	18.40
1. 3/4	18	1060	1533	59	85	41	33	90	12.70	25.00
1. 3/4	24	1213	1838	59	85	41	33	90	12.70	28.70
2	24	1315	2011	64	93	51	39	108	16.78	45.40
2. 1/2	24	1486	2098	75	114	57	38	143	27.22	73.00
2. 3/4	24	1562	2171	89	110	70	42	156	34.02	98.00

## EYE TO JAW TURNBUCKLES - GALVANISED

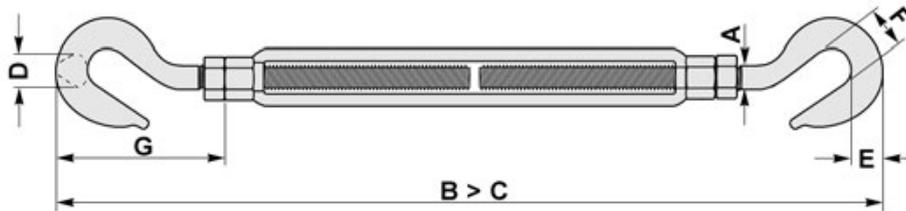
- FORMERLY U.S. FEDERAL SPECIFICATION



Thread Size A	Take Up	B	C	D	E	F	G	H	I	J	K	L	SWL Tonnes	Weight Each kgs
	inches													
3/8	6	302	416	13	22	8	8	21	9	13	28	65	0.54	0.34
1/2	6	338	452	16	26	9.5	10	25	12	18	36	80	1.00	0.69
1/2	9	414	585	16	26	9.5	10	25	12	18	36	80	1.00	0.78
1/2	12	490	719	16	26	9.5	10	25	12	18	36	80	1.00	0.93
5/8	6	394	508	18	33	13	13	33	14	21	43	98	1.59	1.07
5/8	9	470	641	18	33	13	13	33	14	21	43	98	1.59	1.39
5/8	12	546	775	18	33	13	13	33	14	21	43	98	1.59	1.71
5/8	18	701	1150	18	33	13	13	33	14	21	43	98	1.59	1.86
3/4	6	432	546	23	38	15.5	16	41	17	25	53	113	2.36	1.76
3/4	9	508	679	23	38	15.5	16	41	17	25	53	113	2.36	1.95
3/4	12	584	813	23	38	15.5	16	41	17	25	53	113	2.36	2.43
3/4	18	737	1080	23	38	15.5	16	41	17	25	53	113	2.36	2.98
7/8	12	625	854	27	44	19	18	48	20	31	59	118	3.27	3.52
7/8	18	778	1121	27	44	19	18	48	20	31	59	118	3.27	4.19
1	6	524	638	30	52	22	20	54	22	36	74	155	4.54	4.05
1	12	676	905	30	52	22	20	54	22	36	74	155	4.54	5.08
1	18	829	1172	30	52	22	20	54	22	36	74	155	4.54	6.03
1	24	980	1437	30	52	22	20	54	22	36	74	155	4.54	7.39
1. 1/4	12	760	989	44	73	29	25	67	29	45	88	197	6.90	8.80
1. 1/4	18	912	1255	44	73	29	25	67	29	45	88	197	6.90	11.00
1. 1/4	24	1064	1521	44	73	29	25	67	29	45	88	197	6.90	12.90
1. 1/2	12	823	1052	52	70	35	27	80	32	54	105	215	9.71	13.10
1. 1/2	18	975	1318	52	70	35	27	80	32	54	105	215	9.71	14.70
1. 1/2	24	1128	1585	52	70	35	27	80	32	54	105	215	9.71	17.80
1. 3/4	18	1060	1403	59	85	41	33	90	38	60	119	254	12.70	22.30
1. 3/4	24	1213	1670	59	85	41	33	90	38	60	119	254	12.70	27.50
2	24	1315	1772	64	93	51	39	108	45	60	146	308	16.78	42.90
2. 1/2	24	1486	1943	75	114	57	38	143	51	79	165	344	27.22	68.00
2. 3/4	24	1562	2019	89	110	70	42	156	57	83	178	381	34.02	91.00

## HOOK TO HOOK TURNBUCKLES - GALVANISED

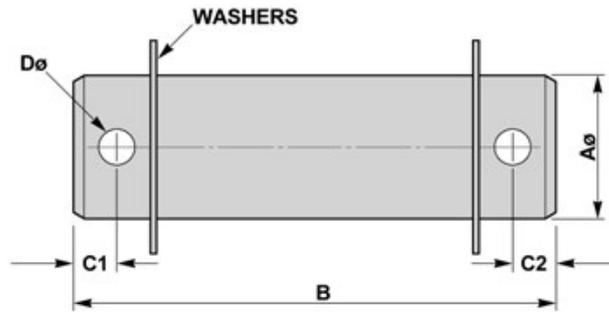
- FORMERLY U.S. FEDERAL SPECIFICATION



Thread Size A	Take Up	B	C	D	E	F	G	SWL	Weight Each
	inches								
3/8	6	302	416	10	15	14	58	0.45	0.32
1/2	6	338	452	13	19	17	72	0.68	0.66
1/2	9	414	585	13	19	17	72	0.68	0.76
1/2	12	490	719	13	19	17	72	0.68	0.91
5/8	6	394	508	16	23	22	90	1.02	1.07
5/8	9	470	641	16	23	22	90	1.02	1.31
5/8	12	546	775	16	23	22	90	1.02	1.71
5/8	18	701	1150	16	23	22	90	1.02	1.86
3/4	6	432	546	20	27	25	98	1.36	1.65
3/4	9	508	679	20	27	25	98	1.36	1.95
3/4	12	584	813	20	27	25	98	1.36	2.30
3/4	18	737	1080	20	27	25	98	1.36	2.85
7/8	12	625	854	23	30	29	126	1.81	3.33
7/8	18	778	1121	23	30	29	126	1.81	4.24
1	6	524	638	23	35	32	144	2.27	3.87
1	12	676	905	25	35	32	144	2.27	5.09
1	18	829	1172	25	35	32	144	2.27	6.00
1	24	980	1437	25	35	32	144	2.27	7.52
1. 1/4	12	760	989	28	37	39	175	3.51	8.12
1. 1/4	18	912	1255	28	37	39	175	3.51	10.40
1. 1/4	24	1064	1521	28	37	39	175	3.51	12.10
1. 1/2	12	823	1052	33	44	47	212	3.4	12.70
1. 1/2	18	975	1318	33	44	47	212	3.4	15.10
1. 1/2	24	1128	1585	33	44	47	212	3.4	17.10

## PIVOT PINS

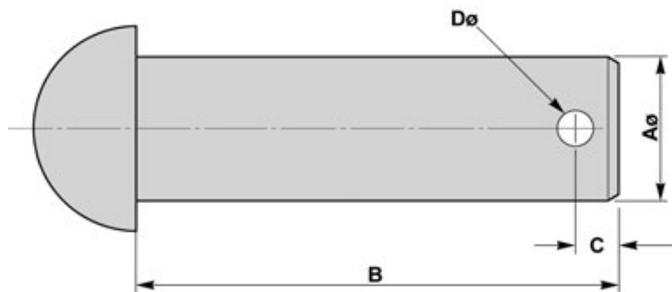
**BFF 30**



**6MM - 100MM DIA SHANK**

## DOME HEAD PINS

**BFF 31**



**6MM - 100MM DIA SHANK**

**MATERIAL**

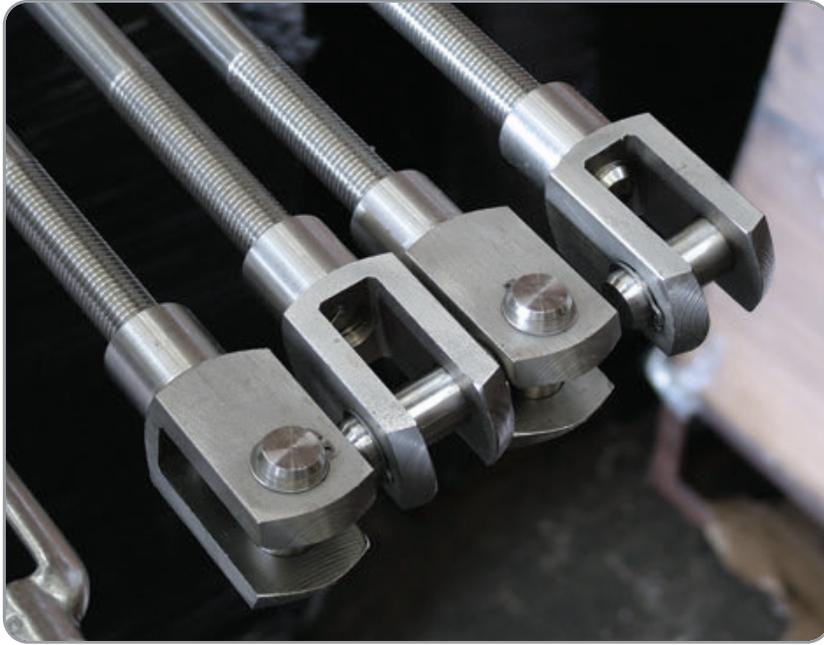
**CARBON STEELS**  
**STAINLESS STEELS**  
**ALLOY STEELS**  
**B7, 4.6, 5.6, 8.8**

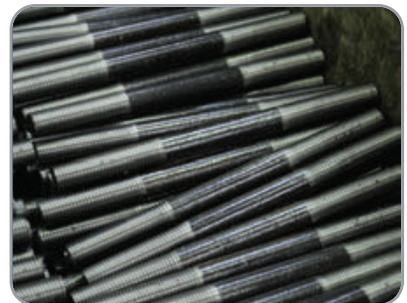
**FINISH**

**SELF COLOUR**  
**GALVANISED**  
**ELECTROPLATED**  
**SHERARDISED**  
**PTFE COATING**

**TO SUIT CUSTOMER  
REQUIREMENTS**

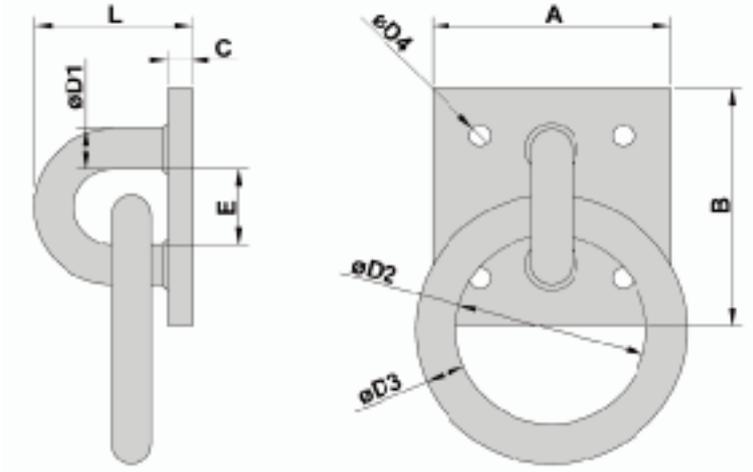
**OTHER VARIANTS ON  
REQUEST**



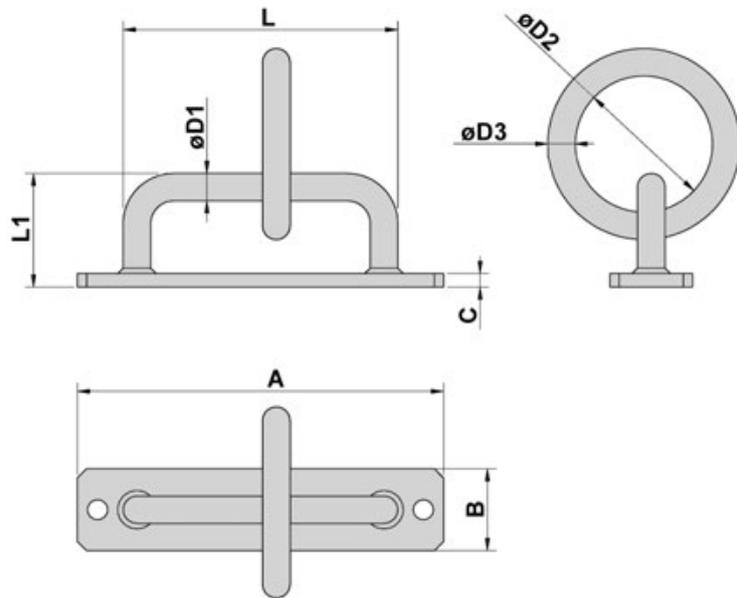




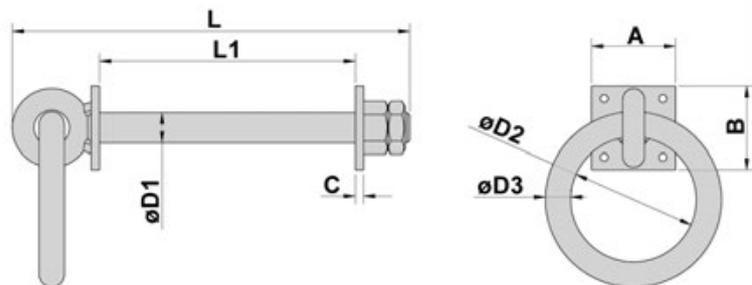
## TYPE 1 - MOORING RING



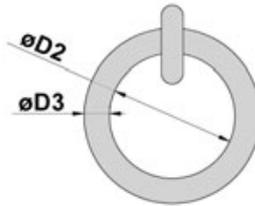
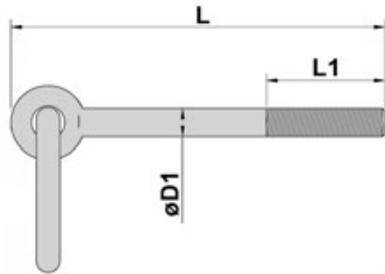
## TYPE 2 - MOORING RING



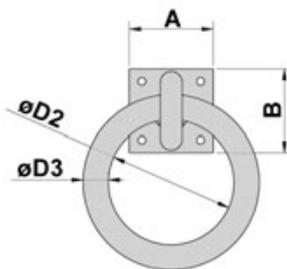
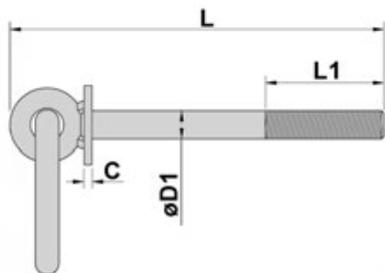
## TYPE 3 - MOORING RING



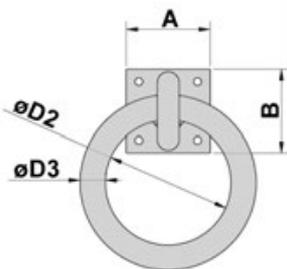
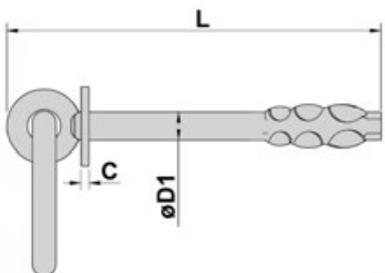
## TYPE 4 - MOORING RING



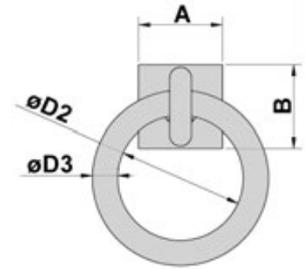
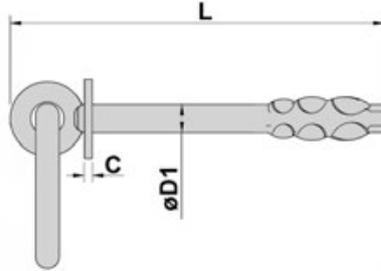
## TYPE 5 - MOORING RING



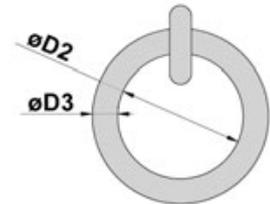
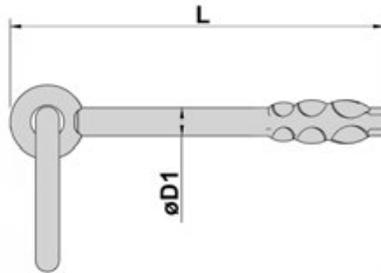
## TYPE 6 - MOORING RING



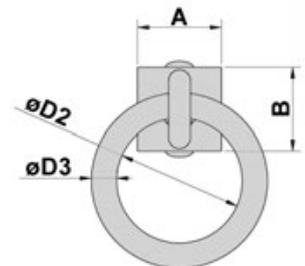
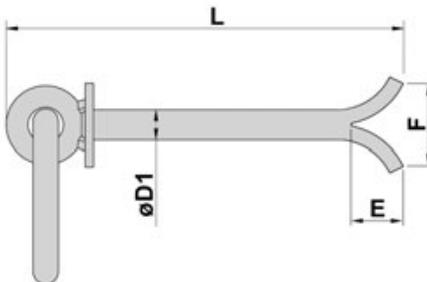
## TYPE 7 - MOORING RING



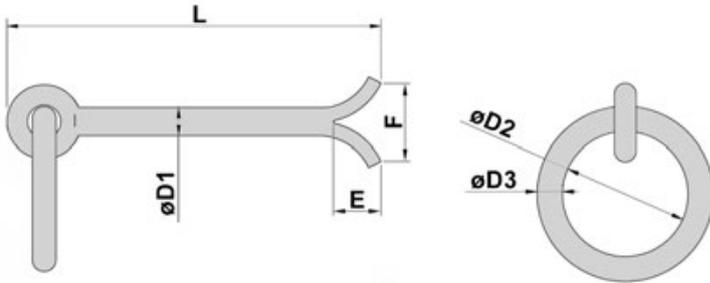
## TYPE 8 - MOORING RING



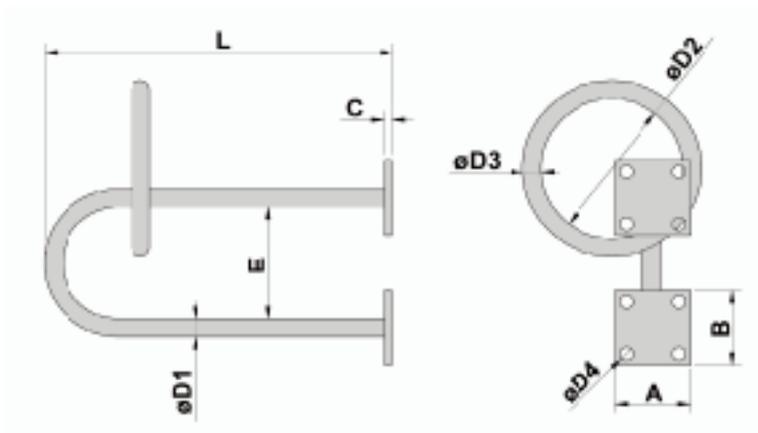
## TYPE 9 - MOORING RING



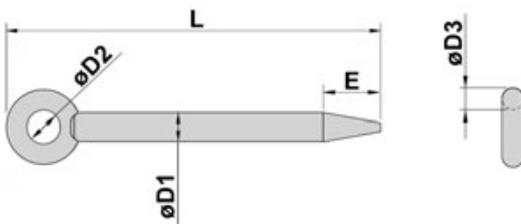
## TYPE 10 - MOORING RING



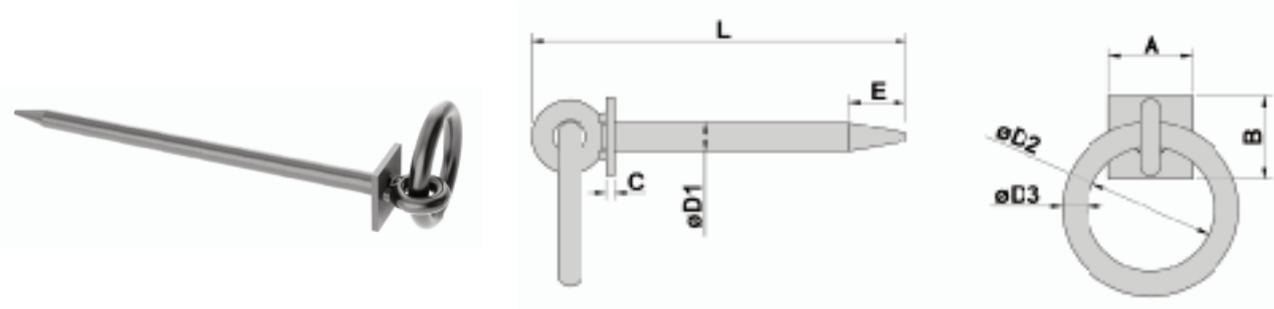
## TYPE 11 - MOORING RING



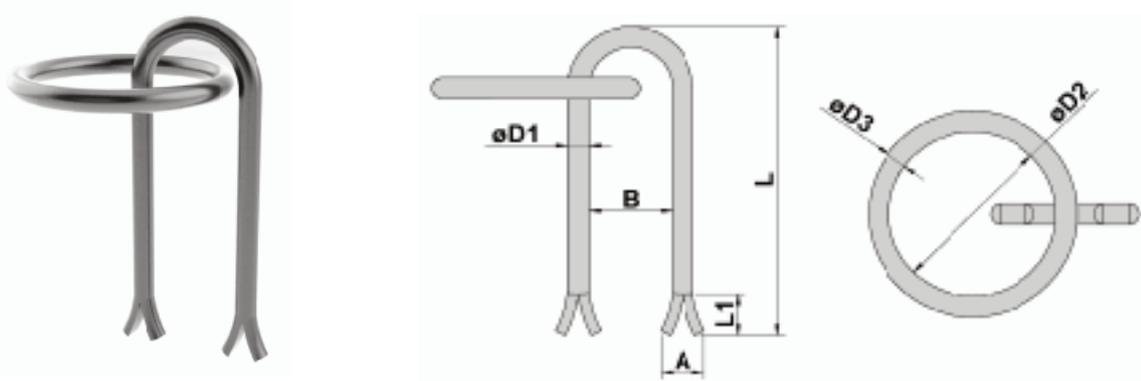
## TYPE 12 - MOORING RING



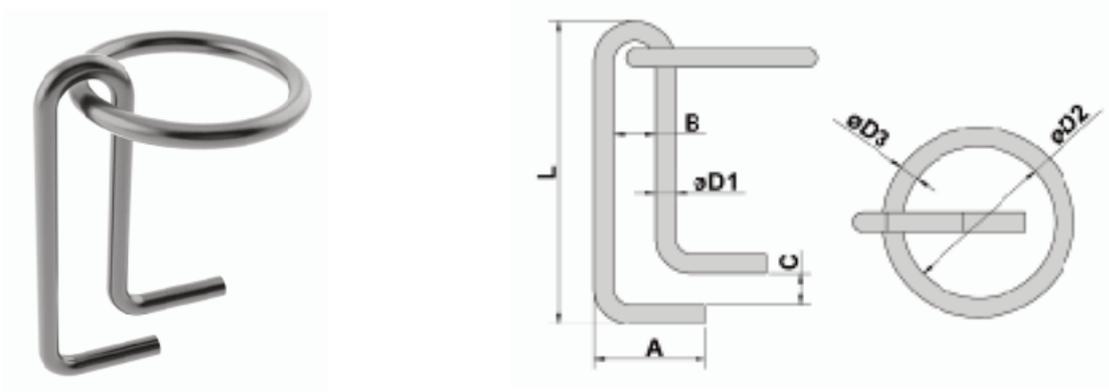
## TYPE 13 - MOORING RING



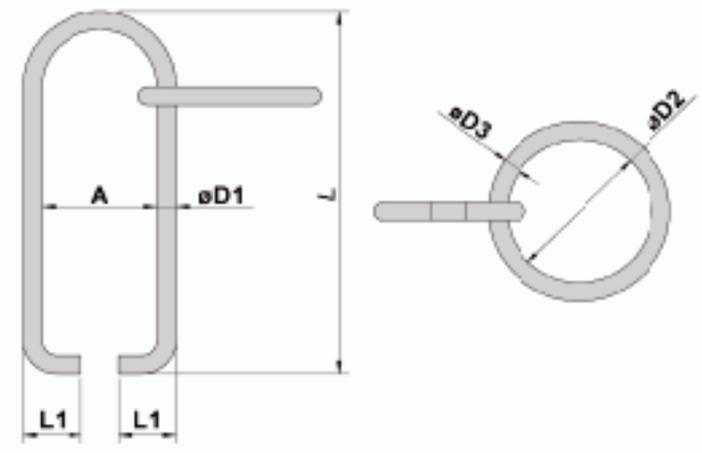
## TYPE 14 - MOORING RING



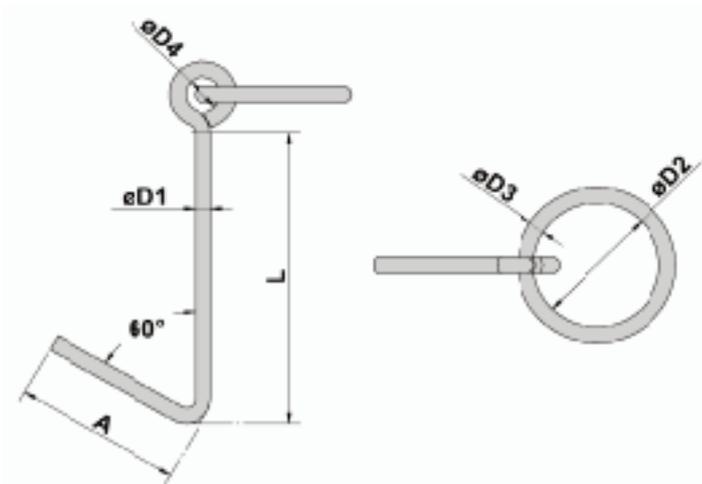
## TYPE 15 - MOORING RING



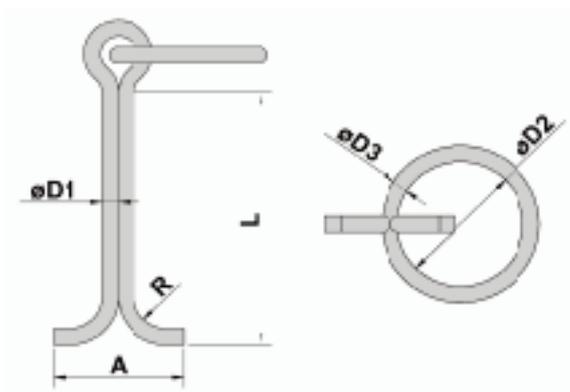
## TYPE 16 - MOORING RING



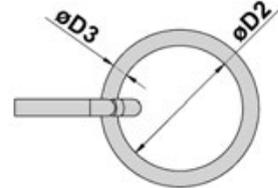
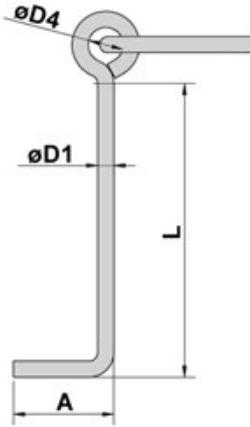
## TYPE 17 - MOORING RING



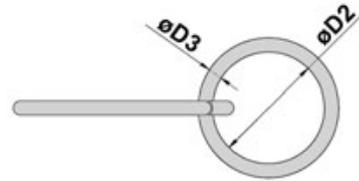
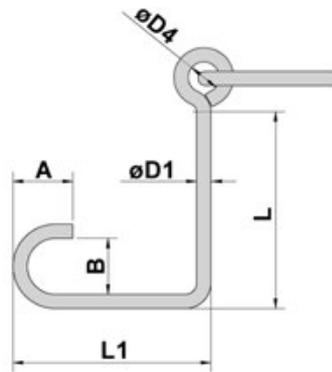
## TYPE 18 - MOORING RING



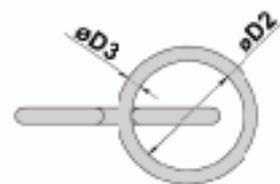
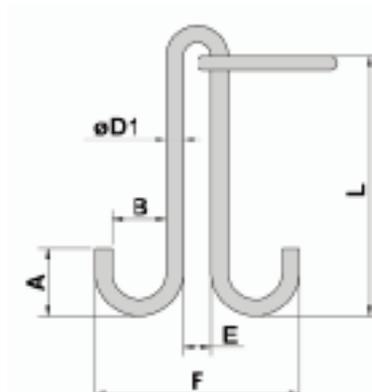
**TYPE 19 - MOORING RING**



**TYPE 20 - MOORING RING**



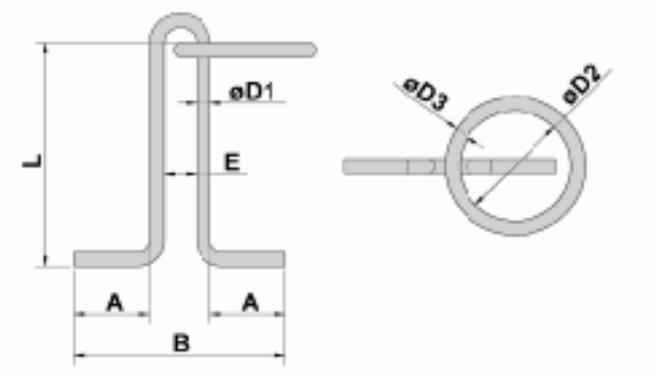
**TYPE 21 - MOORING RING**



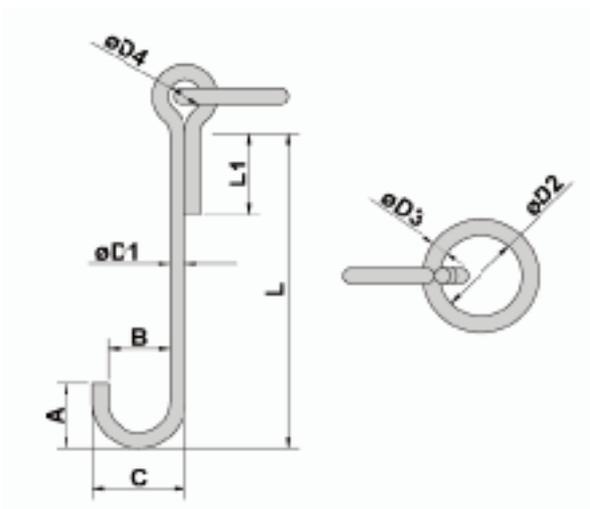
MOORING RINGS

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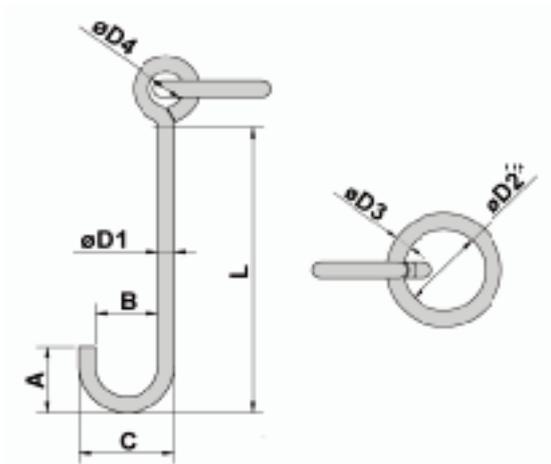
## TYPE 22 - MOORING RING



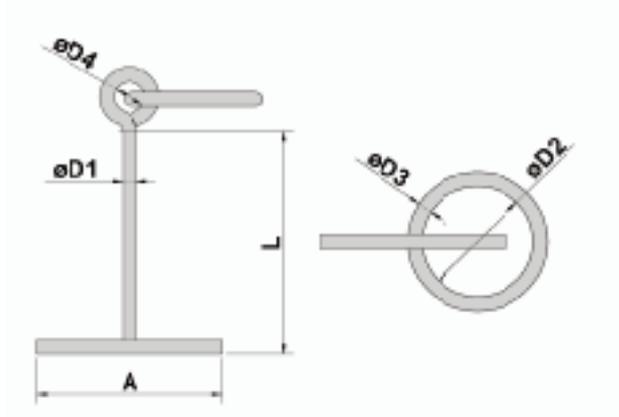
## TYPE 23 - MOORING RING



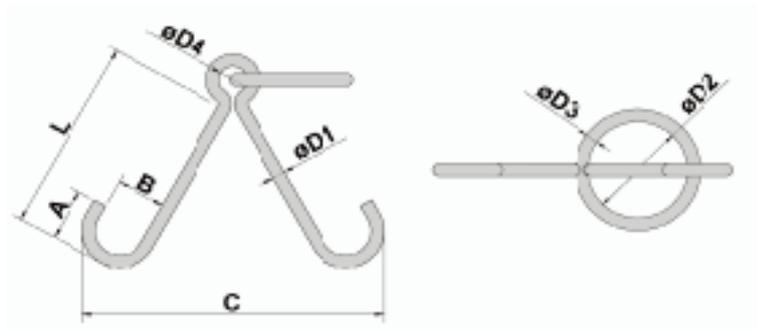
## TYPE 24 - MOORING RING



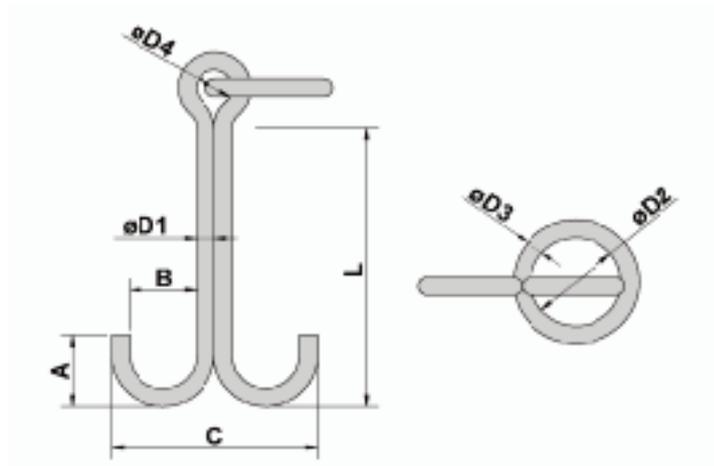
**TYPE 25 - MOORING RING**



**TYPE 26 - MOORING RING**



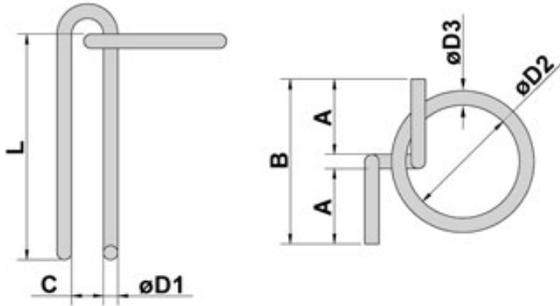
**TYPE 27 - MOORING RING**



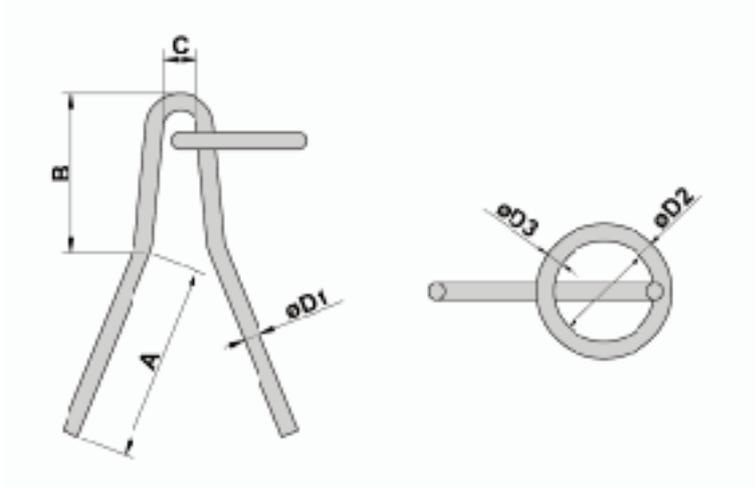
MOORING RINGS

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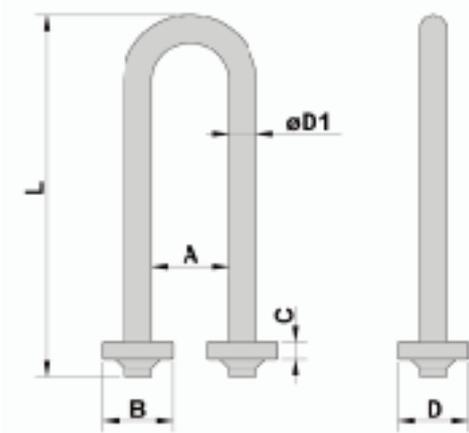
## TYPE 28 - MOORING RING



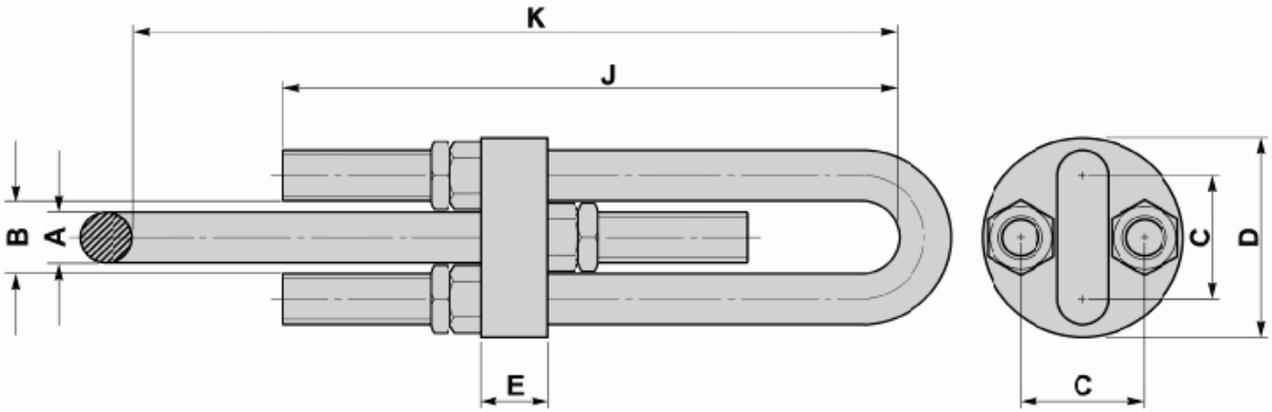
## TYPE 29 - MOORING RING



## TYPE 30 - MOORING RING



## CHAIN ADJUSTERS



SWL	A	B	C	D	E	J	Weight	Thread Length	K Full Open	K Full Close
kN	mm	mm	mm	mm	mm	mm	kg	mm	mm	mm
80	24	38	62	120	25	220	11.7	150	450	300
130	30	48	78	150	30	330	25.8	185	615	430
180	35	60	95	180	40	445	32.0	200	775	575
250	42	70	112	200	40	500	46.0	230	865	637
320	45	80	125	220	40	540	56.0	240	920	680
410	52	83	135	275	50	630	85.0	270	1080	810
509	56	100	156	295	50	670	107.0	290	1145	855
726	68	112	180	320	80	880	190.0	370	1470	1100
1000	76	129	200	350	80	960	273.0	410	1595	1185

**NON STANDARDS MADE  
TO SUIT CUSTOMER  
REQUIREMENTS**



**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

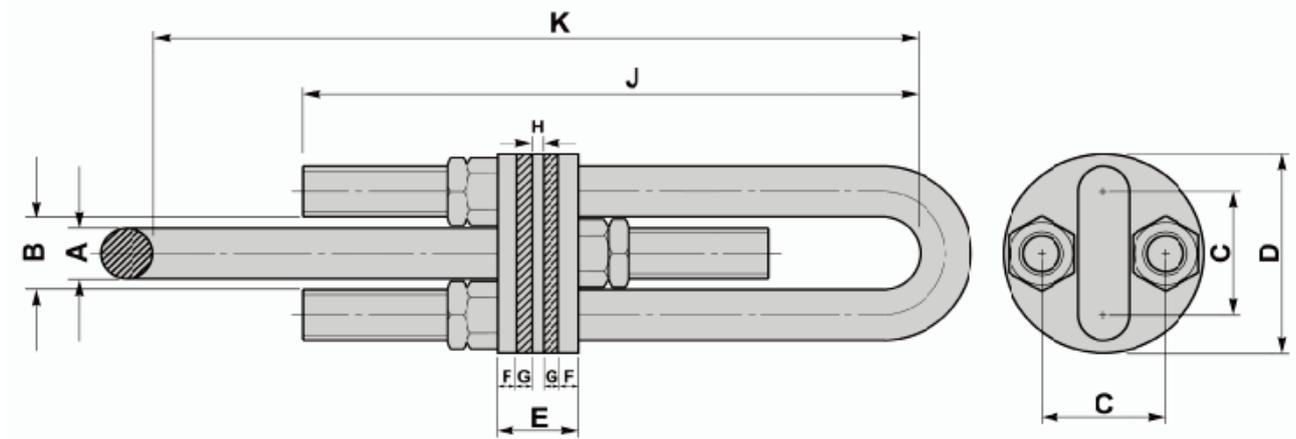
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## SHOCK ABSORBERS



SWL	A	B	C	D	E	F	G	H	J	Weight	Thread Length	K Full Open	K Full Close
kN	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	mm	mm	mm
80	24	38	62	120	102	25	20	12	220	11.7	150	375	225
130	30	48	78	150	102	25	20	12	330	25.8	185	545	360
180	35	60	95	180	135	30	30	15	445	32.0	200	680	480
250	42	70	112	200	135	30	30	15	500	46.0	230	770	542
320	45	80	125	220	135	30	30	15	540	56.0	240	825	585
410	52	83	135	275	180	40	40	20	630	85.0	270	950	680
509	56	100	156	295	180	40	40	20	670	107.0	290	1015	725
726	68	112	180	320	230	50	50	30	880	190.0	370	1320	950
1000	76	129	200	350	230	50	50	30	960	273.0	410	1445	1035

**NON STANDARDS MADE  
TO SUIT CUSTOMER  
REQUIREMENTS**

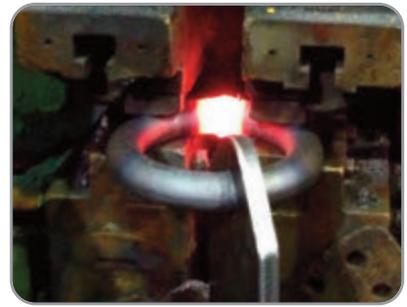


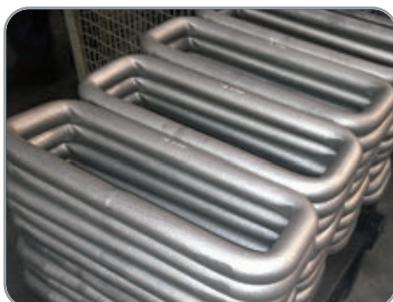
**MATERIAL**  
CARBON STEELS  
STAINLESS STEELS  
ALLOY STEELS  
B7, 4.6, 5.6, 8.8

**FINISH**  
SELF COLOUR  
GALVANISED  
ELECTROPLATED  
SHERARDISED  
PTFE COATING

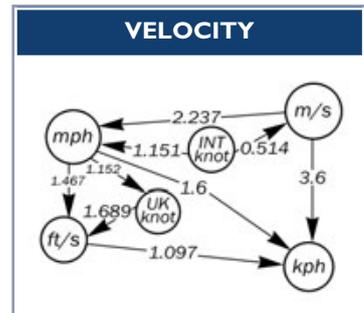
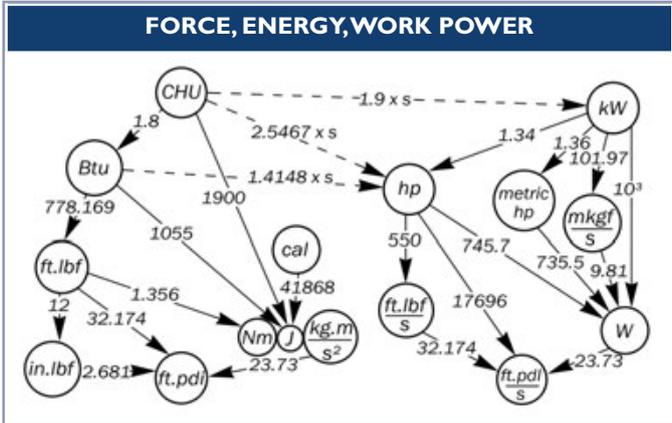
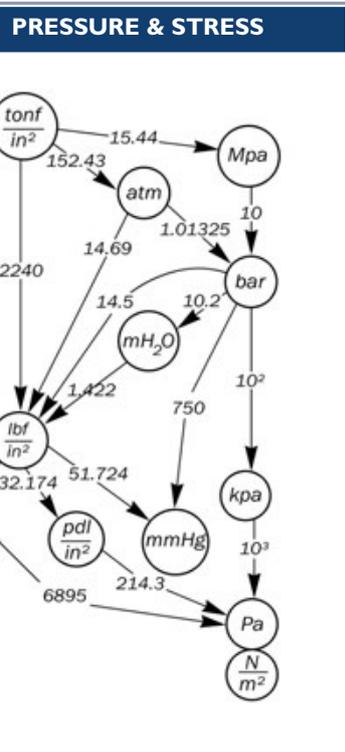
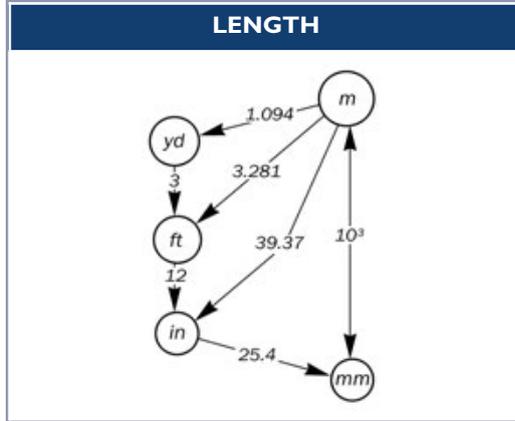
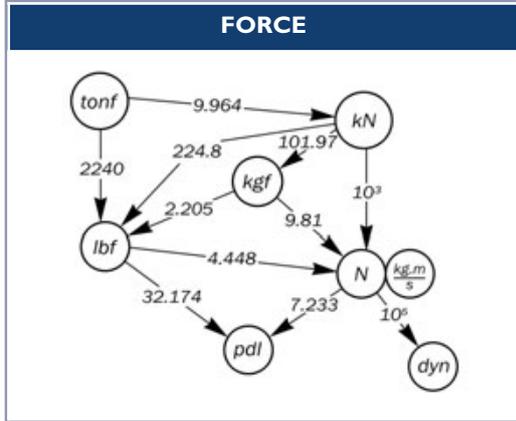
SHOCK ABSORBERS

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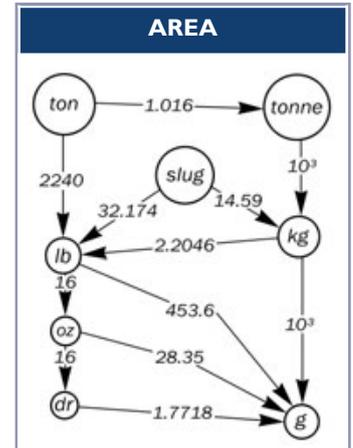
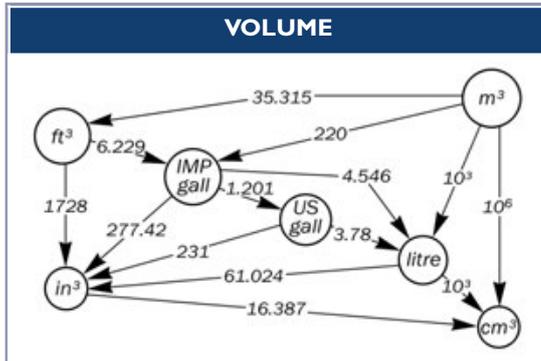
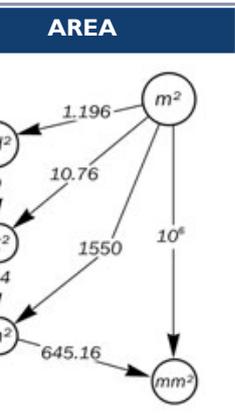




## CONVERSION FACTORS



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 DIRECTION OF ARROW



CONVERSION FACTORS

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## LIFTING GEAR REGULATIONS

	ITEM OF GEAR	DOCK REGULATIONS 1934	FACTORIES ACT 1961	CONSTRUCTION (LIFTING OPERATIONS) REGULATIONS 1961
HEAT TREATMENT	All wrought iron, chains, rings, hooks, shackles and swivels (unless exempted)	1/2" and under - every 6 months.	1/2" and under - every 6 months.	1/2" and under - every 6 months.
		Over 1/2" - every 12 months.  When used on hand operated machinery, periods may be doubled.	Over 1/2" - every 14 months.  If used for molten metal, every 6 months.	Over 1/2" - every 14 months  Applicable to plate clamps and eye bolts if wrought iron.
TESTING	Blocks, chains, rings, hooks, shackles and swivels.	Before taking into use and after repair.	Before taking into use and after repair.	Before taking into use and after repair. In case of pulley blocks, applies only when raising or lowering loads of 1 ton or more. Also applies to plate clamps and eye bolts.
	Wire ropes.	Breaking-load test on sample of rope recorded on Form 87.	Breaking-load test on sample of rope recorded on Form 87.	Breaking-load test on sample of rope recorded on Form 87. Slings to be tested before taking into use and certificates issued.
EXAMINING	Blocks	After proof loading and every 12 months. Also before use or in preceding 3 months.	After proof loading and every 14 months.	After proof loading and every 14 months. Inspect in position every week.
	All chains, rings, hooks, shackles and swivels.	After proof loading and every 12 months. Also before use or in preceding 3 months.	After proof loading and every 6 months.	After proof loading and every 6 months. When not in regular use, examine only when necessary. Also applies to plate clamps and eye bolts.
	Wire ropes	Inspect every 3 months. After broken wires appear, inspect every month.	Every 6 months.	On cranes, inspect in position every week. Slings, after proof loading and every 6 months. When not in use, examine only when necessary.
	Fibre rope slings	---	Every 6 months.	Every 6 months.
Form No. 86	Test Certificate. For pulley blocks.			
Form No. 87	Function. Wire rope. Covers all wire rope and wire rope slings except those spliced mechanically for which a Form 97, with the proof test, should be obtained in addition.			
Form No. 97	Test Certificate. For (a) all new equipment before being taken into use, and (b) equipment that has had to be retested after repairs (except pulley blocks).			
Form No. 1946	Heat treatment. For (a) the annealing of wrought iron equipment, and (b) the heat treatment of steel gear with which the temperature is noted.			
Form No. 1952	Examination. Covers lifting equipment that has been thoroughly examined but not retested. The re-tested is required after repair.			

## MECHANICAL PROPERTIES OF STEEL BOLTS & SCREWS

ISO 898-1:2013 TABLE 3 MECHANICAL OR PHYSICAL PROPERTY		PROPERTY CLASS									
		4.6	4.8	5.6	5.8	6.8	8.8		9.8	10.9	12.9
							$d \leq 16\text{mm}^a$	$d > 16\text{mm}^b$	$d \leq 16\text{mm}$		
Tensile strength, $R_m$ , MPa	nom. <sup>c</sup>	400		500		600	800		900	1000	1200
	min.	400	420	500	520	600	800	830	900	1040	1220
Lower yield strength, $R_{eL}^d$ , MPa	nom. <sup>c</sup>	240	---	300	---	---	---	---	---	---	---
	min.	240	---	300	---	---	---	---	---	---	---
Stress at 0,2 % non-proportional elongation, $R_{p0,2}$ , MPa	nom. <sup>c</sup>	---	---	---	---	---	640	640	720	900	1080
	min.	---	---	---	---	---	640	660	720	940	1100
Stress at 0,0048d non-proportional elongation for full-size fasteners, $R_{pf}$ , MPa	nom. <sup>c</sup>	---	320	---	400	480	---	---	---	---	---
	min.	---	340 <sup>e</sup>	---	420 <sup>e</sup>	480 <sup>e</sup>	---	---	---	---	---
Stress under proof load, $S_p^f$ , MPa	nom.	225	310	280	380	440	580	600	650	830	970
Proof strength ratio		$S_{p, \text{nom}} / R_{eL, \text{min}}$ or $S_{p, \text{nom}} / R_{p0,2, \text{min}}$ or $S_{p, \text{nom}} / R_{pf, \text{min}}$									
		0,94	0,91	0,93	0,90	0,92	0,91	0,91	0,90	0,88	0,88
Percentage elongation after fracture for machined test pieces, $A$ , %	min.	22	---	20	---	---	12	12	10	9	8
Percentage reduction of area after fracture for machined test pieces, $Z$ , %	min.	---					52		48	48	44
Elongation after fracture for full-size fasteners, $A_r$ (see also Annex C)	min.	---	0,24	---	0,22	0,20	---	---	---	---	---
Head soundness		No fracture									
Vickers hardness, HV $F \geq 98 \text{ N}$	min.	120	130	155	160	190	250	255	290	320	385
	max.	220 <sup>g</sup>				250	320	335	360	380	435
Brinell hardness, HBW $F = 30 D^2$	min.	114	124	147	152	181	245	250	286	316	380
	max.	209 <sup>g</sup>				238	316	331	355	375	429
Rockwell hardness, HRB	min.	67	71	79	82	89	---				
	max.	95,0 <sup>g</sup>				99,5	---				
Rockwell hardness, HRC	min.	---					22	23	28	32	39
	max.	---					32	34	37	39	44
Surface hardness, HV 0,3	max.	---					---			390	435
Non-carburization, HV 0,3	max.	---					h			h	h
Height of non-decarburized thread zone, $E$ , mm	min.	---					$\frac{1}{2} H_1$			$\frac{3}{8} H_1$	$\frac{3}{4} H_1$
Depth of complete decarburization in the thread, $G$ , mm	max.	---					0,015				
Reduction of hardness after retempering, HV	max.	---					20				
Breaking torque, $M_b$ , Nm	min.	In accordance with ISO 898-7									
Impact strength, $K_v$ <sup>h</sup> , J	min.	---		27	---		27	27	27	27	k
Surface integrity in accordance with		ISO 6157 - 1 <sup>i</sup>									ISO 6157-3

(a) - Values do not apply to structural bolting. (b) - For structural bolting  $d \geq M12$ . (c) - Nominal values are specified only for the purpose of the designation system for property classes. Refer to clause 5 in the official standard. (d) - In cases where the lower yield strength  $R_{eL}$ , cannot be determined, it is permissible to measure the stress at 0,2% non-proportional elongation  $R_{p0,2}$ . (e) - For the property classes 4.8, 5.8 and 6.8, the values for  $R_{pf}$  min are under investigation. The values at the time of publication of this part of ISO 898 are given for calculation of the proof stress ratio only. They are not test values. (f) - Proof loads are specified in Tables 5 (right) and 7 in the official standard. (g) - Hardness determined at the end of a fastener shall be 250 HV, 238 HB or 99,5 HRB maximum. (h) - Surface hardness shall not be more than 30 Vickers points above the measured base metal hardness of the fastener when the determination of both surface hardness and base metal hardness are carried out with HV 0,3. See 9.11 in official standard. (i) - Values are determined at a test temperature of -20°C. See 9.14 in official standard. (j) - Applies to  $d \geq 16\text{mm}$ . (k) - Value for  $K_v$  is under investigation. (l) - Instead of ISO 6157-1, ISO 6157-3 may apply by agreement between the manufacturer and the purchaser.

## ULTIMATE TENSILE & PROOF LOADS - METRIC COARSE

ISO 898-1:2013 TABLE 4 MINIMUM ULTIMATE TENSILE LOADS - ISO METRIC COARSE PITCH THREAD										
Thread <sup>a</sup> <i>d</i>	Nomial Stress Area <i>A<sub>s,nom</sub></i> <sup>b</sup> mm <sup>2</sup>	PROPERTY CLASS								
		4.6	4.8	5.6	5.8	6.8	8.8	9.8	10.9	12.9
MINIMUM ULTIMATE TENSILE LOAD, <i>F<sub>m,min</sub></i> ( <i>A<sub>s,nom</sub></i> X <i>R<sub>m,min</sub></i> ), N										
M3	5,03	2 010	2 110	2 510	2 620	3 020	4 020	4 530	5 230	6 140
M3,5	6,78	2 710	2 850	3 390	3 530	4 070	5 420	6100	7 050	8 270
M4	8,78	3 510	3 690	4 390	4 570	5 270	7 020	7 900	9 130	10 700
M5	14,2	5 680	5 960	7 100	7 380	8 520	11 350	12 800	14 800	17 300
M6	20,1	8 040	8 440	10 000	10 400	12 100	16 100	18 100	20 900	24 500
M7	28,9	11 600	12 100	14 400	15 000	17 300	23 100	26 000	30 100	35 300
M8	36,6	14 600 <sup>c</sup>	15 400	18 300 <sup>c</sup>	19 000	22 000	29 200 <sup>c</sup>	32 900	38 100 <sup>c</sup>	44 600
M10	58	23 200 <sup>c</sup>	24 000	29 000 <sup>c</sup>	30 200	34 800	46 400 <sup>c</sup>	52 200	60 300 <sup>c</sup>	70 800
M12	84,3	33 700	35 400	42 200	43 800	50 600	67 400 <sup>d</sup>	75 900	87 700	103 000
M14	115	46 000	48 300	57 500	59 800	69 000	92 000 <sup>d</sup>	104 000	120 000	140 000
M16	157	62 800	65 900	78 500	81 600	94 000	125 000 <sup>d</sup>	141 000	163 000	192 000
M18	192	76 800	80 600	96 000	99 800	115 000	159 000	---	200 000	234 000
M20	245	98 000	103 000	122 000	127 000	147 000	203 000	---	255 000	299 000
M22	303	121 000	127 000	152 000	158 000	182 000	252 000	---	315 000	370 000
M24	353	141 000	148 000	176 000	184 000	212 000	293 000	---	367 000	431 000
M27	459	184 000	193 000	230 000	239 000	275 000	381 000	---	477 000	560 000
M30	561	224 000	236 000	280 000	292 000	337 000	466 000	---	583 000	684 000
M33	694	278 000	292 000	347 000	361 000	416 000	576 000	---	722 000	847 000
M36	817	327 000	343 000	408 000	425 000	490 000	678 000	---	850 000	997 000
M39	976	390 000	410 000	488 000	508 000	586 000	810 000	---	1 020 000	1 200 000

(a) - Where no thread pitch is indicated in a thread designation, coarse pitch is specified. (b) - To calculate *A<sub>s,nom</sub>*, refer to 9.1.6.1 in the official standard. (c) - For fasteners with thread tolerance 6az in accordance with ISO 965-4 subject to hot dip galvanising, reduced values in accordance with ISO 10684:2004, Annex A, apply. (d) - For structural bolting 70 000 N (for M12), 95 500 N (for M14) and 130 000 N (for M16).

ISO 898-1:2013 TABLE 5 PROOF LOADS - ISO METRIC COARSE PITCH THREAD										
Thread <sup>a</sup> <i>d</i>	Nomial Stress Area <i>A<sub>s,nom</sub></i> <sup>b</sup> mm <sup>2</sup>	PROPERTY CLASS								
		4.6	4.8	5.6	5.8	6.8	8.8	9.8	10.9	12.9
MINIMUM ULTIMATE TENSILE LOAD, <i>F<sub>p</sub></i> ( <i>A<sub>s,nom</sub></i> X <i>S<sub>p,nom</sub></i> ), N										
M3	5,03	1 130	1 560	1 410	1 910	2 210	2 920	3 270	4 180	4 880
M3,5	6,78	1 530	2 100	1 900	2 580	2 980	3 940	4 410	5 630	6 580
M4	8,78	1 980	2 720	2 460	3 340	3 860	5 100	5 710	7 290	8 520
M5	14,2	3 200	4 400	3 980	5 400	6 250	8 230	9 230	11 800	13 800
M6	20,1	4 520	6 230	5 630	7 640	8 840	11 600	13 100	16 700	19 500
M7	28,9	6 500	8 960	8 090	11 000	12 700	16 800	18 800	24 000	28 000
M8	36,6	8 240 <sup>c</sup>	11 400	10 200 <sup>c</sup>	13 900	16 100	21 200 <sup>c</sup>	23 800	30 400 <sup>c</sup>	35 500
M10	58	13 000 <sup>c</sup>	18 000	16 200 <sup>c</sup>	22 000	25 500	33 700 <sup>c</sup>	37 700	48 100 <sup>c</sup>	56 300
M12	84,3	19 000	26 100	23 600	32 000	37 100	48 900 <sup>d</sup>	54 800	70 000	81 800
M14	115	25 900	35 600	32 200	43 700	50 600	66 700 <sup>d</sup>	74 800	95 500	112 000
M16	157	35 300	48 700	44 000	59 700	69 100	91 000 <sup>d</sup>	102 000	130 000	152 000
M18	192	43 200	59 500	53 800	73 000	84 500	115 000	---	159 000	186 000
M20	245	55 100	76 000	68 600	93 100	108 000	147 000	---	203 000	238 000
M22	303	68 200	93 900	84 800	115 000	133 000	182 000	---	252 000	294 000
M24	353	79 400	109 000	98 800	134 000	155 000	212 000	---	293 000	342 000
M27	459	103 000	142 000	128 000	174 000	202 000	275 000	---	381 000	445 000
M30	561	126 000	174 000	157 000	213 000	247 000	337 000	---	466 000	544 000
M33	694	156 000	215 000	194 000	264 000	305 000	416 000	---	576 000	673 000
M36	817	184 000	253 000	229 000	310 000	359 000	490 000	---	678 000	792 000
M39	976	220 000	273 000	273 000	371 000	429 000	586 000	---	810 000	947 000

(a) - Where no thread pitch is indicated in a thread designation, coarse pitch is specified. (b) - To calculate *A<sub>s,nom</sub>*, refer to 9.1.6.1 in the official standard. (c) - For fasteners with thread tolerance 6az in accordance with ISO 965-4 subject to hot dip galvanising, reduced values in accordance with ISO 10684:2004, Annex A, apply. (d) - For structural bolting 50 700 N (for M12), 68 800 N (for M14) and 94 500 N (for M16).

## THREAD COMPARISONS

METRIC COARSE THREAD TO BS3643				IMPERIAL THREADS THREADS PER INCH			
PITCH	MM	INCHES	BSW	UNC	BSF	UNF	
1.00	M6						
	6.4	1/4	20	20	26	28	
	7.9	5/16	18	18	22	24	
1.25	M8						
	9.5	3/8	16	16	20	24	
1.50	M10						
	11.1	7/16	14	14	18	20	
1.75	M12						
	12.7	1/2	12	13	16	20	
2.00	M14						
	14.2	9/16	12	12	16	18	
	15.8	5/8	11	11	14	18	
2.00	M16						
	19.0	3/4	10	10	12	16	
2.50	M20						
2.50	M22						
	22.2	7/8	9	9	11	14	
3.00	M24						
	25.4	1	8	8	10	12	
3.00	M27						
	28.5	1. 1/8	7	7	9	12	
	31.7	1. 1/4	7	7	9	12	
3.50	M30						
	34.9	1. 3/8	6	6	8	12	
	38.1	1. 1/2	6	6	8	12	
4.00	M36						
	41.2	1. 5/8	5	---	8	---	
4.50	M42						
	44.4	1. 3/4	5	5	7	---	
4.50	M45						
	50.8	2	4. 1/2	4. 1/2	7	---	
5.00	M48						
	53.9	2. 1/8	4. 1/2	---	---	---	
5.50	M56						
	57.1	2. 1/4	4	4. 1/2	6	---	
	60.3	2. 3/8	4	---	---	---	
	63.5	2. 1/2	4	4	6	---	
6.00	M64						
	69.8	2. 3/4	3. 1/2	4	6	---	
6.00	M72						
	76.2	3	3. 1/2	4	5	---	
6.00	M80						
	82.5	3. 1/4	3. 1/4	4	5	---	
	88.9	3. 1/2	3. 1/4	4	4. 1/2	---	
	95.2	3. 3/4	3	4	4. 1/2	---	
6.00	M100						
	101.6	4	3	4	4. 1/2	---	

VALUES AND EQUIVALENT ARE APPROXIMATE

Every care has been taken in the preparation of this technical data, however, no liability can be accepted for any errors or the consequences arising from such errors.

## WEIGHT CHARTS FOR STEEL BAR

### ROUND BAR



DIA OF BAR MM	KGS PER METER
6	0.22
8	0.40
9	0.50
10	0.62
11	0.75
12	0.89
13	1.04
14	1.21
15	1.39
16	1.58
18	2.00
19	2.23
20	2.47
22	2.98
24	3.55
25	3.85
27	4.49
28	4.83
30	5.55
32	6.31
33	6.71
35	7.55
36	7.99
38	8.90
40	9.86
42	10.87
45	12.48
48	14.20
50	15.41
52	16.67
55	18.65
56	19.33
58	20.74
60	22.19
62	23.70
64	25.25
65	26.05
68	28.51
70	30.21
72	31.96
75	34.68
80	39.45
85	44.54
90	49.93
95	55.64
100	61.65

### SQUARE BAR



SIZE MM	KGS PER METER
13	1.33
14	1.54
15	1.77
16	2.01
18	2.54
19	2.83
20	3.14
22	3.80
25	4.91
28	6.15
30	7.06
32	8.04
35	9.62
38	11.33
40	12.56
45	15.89
50	19.62
57	25.50
65	33.16
70	38.46
75	44.15
83	54.07
90	63.58
95	70.84
102	81.66
110	94.97
115	103.80
130	132.65
140	153.84
150	176.60
160	200.93
165	213.69
170	226.84
180	254.31
190	283.35
200	313.96
220	379.89
230	415.21
240	452.10
255	510.38

### FLAT BAR



SIZE MM	KGS PER METER	SIZE MM	KGS PER METER
20 X 5	0.79	80 X 5	3.14
20 X 10	1.57	80 X 10	6.28
20 X 15	2.36	80 X 15	9.42
25 X 5	0.98	80 X 20	12.60
25 X 10	1.96	80 X 25	15.70
25 X 15	2.94	90 X 5	3.53
30 X 5	1.12	90 X 10	7.07
30 X 10	2.36	90 X 15	10.60
30 X 15	3.53	90 X 20	14.10
35 X 5	1.37	90 X 25	17.70
35 X 10	2.75	100 X 5	3.93
35 X 15	4.12	100 X 10	7.85
40 X 5	1.57	100 X 15	11.80
40 X 10	3.14	100 X 20	15.70
40 X 15	4.71	100 X 25	19.60
40 X 20	6.28	100 X 40	31.40
40 X 25	7.85	120 X 10	9.42
45 X 5	1.77	120 X 15	14.10
45 X 10	3.53	120 X 20	18.80
45 X 15	5.30	120 X 25	23.60
45 X 20	7.07	120 X 40	37.70
45 X 25	8.83	130 X 10	10.20
50 X 5	1.96	130 X 15	15.30
50 X 10	3.93	130 X 20	20.40
50 X 15	5.89	130 X 25	25.50
50 X 20	7.85	130 X 40	40.80
50 X 25	9.81	140 X 10	11.00
60 X 5	2.36	140 X 15	16.50
60 X 10	4.71	140 X 20	22.00
60 X 15	7.07	140 X 25	27.50
60 X 20	9.42	140 X 40	44.00
60 X 25	11.80	150 X 10	11.80
65 X 5	2.55	150 X 15	17.70
65 X 10	5.10	150 X 20	23.60
65 X 15	7.65	150 X 25	29.40
65 X 20	10.20	150 X 40	47.10
65 X 25	12.80	160 X 10	12.60
70 X 5	2.75	160 X 15	18.80
70 X 10	5.50	160 X 20	25.10
70 X 15	8.24	160 X 25	31.40
70 X 20	11.00	160 X 40	50.20
70 X 25	13.70	160 X 50	62.80
75 X 5	2.94		
75 X 10	5.89		
75 X 15	8.83		
75 X 20	11.80		
75 X 25	14.70		

### HEXAGON BAR



SIZE AF MM	KGS PER METER
10	0.68
11	0.82
12	0.98
13	1.15
14	1.33
15	1.53
16	1.74
17	1.96
18	2.20
19	2.45
20	2.72
22	3.29
24	3.92
25	4.25
27	4.96
30	6.12
32	9.96
36	8.81
40	10.90
41	11.40
46	14.40
48	15.70
50	17.00
52	18.40
55	20.60
60	24.50
65	28.70
70	33.30
76	39.30

VALUES AND EQUIVALENT ARE APPROXIMATE

Every care has been taken in the preparation of this technical data, however, no liability can be accepted for any errors or the consequences arising from such errors.

## STEEL SPECIFICATION COMPARISONS

BS970 : 1970/72 BS970 : 1983	BS970 : 1955 EN SERIES	BS970 : 1970/72 BS970 : 1983	BS970 : 1955 EN SERIES	BS970 : 1970/72 BS970 : 1983	BS970 : 1955 EN SERIES
040A04	2A, 2A/1, 2B	250A53	45	605A37	16C
040A10	2A, 2A/1, 2B	250A58	45A	605M30	16D
040A12	2A, 2A/1, 2B	250A61	45B	605M36	16
040A22	2C, 2D	302S25	5BA	606M36	16M
045M10	32A	303S21	58M	608M38	17
050A20	2C, 2D	303S41	58M	635M15	351
055M15	2	304S15	58E	637M17	352
060A62	43D	315S16	58H	640A35	111A
060A96	44, 44B	316S16	58J	640M40	111
070A72	42	320S17	58J	653M31	23
070A78	42	321S12	58B, 58C	655M13	36A
070M20	3A, 3C	321S20	58B, 58C	659M15	39A
070M55	9	325S21	58M	665A22	35A
080M15	32C	331S40	54	665A24	35B
080A27	5A	331S42	54A	665M17	34
080A30	5B	347S17	54F, 58G	665M23	35
080A32	5C	401S45	52	708A37	19B
080A35	8A	410S21	56A	708A42	19C
080A37	8B	416S21	56AM	708M40	19A
080A40	8C	416S29	56BM	709M40	19
080A42	8D	416S37	56CM	722M24	40B
080A47	43B	416S41	56AM	735A50	47
080A52	43C	420S29	56B	785M19	13
080A67	43E	420S37	56C	805M17	361
080M15	32C	420S45	56D	805M20	362
080M30	5	430S17	60	805M25	363
080M40	8	431S29	57	815M17	353
080M50	43A	443S65	509	816M40	110
120M36	15B	503A37	12B	817M40	24
130M15	201	503A42	12C	820M17	354
150M19	14A, 14B	503M40	12	822M17	355
150M28	14A, 14B	523A14	206	826M31	25
150M36	15	526M60	11	826M40	26
210M15	32M	527A19	207	830M31	27
212A37	8BM	527A60	48	832M13	36C
212A42	8DM	530A30	18A	835M15	39B
212M36	8M	530A32	18B	835M30	30B
212M44	8M	530A36	18C	897M39	40C
214M15	202	530A40	18D	905M31	41A
216M36	15AM	530M40	18	905M39	41B
220M07	1A	534A99	31	945A40	100C
230M07	1A	535A99	31	945M38	100
240M07	1B	605A32	16B		

**REFERENCE SYMBOLS FOR TENSILE STRENGTH RANGES OF HARDENED AND TEMPERED MATERIAL**  
the various tensile strength rates for the different specifications have been designated with the reference symbols P to Z.

**NOTE:** Tensile strength is governed by ruling section of bar when being heat treated.

For further details please consult  
BS970 : 1983 Part I

REFERENCE SYMBOL	TENSILE STRENGTH N/mm <sup>2</sup>
P	550 - 700
Q	625 - 775
R	700 - 850
S	775 - 925
T	850 - 1000
U	925 - 1075

REFERENCE SYMBOL	TENSILE STRENGTH N/mm <sup>2</sup>
V	1000 - 1150
W	1075 - 1225
X	1150 - 1300
Y	1225 - 1375
Z	1550 MIN

## STEEL HARDNESS & TENSILE COMPARISONS

BRINELL DIA OF IMPRESSION	BRINELL HARDNESS NUMBER	VICKERS HARDNESS NUMBER	ROCKWELL C SCALE HARDNESS NUMBER	TENSILE STRENGTH	TENSILE STRENGTH	TENSILE STRENGTH
mm	HB	HV	HRC	ton f/in <sup>2</sup>	KG f/mm <sup>2</sup>	N/mm <sup>2</sup>
2.50	(601)	640	57	---	---	---
2.55	(578)	615	56	---	---	---
2.60	(555)	591	54.5	---	---	---
2.65	(534)	569	53.5	---	---	---
2.70	(514)	547	52	---	---	---
2.75	(495)	528	51	---	---	---
2.80	(477)	508	49.5	---	---	---
2.85	(461)	491	48.5	101	160	1569
2.90	444	474	47	98	155	1520
2.95	429	455	45.5	95	150	1471
3.00	415	440	44.5	92	145	1422
3.05	401	425	43	88	139	1363
3.10	388	410	42	85	134	1314
3.15	375	396	40.5	82	129	1265
3.20	363	383	39	80	126	1236
3.25	352	372	38	77	121	1187
3.30	341	360	36.5	75	118	1157
3.35	331	350	35.5	73	114	1118
3.40	321	339	34.5	71	111	1089
3.45	311	328	33	68	107	1049
3.50	302	319	32	66	104	1020
3.55	293	309	31	64	101	990
3.60	285	301	30	63	99	971
3.65	277	292	29	61	96	941
3.70	269	284	27.5	59	93	912
3.75	262	276	26.5	58	91	892
3.80	255	269	25.5	56	89	873
3.85	248	261	24	55	87	853
3.90	241	253	23	53	84	824
3.95	235	247	22	51	81	794
4.00	229	241	20.5	50	79	775
4.05	223	235	---	49	77	755
4.10	217	228	---	48	76	745
4.15	212	223	---	46	73	716
4.20	207	218	---	45	71	696
4.30	197	208	---	43	68	667
4.40	187	197	---	41	65	637
4.50	179	189	---	39	62	608
4.60	170	179	---	36	57	559
4.70	163	172	---	35	55	539
4.80	156	165	---	34	54	530
4.90	149	157	---	32	51	500
5.00	143	150	---	31	49	481
5.10	137	144	---	31	49	481
5.20	131	138	---	30	47	461
5.30	126	133	---	29	46	451
5.40	121	127	---	28	44	431
5.50	116	122	---	27	43	422
5.60	111	117	---	26	41	402
5.70	107	113	---	25	39	382
5.80	103	108	---	24	38	373

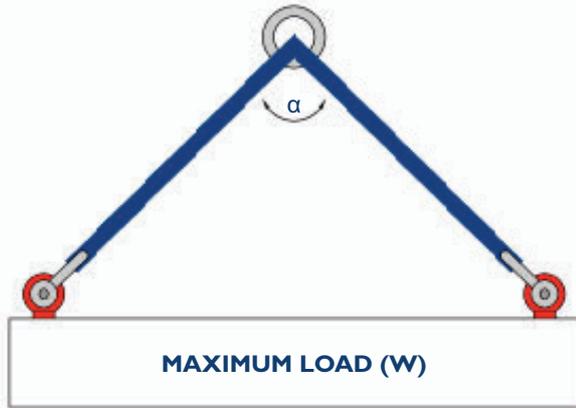
The figures in parenthesis require a 'modified' Brinell test, i.e a tungsten carbide ball is required where BH value exceeds 450 HB to HV and HV to HRC conversions are based on A.S.T.M. E. 140

**VALUES AND EQUIVALENT ARE APPROXIMATE**

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## COLLARED EYEBOLT WORKING LOAD CHART

- INFORMATION BASED ON BS 4278 : 1984



**NOTE: THIS METHOD IS CORRECT FOR COLLARED EYEBOLTS AS ILLUSTRATED AND EYEBOLTS WITH LINK**

**IT IS NOT PERMISSIBLE FOR DYNAMO EYEBOLTS WHICH ARE DESIGNED FOR AXIAL LIFT ONLY.**

### METRIC THREADS

Maximum recommended working loads for collared eyebolts (**metric threads**) when used in pairs for inclined loading conditions.

SAFE WORKING LOAD SINGLE EYEBOLT AXIAL	MAXIMUM LOAD (W) TO BE LIFTED BY A PAIR OF EYEBOLTS WHEN THE ANGLE BETWEEN SLING LEGS IS:		
	$0^\circ < \alpha \leq 30^\circ$	$30^\circ < \alpha \leq 60^\circ$	$60^\circ < \alpha \leq 90^\circ$
tonnes	tonnes	tonnes	tonnes
0.4	0.5	0.32	0.2
0.8	1.0	0.64	0.4
1.6	2.0	1.25	0.8
2.5	3.2	2.0	1.25
4.0	5.0	3.2	2.0
6.3	8.0	5.0	3.2
8.0	10.0	6.3	4.0
10.0	12.5	8.0	5.0
12.5	16.0	10.0	6.3
16.0	20.0	12.5	8.0
20.0	25.0	16.0	10.0
25.0	32.0	20.0	12.5
<b>REDUCTION FACTOR</b>	0.63	0.4	0.25

### IMPERIAL THREADS

Maximum recommended working loads for collared eyebolts (**imperial threads**) when used in pairs for inclined loading conditions.

SAFE WORKING LOAD SINGLE EYEBOLT AXIAL	MAXIMUM LOAD (W) TO BE LIFTED BY A PAIR OF EYEBOLTS WHEN THE ANGLE BETWEEN SLING LEGS IS:		
	$0^\circ < \alpha \leq 30^\circ$	$30^\circ < \alpha \leq 60^\circ$	$60^\circ < \alpha \leq 90^\circ$
tonnes	tonnes	tonnes	tonnes
0.25	0.32	0.2	0.13
0.5	0.63	0.4	0.25
0.9	1.13	0.72	0.45
1.4	1.76	1.12	0.7
2.0	2.52	1.6	1.0
2.75	3.47	2.2	1.38
3.5	4.41	2.8	1.75
4.5	5.67	3.6	2.25
6.5	8.19	5.2	3.25
9.0	11.34	7.2	4.5
12.0	15.12	9.6	6.0
15.0	18.9	12.0	7.5
20.0	25.2	16.0	10.0
30.0	37.8	24.0	15.0
<b>REDUCTION FACTOR</b>	0.63	0.4	0.25

SAFE WORKING LOAD SINGLE EYEBOLT AXIAL	MAXIMUM LOAD (W) TO BE LIFTED BY A PAIR OF EYEBOLTS WHEN THE ANGLE BETWEEN SLING LEGS IS:		
	$0^\circ < \alpha \leq 30^\circ$	$30^\circ < \alpha \leq 60^\circ$	$60^\circ < \alpha \leq 90^\circ$
tonnes	tonnes	tonnes	tonnes
1.0	2.0	1.6	1.25
1.6	3.2	2.5	2.0
2.5	5.0	4.0	3.2
4.0	8.0	6.3	5.0
6.3	12.6	10.0	8.0
<b>REDUCTION FACTOR</b>	1.0	0.8	0.63

### IMPERIAL & METRIC THREADS

Maximum recommended working loads for collared eyebolts with links (**imperial & metric threads**) when used in pairs for inclined loading conditions.

Every care has been taken in the preparation of this technical data, however, no liability can be accepted for any errors or the consequences arising from such errors.