

ALWAYSE ENGINEERING



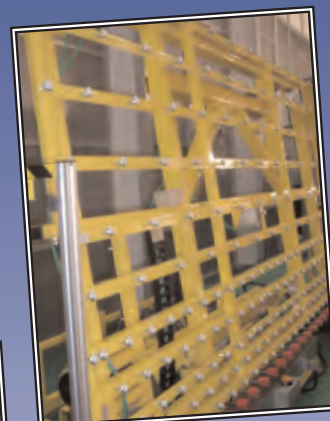
Ball table to be used in an assembly area.



Ball units used for air cargo handling.



Material handling exhibition



Ball frame for glass handling.



Ball units used for the assembly of heating units.



Ball units used for the handling of large sheets of aluminium.



Air cargo facility.



Catalogue 14



Airport cargo dolly transfer.



Glass Handling



DHL Heathrow.



Ball table fitted into steel stockists.



DHL Heathrow - ULD Storage facility.



Special custom designed ball table



Bespoke Tool-Rack with sunk Ball Transfer Units



Die lifters fitted to bed of 600 ton press.



Tilting ball table used in conjunction with live storage system.



Ball table in industry



Special die table with slots for fork-lift truck forks.



Federal Express facility at Hong Kong International Airport.



Live/dead ball tables to move and secure heavy items.



Ball table with hinged section.



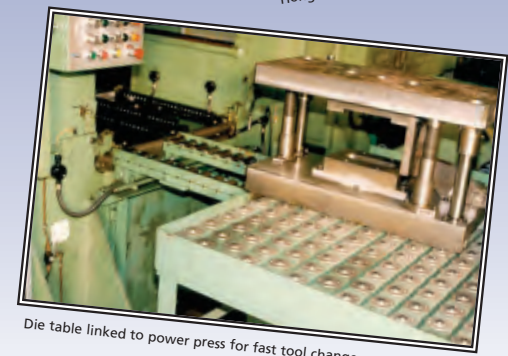
Specially designed assembly area.



Ball table.

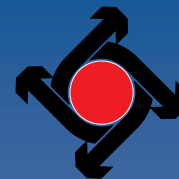


Typical material handling system.



Die table linked to power press for fast tool changes.

ALWAYSE



Ball Transfer Units

1 Interpretation

1.1 In these Terms Conditions:

"COMPANY" means Alwayse Engineering Limited

"CONTRACT" means the contract for the purchase and sale of the Goods

"CUSTOMER" means the person or company who accepts a quotation of the Company for the sale of the Goods, or whose order for the Goods is accepted by the Company

"GOODS" means the goods which the Company is to supply in accordance with these Terms and Conditions

1.2 Any reference in these Terms and Conditions to any provision of a statute shall be construed as a reference to that provision as amended, re-enacted or extended at the relevant time.

2 Basis of the Sale

2.1 The Company shall sell and the Buyer shall purchase the Goods in accordance with any written quotation of the Company which is accepted by the Buyer within 60 days of its date, or any written order of the Buyer which is accepted by the Company, subject in either case to these Terms and Conditions, which shall govern this Contract to the exclusion of any other terms and conditions subject to which any such quotation is accepted or purported to be accepted, or any such order is made or purported to be made, by the Buyer.

2.2 No order submitted by the Buyer shall be deemed to be accepted by the Company unless and until confirmed in writing by the Company's authorised representative.

3 Price of the Goods

3.1 The price of the Goods shall be the Company's quoted price or, where no price has been quoted (or a quoted price is no longer valid), the price listed in the Company's published price list current at the date of delivery of the Goods

3.2 The Company reserves the right, by giving notice to the Buyer at any time before delivery, to increase the price of the Goods to reflect any increase in the cost to the Company which is due to any factor beyond the control of the Company.

3.3 The price is exclusive of delivery, handling, administration and packaging charges and any applicable value added tax, which the Buyer shall be additionally liable to pay to the Company.

4 Delivery

4.1 Unless otherwise provided in the Contract, delivery of the Goods shall be made by the Company at the Buyer's premises

4.2 The Contract price does not include the cost of off-loading and assembly, which shall be arranged by the Buyer and performed at its own expense and risk unless otherwise agreed in writing.

4.3 Any dates quoted for delivery of the Goods are approximate only and the Company shall not be liable for any delay in delivery of the Goods but shall use its reasonable endeavours to deliver on the quoted date. Time for delivery shall not be of the essence of the Contract

4.4 If the Buyer does not accept delivery when tendered by the Company the Buyer shall be liable for any storage, administration, carriage and re-delivery charges.

5 Risk and Property

5.1 Risk of damage to or loss of the Goods shall pass to the Buyer:

5.1.1 in the case of Goods to be delivered at the Company's premises, at the time when the Company notifies the Buyer that the Goods are available for collection; or

5.1.2 in the case of Goods to be delivered other than at the Company's premises, at the time of delivery or, if the Buyer wrongfully fails to take delivery of the Goods, the time when the Company has tendered delivery of the Goods

5.2 Notwithstanding delivery and the passing of risk in the Goods, or any other provision of these Terms and Conditions, the property in the Goods shall not pass to the Buyer until the Company has received in cash or cleared funds payment in full of the price of the Goods and all other goods agreed to be sold by the Company to the Buyer for which payment is then due.

5.3 Until such time as the property in the Goods passes to the Buyer, the Buyer shall hold the Goods as the Company's fiduciary agent and bailee, and shall keep the Goods separate from those of the Buyer and third parties and properly stored, protected and insured and identified as the Company's property, but shall be entitled to resell or use the Goods in the ordinary course of its business providing that the proceeds of such sale shall be held upon trust for the Company. Where the Buyer does sell or pledge the Goods it shall hold the proceeds of sale or charging as fiduciary agent of the Company and forward the same to the Company upon a written request from the Company.

5.4 Until such time as the property in the Goods passes to the Buyer (and provided the Goods are still in existence and have not been resold), the Company shall be entitled at any time to require the Buyer to deliver up the Goods to the Company and, if the Buyer fails to do so forthwith, to enter upon any premises of the Buyer or any third party where the Goods are stored and repossess the Goods.

5.5 The Buyer shall not be entitled to pledge or in any way charge by way of security for any indebtedness any of the Goods which remain the property of the Company, but if the Buyer does so all moneys owing by the Buyer to the Company shall (without prejudice to any other right or remedy of the Company) forthwith become due and payable.

6 Limitation of Liability

6.1 All warranties, conditions or other terms imposed by statute or common law are excluded to the fullest extent permitted by law.

6.2 Any claim by the Buyer which is based on any defect in the quality or condition of the Goods or their failure to correspond with specification shall (whether or not delivery is refused by the Buyer) be notified to the Company within 7 days from the date of delivery or (where the defect or failure was not apparent on reasonable inspection) within 2 months after delivery of the Goods. If delivery is not refused, and the Buyer does not notify the Company accordingly, the Buyer shall not be entitled to reject the Goods and the Company shall have no liability for such defect or failure, and the Buyer shall be bound to pay the price as if the Goods had been delivered in accordance with the Contract.

6.3 Where any valid claim in respect of any of the Goods which is based on any defect in the quality or condition of the Goods or their failure to meet Company specification is notified to the Company in accordance with these Terms and Conditions, the Company shall be entitled to replace the Goods (or the part in question) free of charge or, at the Company's sole discretion, refund to the Buyer the price of the Goods (or a proportionate part of the price), but the Company shall have no further liability to the Buyer.

6.4 Except in respect of death or personal injury caused by the Company's negligence, the Company shall not be liable to the Buyer by reason of any representation (unless fraudulent), or any implied warranty, condition or other term, or any duty at common law, or under the express terms of the Contract, for any indirect, special or consequential loss or damage (whether for loss of profit or otherwise), costs, expenses or other claims for compensation whatsoever (whether caused by the negligence of the Company, its employees or agents or otherwise) which arise out of or in connection with the supply of the Goods or their use or resale by the Buyer, and the entire liability of the Company under or in connection with the Contract shall not exceed the price of the Goods, except as expressly provided in these Terms and Conditions.

6.5 The Company shall have no liability whatsoever where the Goods have not been maintained or used in accordance with their recommended specifications

and maintenance schedules as updated from time to time by the Company.

6.6 The Seller shall not be liable for any delay or failure attributable to any cause beyond the Seller's reasonable control including without limitation fire, strike, act of god and embargo.

7 Terms of Payment

7.1 The Buyer shall pay the price of the Goods in pounds sterling (without any deduction) within 30 days of the date of the Company's invoice, and the time of payment of the price shall be of the essence of the Contract.

7.2 If the Buyer fails to make any payment on the due date then, without prejudice to any other right or remedy available to the Company, the Company shall be entitled to:

7.2.1 cancel the Contract or suspend any further deliveries to the Buyer;

7.2.2 appropriate any payment made by the Buyer to such of the Goods (or the goods supplied under any other contract between the Buyer and the Company) as the Company may think fit; and

7.2.3 charge the Buyer interest (both before and after any judgement) on the amount unpaid, at the rate of 3 per cent per annum above Barclays Bank Plc base rate from time to time, until payment in full is made (a part of a month being treated as a full month for the purpose of calculating interest).

7.2.4 set of any monies due to the Buyer on any account whatsoever against monies due to the Buyer from the Company

7.3 Where the Company agrees to invoice in a currency other than sterling the Buyer shall be liable for all currency conversion brokerage or other charges and ensure that the sum payable to the Company when converted to pounds sterling is not less than the amount payable in pounds sterling on the date of quotation

8 Insolvency of Buyer

8.1 This clause applies if:

8.1.1 the Buyer makes any voluntary arrangement with its creditors or (being an individual or firm) becomes bankrupt or (being a company) becomes subject to an administration order or goes into liquidation (otherwise than for the purposes of amalgamation or reconstruction); or

8.1.2 an encumbrancer takes possession, or a receiver is appointed, of any of the property or assets of the Buyer; or

8.1.3 the Buyer ceases, or threatens to cease, to carry on business; or

8.1.4 there is a change in control of the ownership of the Company or its shares

8.1.5 the Company reasonably apprehends that any of the events mentioned above is about to occur in relation to the Buyer and notifies the Buyer accordingly.

8.2 If this clause applies then, without prejudice to any other right or remedy available to the Company, the Company shall be entitled to cancel the Contract or suspend any further deliveries under the Contract without any liability to the Buyer, and if the Goods have been delivered but not paid for, the price shall become immediately due and payable notwithstanding any previous agreement or arrangement to the contrary.

9 General

9.1 No waiver by the Company of any breach of the contract by the Buyer shall be considered as a waiver of any subsequent breach of the same or any other provision.

9.2 This Contract shall be governed by the laws of England, and the Buyer agrees to submit to the non-exclusive jurisdiction of the English courts.

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FREE Technical Advice:

We offer a free technical advice service - if you are unsure of the correct ball unit to use, ask us. We do not accept liability for the choice of unit if we are not consulted.

Alwayse Engineering Limited

Alwayse Engineering was established in 1939 when a small engineering company, Sheridan Tools, was purchased. Later its name was changed to "Alwayse" meaning that the units are multi-directional and move in all directions or ways - hence "Alwayse". The distinctive spelling adds to the company's individuality.

The present chairman, Mr L.W. Pinnick, has overseen its growth and development since the late 1940s.

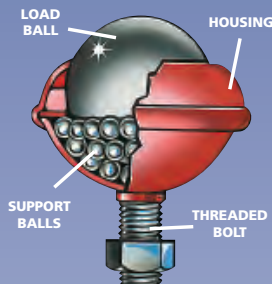
Alwayse Ball Transfer Units are used as part of a conveyor or material handling system to enable loads both light and heavy, to be moved or transferred

in any direction. As the originators of the Ball Transfer Unit over 70 years ago, we have become an important part of the material handling industry.

Whether ball units are used for loading/feeding machines, moving goods/materials, as an alternative to a castor, or in a form of linear operation, they have become an integral part of industry and provide an important and essential service.

Alwayse Ball Units are used in all industries throughout the World and over 2,000,000 are sold every year.

DESIGN & CONSTRUCTION

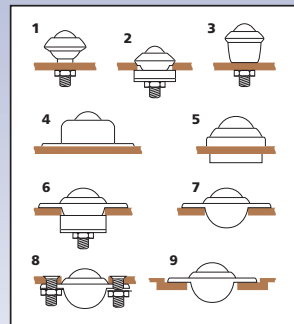


ALWAYSSE ball units are a multi-directional, material handling system, manufactured from high quality materials in our Birmingham factory.

They consist of a large load-bearing ball which sits upon many small balls encapsulated in a hemi-spherical cup. The housing can contain a seal to clean the load ball as it rotates. The design greatly reduces friction and allows heavy loads to be moved with a minimum of effort.

Our ball units may be used at any orientation but deviation from the vertical may result in a reduction in the stated load ratings quoted in this catalogue.

FIXING METHODS



There are various methods of fixing ALWAYSSE ball units. A wide range of fixings enable them to be used with various different materials.

Fixing clips are available for most designs - see pages 30 & 31.

MATERIALS

Type	Load Ball	Support Balls	Housing
13	Carbon Steel 60-66RC	Carbon Steel 60-66RC	Carbon Steel Bright Zinc Plated
14	Nylon 66	Stainless Steel AISI 420 52-58HRC	Carbon Steel Bright Zinc Plated
15	Stainless Steel AISI 420 52-58RC	Stainless Steel AISI 420 52-58RC	Stainless Steel AISI 304 SelfColour
16	Stainless Steel AISI420 52-58HRC	Stainless Steel AISI 420 52-58RC	Carbon Steel Bright Zinc Plated

ALWAYSSE ball units are available in various materials. The material required for your ball units should be quoted when ordering - see page 3 for ordering details.

Lubrication

Each unit is pre-lubricated during manufacture and normally does not require further attention. In certain instances we will advise on lubrication. Greasing or oil points can be incorporated in some units.

Cleaning

A suitable cleaning or release fluid should be used in dirty conditions. For washing, a suitable detergent such as paraffin, for freeing, a suitable agent such as AC90 + Ozzy Juice Sw-3i please consult technical support.

Most designs have dirt exit holes incorporated in the bearing cup, or these can be added on request.

Shock Loads

When calculating loads, consider the possibility of impact caused by incorrect levels. Spring loaded units will reduce wear and tear if there are regular shock impacts. Shock loading can also be reduced by fitting compressible pads.

Ball units can also be made retractable by other means, such as pneumatic or hydraulic cylinders, cams or levers. They can be programmed to operate in sequence. All stated loads in the catalogue are dynamic loads.

Self Levelling

Can be achieved by fitting rubber pads. This reduces excessive loads on just a few units. Details on request.

Temperature Range

Min. -30°C to max. +70°C continuous, or +100°C intermittent. Special seals may need to be fitted to suit extreme conditions. In clean conditions and without seals +150°C to +200°C are possible, using Type 15 units at reduced loads.

Conveying Speed

Maximum recommended conveying speed is 1 metre per second for steel load balls and 0.25 metres per second for nylon.

Seals

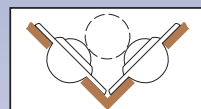
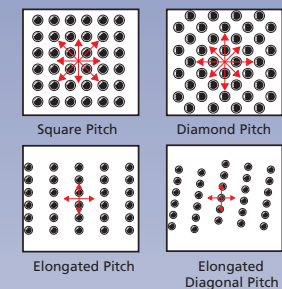
These help resist ingress of dirt and swarf. They can be omitted on request. Woollen felt seals fitted as standard.

Breakaway Coefficient of Friction

The average breakaway friction for new ball units containing steel balls in a good working environment is 0.01 to 0.015 (1% to 1.5% of the load) and 0.02 to 0.025 (2% to 2.5%) for units with felt seals.

BALL TABLES

Red arrows indicate ideal movement.



Vee location

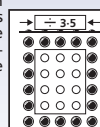
QUANTITY CALCULATION

The weight of the article to be conveyed should be divided by 3. The result will give the maximum load any single ball will bear.

On any accurately levelled or flexible surface, a number greater than 3 may be used. The surface hardness and condition of the article should be considered to avoid ball unit penetration.

Spacing

The pitch is calculated by dividing the narrowest dimension by 3.5, i.e. if the narrowest dimension is 350mm divided by 3.5=100mm pitch between ball centres. This ensures 3 ball units are always beneath the narrowest dimension of the load at any one time.



APPLICATIONS



There are many possible applications for **ALWAYSSE** ball transfer units, where loads need to be moved smoothly, precisely and with minimum effort in any direction.

Some typical applications include cargo and baggage handling

(shown above), assembly lines, as a castor, machine loading, sliding-door systems, machine tables, etc.

Always not only advise and supply ball units, but also regularly design and manufacture complete assemblies ready for customers to use.

QUALITY

ALWAYSSE Engineering Limited are quality registered to ISO 9001.



We have a policy of continually improving the product range with new innovative and creative ideas using the latest CNC machinery and production/inspection methods.

Our specially designed ball unit test machines, routinely used to test production units, together with many years of research and experience, ensures world-class performance.

ORDERING PROCEDURE

Always provide a completely free technical advice service. We can help you select not only the most suitable ball unit for your application, we can advise on every aspect of layout, design, manufacture and maintenance of your installation.

We strongly recommend you take advantage of this service.

To Order

1) It is generally only necessary to quote the Product Reference Number (i.e. 1009, 1019 or 530-0) and the Material Type (i.e. Type 13, 14, 15 or 16).

2) There are however instances where more information is required.

a) Where applicable the length of thread (dimension N) and the spring washer diameter (dimension W), see pages 6-7 & 8-9, also need to be indicated, e.g. 3001-13-25 and 3004-13-16.9.

b) Also, if applicable, quote the special specification code. For example,

NO (no oil)
NS (no seal)
NB (nylon ball)
PB (phenolic load ball)
DE (dirt exit hole)
SI (solid steel inner ring).

Black phenolic balls are available in Ø19mm and Ø25.4mm load balls only.

QUICK GUIDE TO THE PRODUCT RANGE

Pages 4,5

Flange Fixing Units

Pages 6,7

Thread Fixing Units

Pages 8,9

Tube Fixing-Clamp Fixing-Miscellaneous Units

Pages 10,11

Base Fixing Units

Pages 12,13

Mini Ball Transfer Units, & "FLOAT-ON"

Pages 14,15

Special Ball Units & Fixing Sockets

Pages 16,17

Euro Units

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Heavy Duty Units, Series 800

Pages 20,21

Hi-Tech, Double Seal, Units

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Hevi-Load Units 0, 1, 2 & 3

Pages 24,25

Hevi-Load Units 5, 6 Die Lifters

Pages 26,27

Spring Loaded Units

Pages 28,29

TUFF Series Heavy Duty Units

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Fixing Clips

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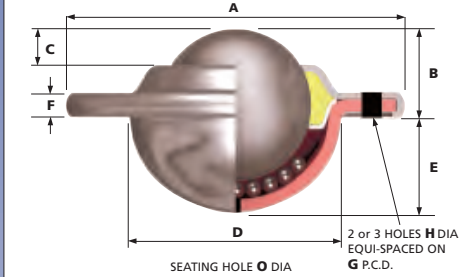
Tee Blocks, Die Tables



FLANGE FIXING UNITS

0531 - 4001 (inc. 2002 XTRA-TUF)

Features: General purpose. Low profile, dirt exit hole. No seals in 3016 and 3025 units. 2002 XTRA-TUF has heavy duty construction, designed for arduous and dirty conditions. Flushing hole for cleaning, extra large dirt exit hole.

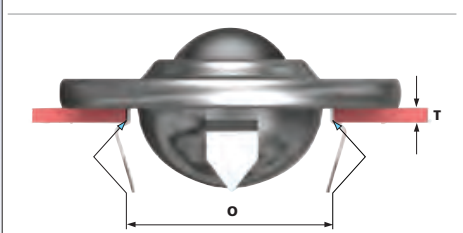
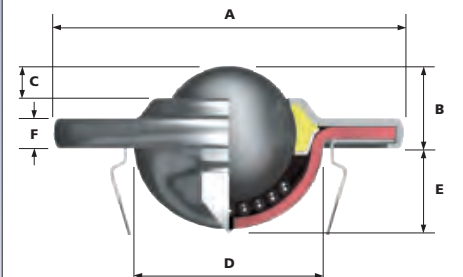


Ball unit Ref. No's 1022 and 1035 with solid steel inner ring (SI) option illustrated with no seal for improved protection from shock loading.



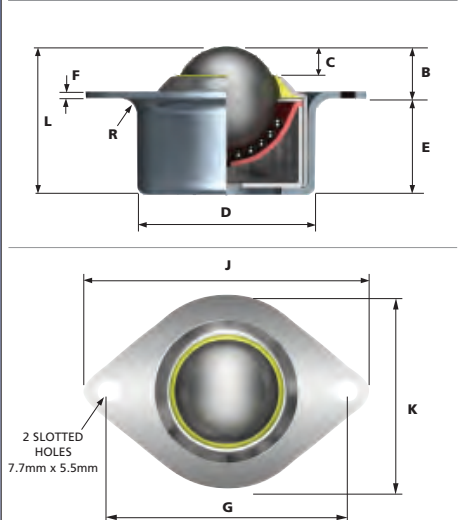
1010 / 1030

Features: Press ball unit into hole to fix, prise out to remove. Units can either be fixed or replaced quickly. Low profile, dirt exit hole.



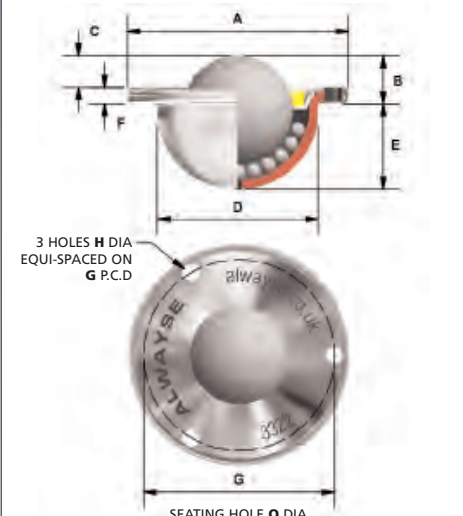
1502

Features: Low profile, high load capacity. Plastic knife edge seal on load ball. Dirt exit hole. Requires 5mm radius on fixing hole. See 'R'.



3322

Features: Very low profile with large load ball exposure, high load rating, 3 hole fixing, woolen felt seal and single dirt exit hole.



REF No.	FIXING HOLES	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)										MAXIMUM DYNAMIC LOADING (kg)							
				A	B	C	D	E	F	G	H	O		TYPE 13	TYPE 14	TYPE 15	TYPE 16				
				Max Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Under Flange to Base	Flange Thickness	P.C.D. or Centres of Fixing Holes	Hole Diameter of Fixing Holes	Seating Hole Diameter		Carbon Steel Bearings, Zinc Plated Pressings	Nylon Load Bearing, Zinc Plated Pressings	Stainless Steel Bearings and Pressings	Stainless Steel Bearings, Zinc Plated Pressings				
0531	2	12.7	0.022	31	7	2.5	19.2 ±0.2	8.2	2.6	24 ±0.2	2.8	20		8	4	4	2	8	4	8	4
3016	2	15.8	0.045	41.3	10.2	4	22.2 ±0.2	8.3	3.2	30 ±0.2	3.5	23		12	6	8	4	12	6	12	6
3000	2																				
3006	3	19	0.087	61	10	3.2	29.1 ±0.2	12	3.2	44.5 ±0.2	5.1	30		25	10	20	10	25	10	25	10
3025	2	25.4	0.135	14.6	56	7.3	34.7 ±0.2	14.6	4	45.5 ±0.2	4.5	35.5									
1000	2	25.4	0.175	14.2	73	6.3	37.2 ±0.2	15.8	3.5	55.6 ±0.2		38.1		55	25	25	10	55	25	55	25
1008	3										5.1										
1022	3	31.7	0.265	73.7	16.2	8	45.5 ±0.2	19.9	4.2	58.7 ±0.2		46.5									
1035	2													125	55	25	10	125	55	125	55
32742	2	31.7	0.270	73.7	16.2	8	45.5 ±0.2	19.9	4.2	58.7 ±0.2	5.1	46.5									
32743	3																				
2000	2	39.7	0.515	89	21.4	8.7	55.6 ±0.2	24.6	6	70 ±0.2	7	56.5		140	60	N/A	N/A	140	60	140	60
2011	3																				
2002	3	39.7	0.635	94.6	21.2	6.9	62 ±0.2	27.3	6.3	76.2 ±0.2	7	63.3		225	100	N/A	N/A	225	100	225	100
4001	3	50.8	1.065	120.7	28.3	14.3	75.3 ±0.2	30.2	6.3	92 ±0.2	8	76.5		340	100	N/A	N/A	250	100	340	100

The 1022, 1035, 32742 and 32743 ball units have 7 dirt exit holes for removal of dirt and debris. 32742 and 32743 have no seal.

DIMENSIONS (mm)												
Working Height of Ball	B	C	D	E	F	G	H	J	K	L	R	
Ball Exposure above Outer Ring												
Body Diameter												
Under Flange to Base												
Flange Thickness												
P.C.D. or Centres of Fixing Holes												
Slotted Hole Size of Fixing Holes												
Major Flange Size of Fixing Holes												
Minor Flange Size												
Overall Height												
Radius Under Flange												

1502	2	25.4	0.196	12	6	42 ±0.2	24.5	1.7	60.3 ±0.2	5.5	69	51	36.5	5	100	50	25	10	100	50	100	50
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DIMENSIONS (mm)																					
A	B	C	D	E	F	G	H	O	T												
Max Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Under Flange to Base	Flange Thickness	P.C.D. or Centres of Fixing Holes	Hole Diameter of Fixing Holes	Seating Hole Diameter	Table Top Thickness												
1010	-	25.4	0.195	73	15.4	6.3	36.8 ±0.2	15	4.8	N/A	N/A	50	5	55	25	25	10	55	25	55	25
1030	-	31.7	0.275	73.7	17	8	44.6 ±0.2	19.5	5	N/A	N/A	50	5	125	55	25	10	125	55	125	55

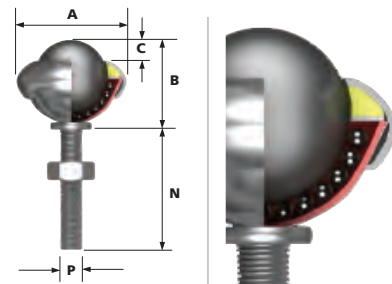
DIMENSIONS (mm)																				
A	B	C	D	E	F	G	H	O												
Max Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Under Flange to Base	Flange Thickness	P.C.D. or Centres of Fixing Holes	Hole Diameter of Fixing Holes	Seating Hole Diameter												
3322	3	22.2	0.1	45	9.8	6.2	33	17.9	3.6	39	3.5	34	120	60	20	10	80	40	120	60

To order, specify REF N° and TYPE, i.e. 3016-13. General Tolerance unless stated ±0.3mm

THREAD FIXING UNITS

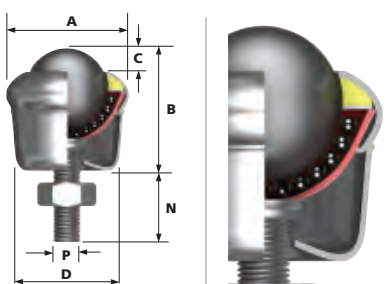
3001

Features: Adjustable height, drilled hole fixing.
Optional extras: Additional nuts, alternative thread sizes, dirt exit hole.



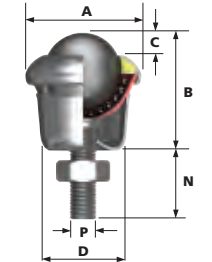
3002

Features: Large support area, greater stability, drilled hole fixing.
Optional extras: Alternative thread sizes, dirt exit hole.



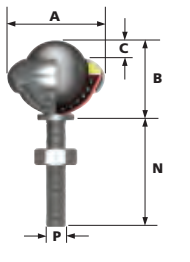
1003

Features: Large support area, greater stability, drilled hole fixing.
Optional extras: Alternative thread sizes, dirt exit hole.



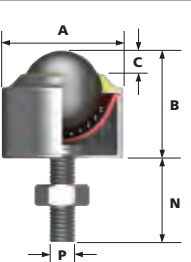
1009

Features: Adjustable height, drilled hole fixing.
Optional extras: Additional nuts, alternative thread sizes, dirt exit hole.



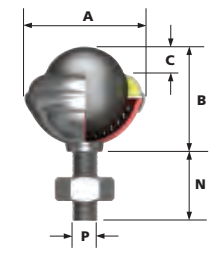
1501

Features: Large support area, greater stability, drilled hole fixing. High load capacity, plastic knife edge seal on main ball.
Optional extras: Alternative thread sizes, dirt exit hole.



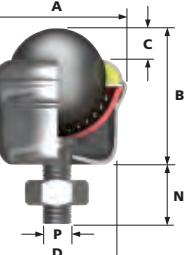
2001

Features: Adjustable height, drilled hole fixing.
Optional extras: Additional nuts, alternative thread sizes, dirt exit hole.



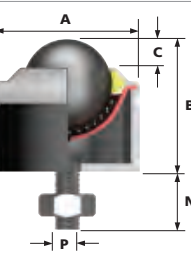
2005

Features: Large support area, greater stability, drilled hole fixing.
Optional extras: Alternative thread sizes, dirt exit hole.



4004

Features: Adjustable height, drilled hole fixing. High load capacity, dirt exit hole.
Optional extras: Grease points can be fitted. Alternative thread sizes.
Finish: Body black for types 13 & 16



REF No.	BALL SIZE (mm)	MAX TORQUE on NUT (Nm)	WEIGHT (KGS)	DIMENSIONS (mm)						MAXIMUM DYNAMIC LOADING (kg)											
				A	B	C	D	N	P	TYPE 13		TYPE 14		TYPE 15		TYPE 16					
				Max Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Length of Thread	Thread Sizes	Carbon Steel Bearings, Zinc Plated Pressings	LOAD UP	LOAD DOWN	Nylon Load Bearing, Zinc Plated Pressings	LOAD UP	LOAD DOWN	Stainless Steel Bearings and Pressings	LOAD UP	LOAD DOWN	Stainless Steel Bearings, Zinc Plated Pressings	LOAD UP	LOAD DOWN
3001	19	15	0.060	32.1	24.6	4.7	-	25 30 35 40 50	M8	25	10	20	10	25	10	25	10				
3002			0.080		30.2		25.4	20 25 30 35 45													

Ball units are also available with black phenolic load balls (see page 3 suffix PB) of Ø19mm and Ø25.4mm. Ball transfer units assembled with a black phenolic load ball can be used for glass handling applications.

1003			0.160	39.7	39.7	6.3	25.4	18 23 28 33 43	M8	55	25	25	10	55	25	55	25
1009	25.4	15	0.140		32.5		-	25 30 35 40 50		100	50	25	5	100	50	100	50
1501			0.180	39.5	35.8	6.1	-	18 23 28									

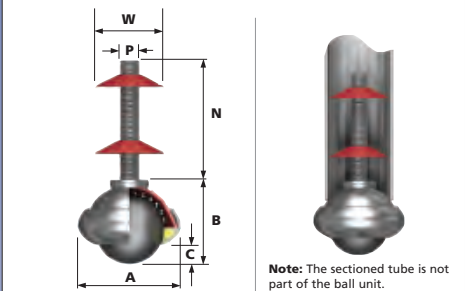
*Pattern 4004 can be supplied with other screw sizes or plain shanks.

REF No.	BALL SIZE (mm)	MAX TORQUE on NUT (Nm)	WEIGHT (KGS)	DIMENSIONS (mm)							MAXIMUM DYNAMIC LOADING (kg)									
				A	B	C	D	N	P*	S	TYPE 13	TYPE 14	TYPE 15	TYPE 16						
				Max Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Length of Thread	Thread sizes	Base to top of body	Carbon Steel Bearings, Zinc Plated Pressings	Nylon Load Bearings, Zinc Plated Pressings	Stainless Steel Bearings and Pressings	Stainless Steel Bearings, Zinc Plated Pressings						
	</																			

To order, specify REF N°, TYPE and LENGTH OF THREAD, i.e. 3001-13-25. General Tolerance unless stated ±0.3mm

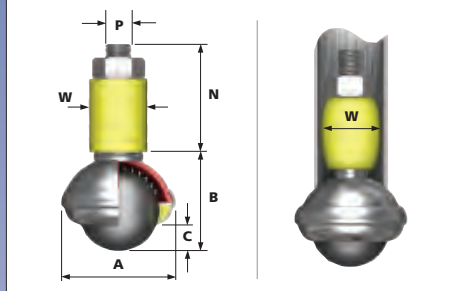
3004 • 1002 TUBE FIXING

Features: Tube fixing is achieved by pushing the spring washer into a suitable size tube and turning to lock. 3 sizes available - see dimension 'W'. Suitable for use as a castor.



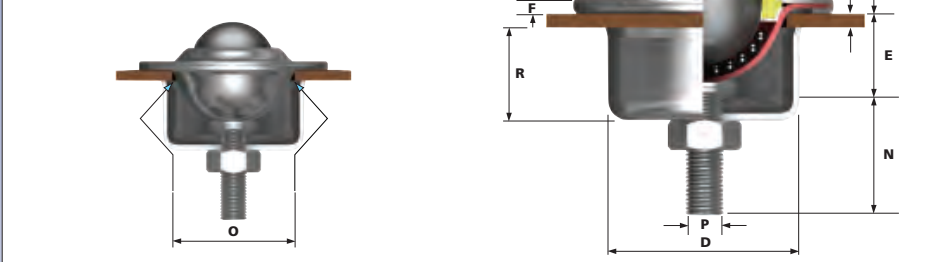
2004 TUBE FIXING

Features: Tube fixing is achieved by pushing the bush into the tube. Rotating the unit expands the rubber bush for an interference fit. Excellent as a castor.



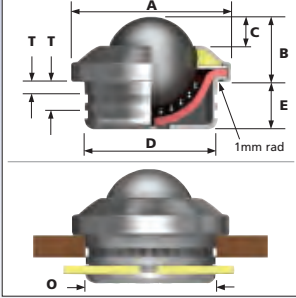
3007 • 1001 • 1021 CLAMP FIXING

Features: The 3007 and 1001 can be fixed to 1mm-10mm thick materials. 1mm-27mm thick materials for the 1021. The maximum tightening torque is 15Nm for the 3007 and 1001, 20Nm for the 1021. Optional extras: Dirt exit hole.



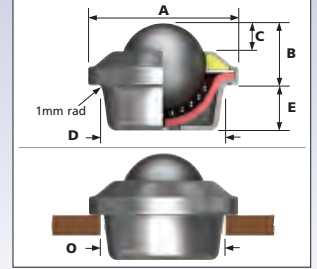
1004

Features: Supplied with circlip for loosely fixing to materials up to 6.4mm thick. Dirt exit hole.



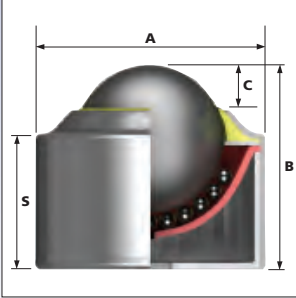
1007

Features: Small taper on body allows for interference fixing. Do not strike the ball, use a tube on the flange diameter when fixing. Approx size of taper is 35.8mm top and 35.4mm bottom. Dirt exit hole.



1500

Features: High load capacity. Improved plastic knife edge seal wipes debris off outside the ball. Dirt exit hole.



REF No.	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)						MAXIMUM DYNAMIC LOADING (kg)							
			A	B	C	N	P	W	TYPE 13	TYPE 14	TYPE 15	TYPE 16	LOAD UP	LOAD DOWN	LOAD UP	LOAD DOWN
			Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Length of Thread	Thread Size	Spring Washer Diameter	Carbon Steel Bearings, Zinc Plated Pressings	Nylon Load Bearing, Zinc Plated Pressings	Stainless Steel Bearings and Pressings	Stainless Steel Bearings, Zinc Plated Pressings				

3004	19	0.060	32.1	24.6	4.7	40	M6	16.9 20.2 23.5
1002	25.4	0.120	39.7	32.5	6.3			
2004	39.7	0.420	55.5	47.6	11.9			

25	10	20	10	25	10	25	10
55	25	25	10	55	25	55	25
140	60	N/A	N/A	140	60	140	60

To order, specify REF N°, TYPE and SPRING WASHER DIAMETER, i.e. 3004-13-16.9.

DIMENSIONS (mm)												
A	B	C	D	E	F	N	O	P	R	T		
Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Distance Under Flange to Base	Flange Thickness	Length of Thread	Fixing Hole Diameter	Thread Size	Body Depth	Table Top Thickness		

3007	19	0.160	61	10	3.2	14.5	3	30	M8	25	1	to 10
1001	25.4	0.260	73	14.2	6.3						55	25
1021	31.7	0.360	73.7	16.2	8						125	55

25	10	20	10	25	10	25	10
55	25	25	10	55	25	55	25
125	55	25	10	125	55	125	55

DIMENSIONS (mm)									
A	B	C	D	E	O	S	T		
Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Distance Under Flange to Base	Fixing Hole Diameter	Base to Top of Body	Table Top Thickness		

1004	25.4	0.140	45.2	18.4	7.9	34.9	12.7	36	-	3.2 6.4
1007	25.4					35.8	11.9	To suit	-	-
1500	25.4	0.160	39.5	35.8	6.1	-	-	To suit	22.8	-

55	25	25	10	55	25	55	25
55	25	25	10	55	25	55	25
100	50	25	10	100	50	100	50

To order, specify REF N° and TYPE, i.e. 3007-13.

General Tolerance unless stated ±0.3mm

BASE FIXING UNITS

3005

Features: Heavy duty fixing. High profile. Drill hole fixing.
Optional extras: Dirt exit hole.

1005

Features: Heavy duty fixing. High profile. Drill hole fixing.
Optional extras: Dirt exit hole.

1020

Features: Heavy duty fixing. High load capacity. High profile. Drill hole fixing.
Optional extras: Dirt exit hole.

2003

Features: Heavy duty fixing. High load capacity. High profile. Drill hole fixing.
Optional extras: Dirt exit hole.

4002

Features: Heavy duty fixing. High load capacity. High profile. Dirt exit hole standard. Drill hole fixing.
Optional extras: Grease points can be fitted.
Finish: Body Black for types 13 and 16.

1006, 1041, 1050

Features: High load capacity. High profile. Dirt exit hole standard. Drill hole fixing. The 1041 and 1050 ball units are similar in design to the 1006 ball unit. 1041 & 1050 are assembled without a seal

1503

Features: High load capacity. High profile. Dirt exit hole standard. Drill hole fixing. Plastic knife edge seal on main ball.

REF No.	BALL SIZE (mm)	FIXING HOLES	WEIGHT (KGS)	DIMENSIONS (mm)										MAXIMUM DYNAMIC LOADING (kg)									
				A	B	C	F	G	H	I	J	K	S	TYPE 13		TYPE 14		TYPE 15		TYPE 16			
				Max Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Base Thickness	Hole Centres (Length)	Hole Diameter of Fixing Holes	Hole Centres (Width)	Base Plate (Length)	Base Plate (Width)	Base to Top of Body	Carbon Steel Bearings, Zinc Plated Pressings	LOAD UP	LOAD DOWN	Nylon Load Bearing, Zinc Plated Pressings	LOAD UP	LOAD DOWN	Stainless Steel Bearings and Pressings	LOAD UP	LOAD DOWN	Stainless Steel Bearings, Zinc Plated Pressings
		No. of holes																					

3005	19	4	0.100	32.1	32.5	4.7	2.0	49.2 ±0.2	6.3 ±0.2	25.4 ±0.2	65	38	-	25	10	20	10	25	10	25	10	25	10
1005	25.4	4	0.160	39.7	41.3	6.3	2.0	49.2 ±0.2	6.3 ±0.2	25.4 ±0.2	65	38	-	55	25	25	10	55	25	55	25	55	25

1020	31.7	4	0.380	73	44.4	8	2.0	47.6 ±0.2	4.8 ±0.2	47.6 ±0.2	58.7	58.7	-	125	55	25	10	125	55	125	55
2003	39.7	4	0.480	55.5	57	11.9	2.0	47.6 ±0.2	4.8 ±0.2	58.7	58.7	-	-	140	60	N/A	N/A	140	60	140	60
4002	50.8	4	2.100	89	76	14.3	6.3	89 ±0.2	13.5 ±0.2	89 ±0.2	127	127	54	340	100	N/A	N/A	250	100	340	100

1041	15.8	2	0.042	27.5	20.0	4.0	0.9	40.0 ±0.2	5.2	-	50.0	35.0	-	20	10	10	5	20	10	20	10
1006	25.4	2	0.160	44.5	31.5	6.3	1.0	60.3 ±0.2	7.7 ±0.2	-	69.0	51.0	-	55	25	25	10	55	25	55	25
1050	25.4	2	0.145	42	31.0	7.5	1.0	60.3 ±0.2	7.7 ±0.2	-	69.0	51.0	-	30	10	20	10	30	10	30	10
1503	25.4	2	0.200	42	35.8	6.1	1.75	60.3 ±0.2	7.7 ±0.2	-	69.0	51.0	-	100	50	25	10	100	50	100	50

Note 1006 & 1050 unit supplied with Slotted fixing holes 7.7 mm x 5.5 mm on 58.1 pcd

General Tolerance unless stated ±0.3mm

MINI BALL TRANSFER UNITS

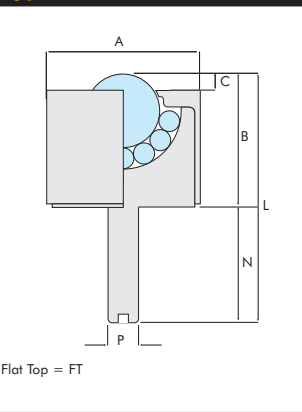
REF No	Ball Size (mm)	Weight (Kg)	A	B	C	L	N	P	Dynamic Load Up Rating (Kg)
11MI-05-13	4.8	0.01	13	9	1	24	15	M6	10
11MI-05-15		0.003	8	6		8.5	2.5	M2	5
11MI-05-17	6.4	0.02	17	11	2	26	15	M6	20
11MI-06-13		0.008	13	10.5		16.5	6	M3	10
11MI-06-15		0.03	18	14		32	18	M8	30
11MI-08-13	7.9	0.011	15	12.5	2	20.5	8	M4	15
11MI-08-15		0.06	23	20		40	20	M8	40
11MI-10-13	9.6	0.1	28	25	3.5	48	23	M8	50
11MI-10-15		0.05	24	20.5		32.5	12	M6	70
11MI-13-13	12.7	0.06	23	20	2	40	20	M8	40
11MI-13-15		0.1	28	25		48	23	M8	50
11MI-16-13	15.8	0.05	24	20.5	4	32.5	12	M6	70
11MI-16-15		0.06	23	20		40	20	M8	40
11MI-16-13-FT		0.06	23	20		40	20	M8	40
11MI-16-15-FT									

Applications

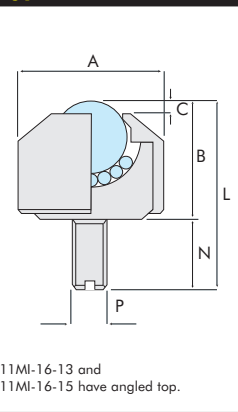
- Measuring Equipment
- Lightweight Coilholder
- Guides for small linear motion (eg photo copier slides)
- Transfer of material in clean rooms
- Miniature mechanisms
- All thread sizes for dimension "P" are metric coarse
- Carbon Steel type 13 mini ball transfer units are assembled with a small amount of oil to protect the carbon steel balls from oxidation.

11MI-16-13 & 11MI-16-15
Can be supplied as Flat-Topped "FT" or as angled top

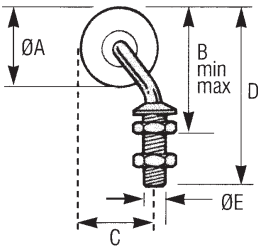
Type 13 & 15



Type 17



REF No	Balls	Body
11MI-05-17	Stainless Steel Load Ball	Aluminium Outer Cover
11MI-06-17	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-08-17	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-05-13	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-06-13	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-05-15	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-06-15	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-08-13	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-10-13	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-13-13	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-16-13	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-08-15	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-10-15	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-13-15	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-16-15	Carbon Steel Load Ball	Carbon Steel Outer Cover
11MI-16-13-FT	Stainless Steel Small Balls	Stainless Steel Screw Thread
11MI-16-15-FT	Carbon Steel Load Ball	Carbon Steel Outer Cover



FIXING: Drill a 14mm dia. hole, Fix socket and adjust height

A Ømm	B mm		C mm	D mm	Load Cap Kgs	E Ømm
	min	max				
35	55	77	38	88	15	135
50	73	95	58	106	20	135

Float-on

DESIGNED FOR USE IN WET AND DRY CONDITIONS

FLOAT-ON

DESIGNED FOR USE IN WET AND DRY CONDITIONS

Ensures smooth movement of materials with delicate or polished surfaces
Comes in Red Polyurethane & Black Rubber - 35mm & 50mm Diameter

COMPLETE ASSEMBLY

	BLACK RUBBER	RED POLYURETHANE
35MM BZP	ACP 35 R/H OR L/H	ACP 35 R/H OR L/H
35MM S/S	ACP 35 R/H OR L/H S/S	ACP 35 R/H OR L/H S/S
50MM BZP	ACP 50 R/H OR L/H	ACP 50 R/H OR L/H
50MM S/S	ACP 50 R/H OR L/H S/S	ACP 50 R/H OR L/H S/S

STEM, CIRCLIP, WASHER AND BALL ONLY

BZP	S/S
SCW 35 PB R/H OR L/H	SCW 35 PB R/H OR L/H S/S
SCW 50 PB R/H OR L/H	SCW 50 PB R/H OR L/H S/S
SCW 35 PB R/H OR L/H	SCW 35 PB R/H OR L/H S/S
SCW 50 PB R/H OR L/H	SCW 50 PB R/H OR L/H S/S

BALLS ONLY

	BLACK RUBBER	RED POLYURETHANE
35MM	ACP 35B	ACP 35B
50MM	ACP 50B	ACP 50B

BZP = Bright Zinc Plate, can be used in most applications
S/S = Stainless Steel Inox. for the most arduous of conditions

NOTE: When ordering stems/circlip/washers or complete castors please state whether you require R/H (right hand) or L/H (left hand).

FLOAT-ON castors are used for easy handling of other flat sheet materials
i.e. Granite, Wood, Plastic, Paper and Card etc.

Shore Hardness: RUBBER 80-85A (30D) POLY 90-95A (48D)



GLIDE-ALWAYSE UNITS & FIXING SOCKETS

This is a simple and inexpensive range of ball transfer units which have a large ball exposure. They are ideal for lighter duties and where there is a cost consideration.

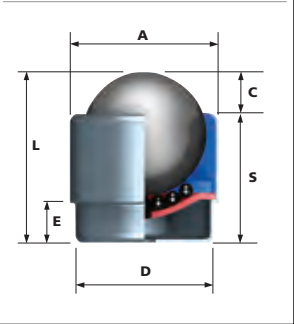
All units are fitted with a seal which simply and effectively removes debris by an internal plastic scraper.

The direction of rotation slightly moves the ball against the seal providing a highly effective cleaning action.

For normal applications steel bearings with zinc plated pressings and components are recommended. However, when used as a castor or in wet conditions stainless steel (Type 15) is recommended.

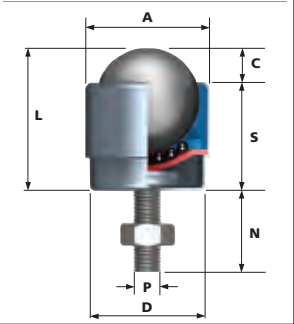
1700 PLUG FIXING

Features: Plain body, dirt exit hole standard.



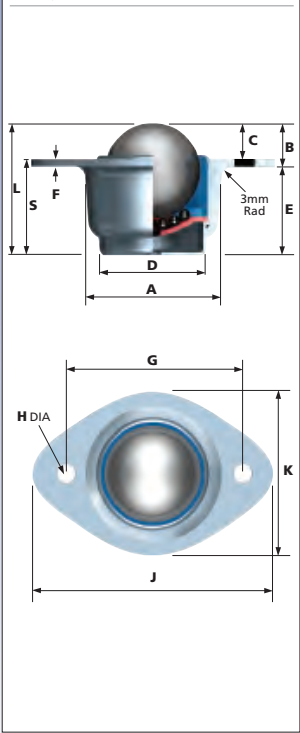
1701 BOLT FIXING

Features: Drill hole nut and bolt fixing. Maximum tightening torque is 15Nm.



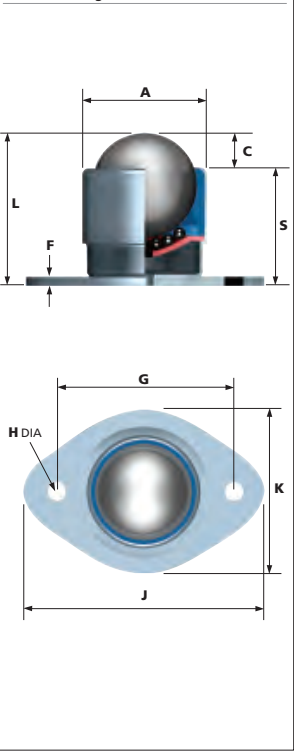
1702 FLANGE FIXING

Features: Low profile flange fixing, dirt exit hole standard. Seating hole diameter 39mm.



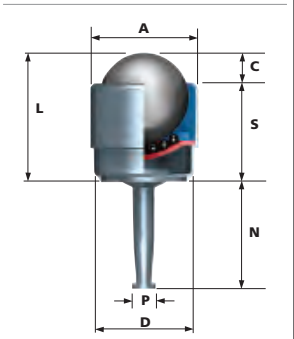
1703 PLATE FIXING

Features: High profile base plate fixing. Drill hole fixing. Dirt exit hole standard.



1709 GRIP NECK FIXING

Features: Plastic or steel socket fixing.



1705 GRIP NECK



FIXING SOCKET FOR GLIDE-ALWAYSE 1709

TOOTHED STEEL SOCKET WITH 19mm HEAD DIAMETER
For 9.5mm x 35mm drilled hole.

APPLICATION: WOOD

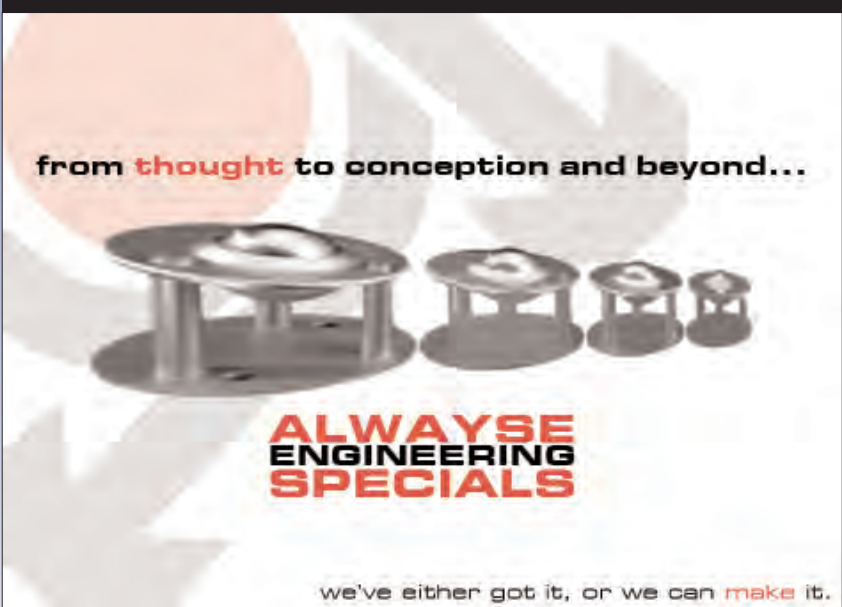
Other tube fixing sockets are available on request

REF No.	FIXING	BALL SIZE (mm)	WEIGHT (kg)	DIMENSIONS (mm)														MAXIMUM DYNAMIC LOADING (kg)			
				A	B	C	D	E	F	G	H	J	K	L	N	P	S	TYPE 13	TYPE 14	TYPE 15	TYPE 16
				Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Distance Under Flange to Base	Flange Thickness	P.C.D. or Centres of Fixing Holes	Hole Diameter of Fixing Holes	Major Flange Size	Minor Flange Size	Overall Height	Length of Thread	Thread Size or Pin Diameter	Base to Top of Body	Carbon Steel Bearings, Zinc Plated Pressings	Nylon Load Bearing, Zinc Plated Pressings	Stainless Steel Bearings & Pressings	Stainless Steel Bearings, Zinc Plated Pressings
1700	PLUG	25.4	0.10	-	-	-	-	7.8	-	-	-	-	-	-	-	-	-	50	20	50	50
1701	BOLT		0.12	30.5	-	-	26.6	-	-	-	-	-	-	33.5	18 23 28	M8	-				
1702	FLANGE		0.12	34.5	12.4	-	-	21.1	2	-	48 ±0.2	5.25	64	44	-	-	23.1				
1703	PLATE		0.12	30.5	-	-	-	-	2	-	-	-	-	35.7	-	-	26.9				
1709	GRIP NECK		0.12	30.5	-	-	26.6	-	-	-	-	-	-	34.7	34.7	7.7	25.9				

To order, specify REF N° and TYPE, i.e. 1700-13.

General Tolerance unless stated ±0.3mm

SPECIAL BALL UNITS



Alwaysse Engineering provide the largest range of Ball Transfer Units of any manufacturer, Ensuring an elegant solution is at hand to any uni-movement problem.
In the unlikely event of us having no suitable unit in our range we can design and manufacture a Ball Unit specific to your requirements.

PLEASE CONSULT OUR TECHNICAL DEPARTMENT ABOUT YOUR APPLICATION.

EURO UNITS

ALWAYS Euro Units have a main bearing cup of special toughened steel with a dirt exit hole and a woollen felt seal.

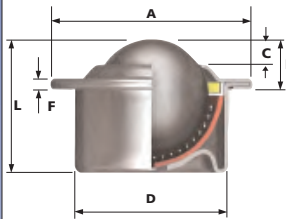
Min. -30°C to max. +70°C continuous, or +100°C intermittent. Special seals may need to be fitted to suit extreme conditions. In clean conditions and without seals +150°C to +200°C are possible, using Type 15 units at reduced loads.

MATERIAL SPEC:

Stainless Steel Pressings AISI 304
Stainless Steel Balls AISI 420
Nylon Balls NYLON 66

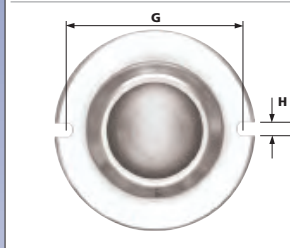
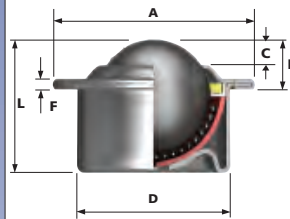
EURO 0

Features: Various fixing clips available, dimensionally compatible with the 800 series, see pages 18 & 19.



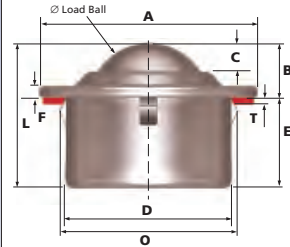
EURO 1

Features: Pop rivet or screw fixing.



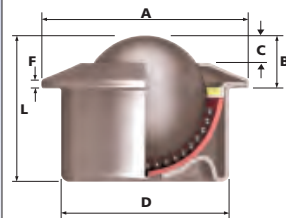
EURO 2

Features: Easy fitting with a 3 prong built-in clip from top face of ball table, compact and low profile, dimensionally identical to other Euro Unit ball units



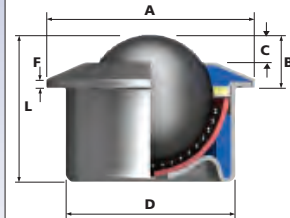
EURO 4

Features: Various fixing clips available, Reinforced coned outer ring. Dimensionally compatible with the 800 series, see pages 18 & 19.



EURO 6

Features: Various fixing clips available. Reinforced coned outer ring and support cup for improved protection against shock loading. Dimensionally compatible with the 800 series. Woollen felt seals are standard except for the 515-6 ball unit.



REF No.	BALL SIZE (mm)	DIMENSIONS (mm)								MAXIMUM DYNAMIC LOADING (kg)							
		A	B	C	D	F	G	H	L	TYPE 13	TYPE 14	TYPE 15	TYPE 16	TYPE 13	TYPE 14	TYPE 15	TYPE 16
		Maximum Diameter	Working Height of Ball	Ball Exposure (mm)	Body Diameter	Flange Thickness	P.C.D. or Centres of Fixing Slots	Hole Diameter of Fixing Slots	Overall Height	Carbon Steel Bearings, Zinc Plated Pressings	Nylon Load Bearing, Zinc Plated Pressings	Stainless Steel Bearings and Pressings	Stainless Steel Bearings, Zinc Plated Pressings	WEIGHT (KGS)	CAPACITY (kg)	WEIGHT (KGS)	CAPACITY (kg)
515-0							-	-		0.043	60	0.028	10	0.043	38	0.043	60
515-1	15.8	31	9.5 ±0.2	3.2	24 ±0.065	2.8	29 ±0.2	3.5	21	0.043	60	0.028	10	0.043	38	0.043	60
515-4							-	-		0.043	60	0.028	10	0.043	38	0.043	60
515-6							-	-		0.054	60	0.039	10	0.054	38	0.054	60
522-0							-	-		0.132	160	0.096	20	0.132	100	0.132	160
522-1	22.2	45	9.8 ±0.2	4.3	36 ±0.08	2.8	42 ±0.2	3.5	30	0.132	160	0.096	20	0.132	100	0.132	160
522-4							-	-		0.132	160	0.096	20	0.132	100	0.132	160
522-6							-	-		0.165	160	0.130	20	0.165	100	0.165	160
530-0							-	-		0.278	300	0.182	25	0.278	200	0.278	300
530-1	30	55	13.8 ±0.3	5.5	45 ±0.08	4	51 ±0.2	3.5	37	0.278	300	0.182	25	0.278	200	0.278	300
530-4							-	-		0.278	300	0.182	25	0.278	200	0.278	300
530-6							-	-		0.335	300	0.238	25	0.335	200	0.335	300
545-0							-	-		0.725	610	-	-	0.725	250	0.725	610
545-1	44.5	75	19 ±0.4	9	62 ±0.095	4	69 ±0.2	4.3	53.5	0.725	610	-	-	0.725	250	0.725	610
545-4							-	-		0.725	610	-	-	0.725	250	0.725	610
545-6							-	-		0.887	610	-	-	0.887	250	0.887	610

REF No.	LOAD BALL SIZE (mm)	DIMENSIONS (mm)									MAXIMUM DYNAMIC LOADING (kg)							
		A	B	C	D	E	F	L	O	T	TYPE 13		TYPE 14		TYPE 15		TYPE 16	
		Maximum Diameter (mm)	Working Height of Ball (mm)	Ball Exposure (mm)	Body Diameter (mm)	Distance from Flange to Base (mm)	Flange Thickness (mm)	Seating Hole Diameter (mm)	Overall Length (mm)	Table Top Thickness (mm)	Carbon Steel Bearings, Zinc Plated Pressings	Capacity (kg)	Nylon Load Bearing, Zinc Plated Pressings	Capacity (kg)	Stainless Steel Bearings and Pressings	Capacity (kg)	Stainless Steel Bearings, Zinc Plated Pressings	Capacity (kg)
515-2	15.8	31	9.5 ±0.2	3.2	24 ±0.1	11.5	2.8	21	25.0 25.5	2	0.043	60	0.028	10	0.043	38	0.043	60
522-2	22.2	45	9.8 ±0.2	4.3	36 ±0.1	20.2	2.8	30	37.0 37.5	3	0.132	160	0.096	20	0.132	100	0.132	160
530-2	30	55	13.8 ±0.2	5.5	45 ±0.1	23.2	4	37	46.0 46.5	6	0.278	300	0.182	25	0.278	200	0.278	300
545-2	44.5	75	19 ±0.2	9	62 ±0.1	34.5	4	53.5	63.0 63.5	7	0.725	610	-	-	0.725	250	0.725	610

To order, specify REF N° and TYPE, i.e 515-0-13.

For load down use as a castor, reduce dynamic load rating by 50%.

CL14 FIXING CLIPS (Please see pages 30 and 31 for CL14 fixing clip dimensions)

REF No.	SUITABLE FOR UNITS	FIXING HOLE SIZES (mm)
CL14-515	515-0, 515-4, 515-6	24 +1.0 +1.5
CL14-522	522-0, 522-4, 522-6	36 +1.0 +1.5
CL14-530	530-0, 530-4, 530-6	45 +1.0 +1.5
CL14-545	545-0, 545-4, 545-6	62 +1.0 +1.5

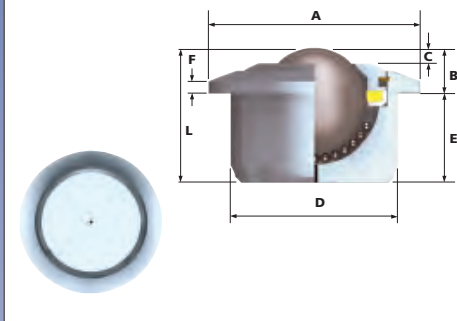
To order, specify REF N°, i.e CL14-515.

General Tolerance unless stated ±0.3mm

HEAVY-DUTY UNITS, SERIES 800

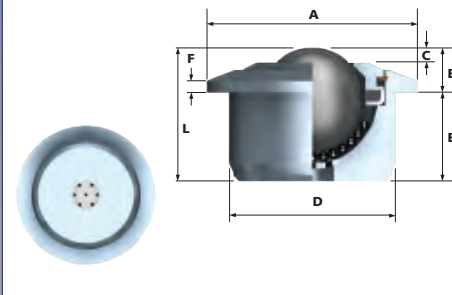
HEAVY DUTY 800

Features: High load capacity, low profile, robust construction.



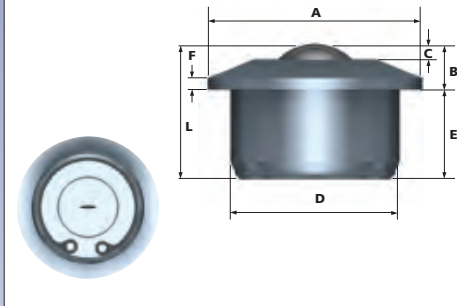
HEAVY DUTY 805

Features: High load capacity, low profile, robust construction. Multi-hole drain plug provides an extra 600% debris hole area to assist in cleaning.



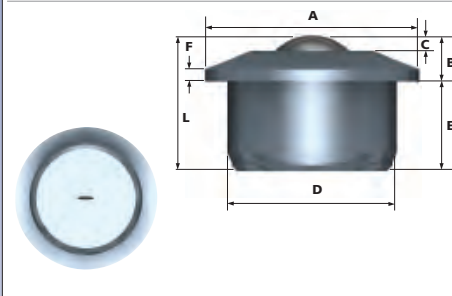
HEAVY DUTY 806

Features: High load capacity, low profile, can be disassembled. Slotted dirt exit hole allows large debris particles to pass through.



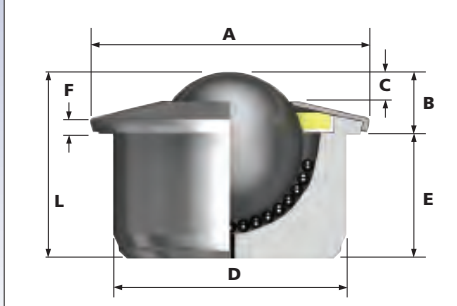
HEAVY DUTY 807, 808

Features: High load capacity, low profile. Slotted dirt exit hole allows large debris particles to pass through. The 808-30 has a polymer scraper seal fitted to resist ingress of dirt.



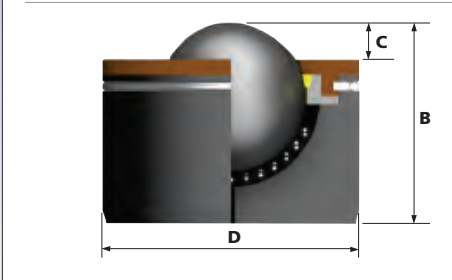
HEAVY DUTY 810

Features: High load capacity, low profile, coned outer ring. The 810-12 does not have a flange.



HEAVY DUTY 820

Features: High load capacity, solid body and robust outer ring for greater durability. Can be dismantled for cleaning. Fixing hole options available on request. Finish Body chemical black for types 13 and 16.



Always Series 800 are solid body steel ball units.

They incorporate a seal and dirt exit hole for maximum efficiency and smooth running.

Our CNC production plant can produce special designs to individual customers requirements.

Easy fixing clips are available, ref no. CL14, for quick and effective fixing, see pages 30 and 31. When used the working height of the ball unit dimension 'B' is increased by 0.3mm.

800 Series Type 15, Stainless Steel

In general ball unit sizes from Ø15.8mm to Ø30mm will have unhardened components typically 303/304 stainless steel.

Ball units with Ø44.5mm, Ø57.1mm, Ø76.2mm and Ø88.9mm balls have hardened bodies. In general balls are hardened 420 Stainless Steel.

805 Heavy Duty Ball Units

Similar to 800 series units, the 805 ball units incorporate a stainless steel multi-hole drain plug for improved cleaning and debris removal, stainless bearings for corrosion resistance, and no seal for easy cleaning and reduced friction.

The 800, 805, 806, 807, 808 and 810 range of ball units are dimensionally compatible with our Euro Unit range of ball transfer units, see pages 16 and 17.

REF No.	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)							MAXIMUM DYNAMIC LOADING (kg)		
			A Maximum Diameter	B Working Height of Ball	C Ball Exposure above outer ring	D Body Diameter	E Distance Under Flange to Base	F Flange Thickness	L Overall Height	TYPE 13 Carbon Steel Bearings, Zinc Plated Pressings	TYPE 15 Stainless Steel Bearings and Pressings	TYPE 16 Stainless Steel Bearings, Zinc Plated Pressings
										LOAD UP*	LOAD UP*	LOAD UP*
800-22	22.2	0.18	45	9.8 ±0.2	3.8	36 ±0.08	20.7	3.0	30.5	180	120	180
800-30	30	0.38	55	13.8 ±0.2	5.5	45 ±0.08	23	3.4	36.8	350	200	350
800-45	44.5	1.10	75	19	9	62 ±0.1	34.5	3.8	53.5	600	300	600
800-60	57.1	3.80	117	29.5	16.5	100 ±0.1	48	5.0	77.5	1500	1000	1000
805-30	30	0.38	55	13.8 ±0.2	5.5	45 ±0.08	23	3.4	36.8	350	200	350
805-45	44.5	1.10	75	19	9	62 ±0.1	34.5	3.8	53.5	600	300	600
806-30	30	0.35	55	13.8 ±0.2	5.5	45 ±0.08	23	3.4	36.8	350	200	350
807-30	30	0.36	55	13.8 ±0.2	5.5	45 ±0.08	23	3.4	36.8	350	200	350
808-30	30	0.34	55	13.8 ±0.2	5.5	45 ±0.08	23	3.4	36.8	350	200	350
810-12	12.7	0.034	-	-	3	22 ±0.06	-	-	17.5	40	25	40
810-15	15.8	0.06	31	9.5 ±0.2	4	24 ±0.06	11.5	3.8	21	70	45	70
810-22	22.2	0.20	45	9.8 ±0.2	3.5	36 ±0.08	20.7	4.0	30.5	180	120	180
810-30	30	0.37	55	13.8 ±0.2	5.5	45 ±0.08	23	5.0	36.8	350	200	350
810-45	44.5	0.99	75	19	9	62 ±0.1	34.5	4.5	53.5	600	300	600
810-60	57.1	3.93	117	29.5	15	100 ±0.1	48	13.1	77.5	1500	1000	1000
820-60	57.1	3.5	-	77.5	16.5	100 ±0.1	-	-	-	1500	-	1000
820-76	76.2	8.6	-	103	23	130 ±0.1	-	-	-	3000	-	2500
820-90	88.9	11.0	-	115	25	145 ±0.1	-	-	-	4000	-	3500

To order, specify REF N° and TYPE, i.e. 800-22-13.

General Tolerance unless stated ±0.3mm

*Please consult us when mounting in inverted position as a castor, load down.

HI-TECH, DOUBLE SEAL, UNITS

DOUBLE SEAL

This is the first ball transfer design that incorporates double sealing for excluding debris from the bearings.

The top cover seal removes larger particles and the inner knife edge scraper seal skims liquid, paste, fine dust, etc. off the large ball and expels it through side vents.

A dirt exit hole can also be incorporated.

RUST RESISTANT UNITS (Type 15 only)

All parts are of non-rusting material, impervious to the most severe industrial environment and have high impact resistance.

The main bearing track is hardened and has been load and life tested. The ball unit runs equally well inverted or at an angle.

MATERIALS

Steel (Type 13) or stainless (Type 15) load components and bearings.

Hi-Tech Units have the same rated load capacities as the Ø25.4mm Hevi-Load units (see pages 22 & 23). The Hi-tech units have glass re-inforced nylon bodies so their weight is less than half that of the Ø25.4mm Hevi-Load units.

Stainless steel bearings with steel load components (Type 16) are available on request.

CHEMICAL RESISTANCE

High resistance to organic solvents, petrol and oil.

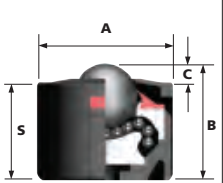
Seek our advice if in doubt.

TEMPERATURE

-30°C upto +100°C.

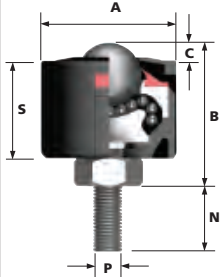
6025-0

Features: High load capacity. Dimensionally compatible with Hevi-Load 7121.



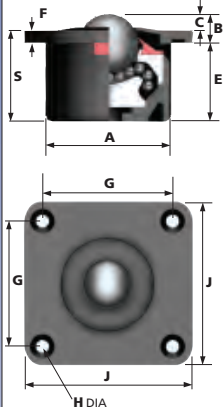
6025-1

Features: Bolt fixing high load capacity. If used for height adjustment the locknut must remain secured to the body. Maximum tightening torque is 15Nm.



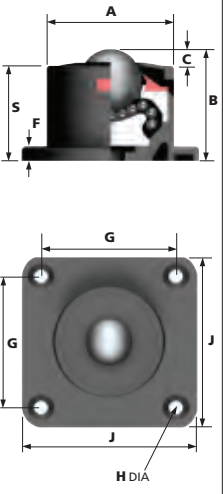
6025-2

Features: Top flange high load capacity. Dimensionally compatible with Hevi-load 7125.



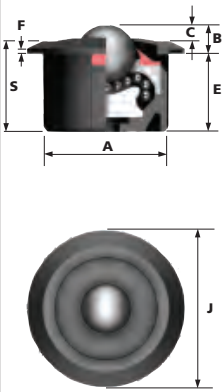
6025-3

Features: High load capacity. Ball height compatible with Hevi-load 7123.



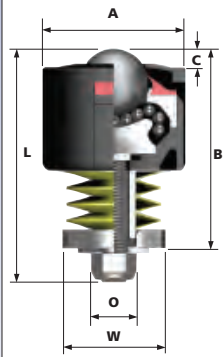
6025-4

Features: High load capacity. Coned flange for smoother on-off transfer.



6025-5

Features: Ideal for shock loading. Stainless steel springs available on request. Compatible with Hevi-load 7136, 7139, 7137, 7135.



REF No.	BALL SIZE (mm)	BEARING COMPONENTS	WEIGHT (KGS)	DIMENSIONS (mm)											DYNAMIC LOAD CAPACITY (kg)	
				A	B	C	E	F	G	H	J	N	P	S	TYPE 13	TYPE 15

General Tolerance unless stated ±0.3mm

DIMENSIONS (mm)										DYNAMIC SUPPORT LOAD (Kg)	LOAD FOR MAXIMUM DEFLECTION		
A	B	C	L	O	W						(Kg)	(mm)	
Maximum Diameter	Working Height of Ball	Ball Exposure Above Outer Ring	Overall Length	M10 Nut Clearance Diameter	Collar Diameter								
TYPE 5													
6025-5-15A	25.4	Stainless	0.330	50.8	61.9	6.7	77.0	20.0	38.1	7	100	3.2	
6025-5-13A		Ferrous		50.8	61.5	6.7	77.0	20.0	38.1		110	3.2	
6025-5-15B	25.4	Stainless	0.330	50.8	61.5	6.7	77.0	20.0	38.1	23	110	3.2	
6025-5-13B		Ferrous		50.8	60.7	6.7	77.0	20.0	38.1		120	3.2	
6025-5-15C	25.4	Stainless	0.330	50.8	60.7	6.7	77.0	20.0	38.1	45	120	3.2	
6025-5-13C		Ferrous		50.8	61.9	6.7	77.0	20.0	38.1		125	3.2	
6025-5-15D	25.4	Stainless	0.335	50.8	61.9	6.7	77.0	20.0	38.1	70	125	3.2	
6025-5-13D		Ferrous		50.8	61.9	6.7	77.0	20.0	38.1		125	3.2	
6025-5-15E	25.4	Stainless	0.470	50.8	81.0	6.7	98.4	20.0	38.1	90	210	3.2	
6025-5-13E		Ferrous		50.8	81.0	6.7	98.4	20.0	38.1		210	3.2	
6025-5-15F	25.4	Stainless	0.470	50.8	79.8	6.7	98.4	20.0	38.1	140	245	3.2	
6025-5-13F		Ferrous		50.8	79.8	6.7	98.4	20.0	38.1		245	3.2	
6025-5-15G	25.4	Stainless	0.480	50.8	81.0	6.7	98.4	20.0	38.1	180	270	3.2	
6025-5-13G		Ferrous		50.8	81.0	6.7	98.4	20.0	38.1		270	3.2	
6025-5-15H	25.4	Stainless	0.490	50.8	81.0	6.7	98.4	20.0	38.1	230	310	3.2	
6025-5-13H		Ferrous		50.8	81.0	6.7	98.4	20.0	38.1		310	3.2	

To order, specify REF N°, i.e. 6025-0-15.

General Spring Rating Tolerance unless stated ±10%

HEVI-LOAD UNITS 0,1,2 & 3

ALWAYS Hevi-Load Units are designed and manufactured to precise standards.

They offer the highest performance available in load transfer applications with load ball sizes from 12.7mm to 50.8mm diameters and a load capacity range from 35kg to 2000kg used either ball up or ball down.

Hevi-Load Units run on the re-circulating ball principal. The load ball rotates on a bed of small balls supported on a hardened steel, precision machined table.

They can work at maximum capacity in temperatures from - 30°C to +100°C. Drain hole or grease points can be incorporated on request.

No spanner flats for 7110 and 7106 Hevi-Load Units. *Models marked with an asterisk have a bearing shell and are assembled with no felt seal with a chemical black finish for Types 13 and 16.

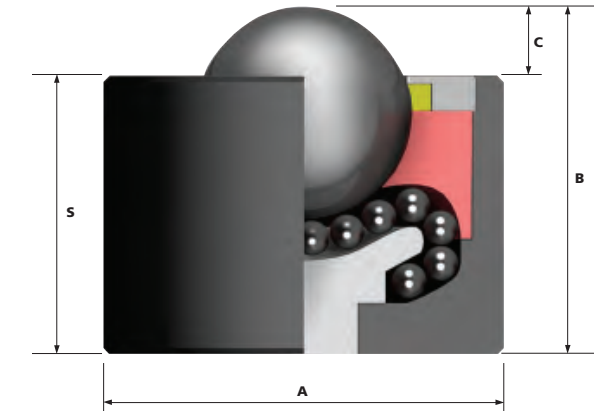
Type 15 Units (all stainless steel) available on request. When using stainless balls, reduce Type 13 load capacity by 33.3%.

All units are machined using CNC machines from one piece of steel, therefore flanges and threads are integral.

All hevi-load units have a electrophoretic black coated body for corrosion resistance

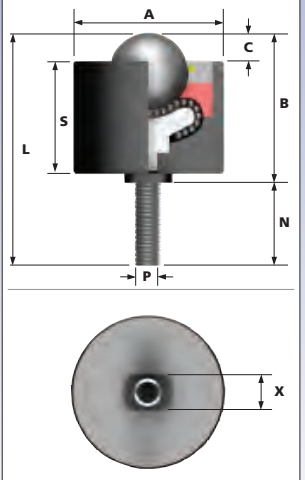
HEVI-LOAD 0

Features: High load capacity, robust body. The Hevi-Load 7121 is dimensionally compatible with the Hi-Tech 6025-0.



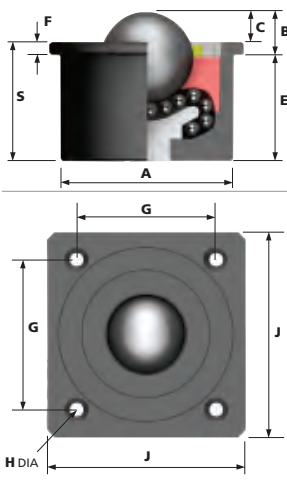
HEVI-LOAD 1

Features: High load capacity, bolt fixing. Two spanner flats for fixing and removing. Drill hole fixing. Maximum tightening torques range from 15Nm for M8 to 25Nm for M24.



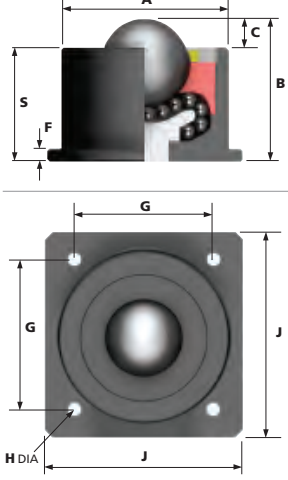
HEVI-LOAD 2

Features: High load capacity, top flange fixing. The Hevi-Load 7125 is dimensionally compatible with the Hi-Tech 6025-2.



HEVI-LOAD 3

Features: High load capacity, bottom flange fixing. Drill hole fixing. The Hevi-Load 7123 is dimensionally compatible with the Hi-Tech 6025-3.



PATTERN	REF No.	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)								DYNAMIC LOAD CAPACITY (kg)	
				A	B	C	L	N	S	P	X	TYPE 13	TYPE 16
				Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Overall Length	Length of Thread	Base to Top of Body	Thread Size	Dimension Across Flats	Carbon Steel Balls.	Stainless Steel Balls.
HEVI-LOAD 0	7101*	12.7	0.036	20.6	19.6	3.5	-	-	16.1	-	-	35	35
	7120	25.4	0.394	44.5	41.4	5.6	-	-	35.8	-	-	135	135
	7121		0.550	50.8	44.7	6.1	-	-	38.6	-	-	320	215
	7150	38.1	1.0	60.0	61.5	13	-	-	48.5	-	-	1000	670
	7170	50.8	5.02	101.6	98.4	14.3	-	-	84.1	-	-	2000	1330
	7180	76.2	14.87	160	145	21	-	-	124	-	-	4000	3000

HEVI-LOAD 1	7110*	12.7	0.042	20.6	19.6	3.5	35.8	16.2	16.1	5/16" UNF	-	35	35
	7106*									M8			
	7127		0.431	44.5	48.3	5.6	72.4	24.1	35.8	1/2" UNF	19	135	135
	7128	25.4								M12			
	7130		0.581	50.8	51.3	6.1	77	25.7	38.6	M12	19	320	215
	7131									1/2" UNF			
	7153	38.1	1.14	60.0	73.5	13	114.3	40.8	48.5	M20	30	1000	670
	7154									3/4" UNF			
	7172	50.8	5.26	101.6	109.1	14.3	159	49.9	84.1	M24	38	2000	1330
	7173									1" UNF			

DIMENSIONS (mm)											DYNAMIC LOAD CAPACITY (kg)	
A	B	C	E	F	G	H	J	S			TYPE 13	TYPE 16
Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Distance Under Flange to Base	Flange Thickness	Centres of Fixing Holes	Hole Diameter & Fixing Holes	Major Flange Size	Base to Top of Body			Carbon Steel Balls.	Stainless Steel Balls.

Hevi-Load ball units Ref. No's 7104 and 7103 have a round flange with two fixing holes.

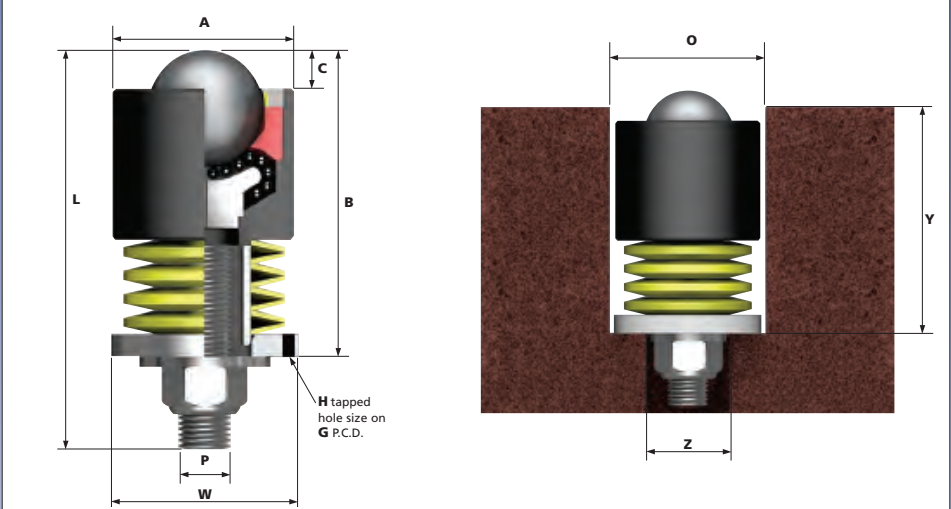
HEVI-LOAD 2	7104*	12.7	0.082	23.8	11.2	3.5	11.2	3.2	34.8 ±0.2	2x3.6	44.5	18.9	35	35
	7124	25.4	0.463	44.5	10.3	5.6	31.3	4.7	44.5 ±0.2	4x5.6	57.2	36	135	135
	7125		0.746	50.8	13.0	6.1	32.0	6.9	57.9 ±0.2	4x7.1	76.2	38.9	320	215
	7152	38.1	1.24	60.0	25.4	13	35.8	12.4	101.6 ±0.2	4x11	127.0	84.2	1000	670
	7171	50.8	6.14	101.6	33.3	14.3	65.0	19.0	145 ±0.2	4x13	175	124	2000	1330
General Tolerance unless stated ±0.3mm														
HEVI-LOAD 3	7103*	12.7	0.086	23.8	22.6	3.5	-	3.2	34.8 ±0.2	2x3.6	44.5	19.1	35	35
	7122	25.4	0.459	44.5	41.4	5.6	-	4.8	44.5 ±0.2	4x5.6	57.2	35.8	135	135
	7123		0.735	50.8	45.5	6.4	-	6.3	57.9 ±0.2	4x7.1	76.2	39.1	320	215
	7151	38.1	1.3	60.0	62.2	13	-	12.4	101.6 ±0.2	4x11	127.0	84.0	1000	670
	7174	50.8	5.52	101.6	98.3	14.3	-	9.6	145 ±0.2	4x13	175	124	2000	1330
	7184	76.2	16.1	160	145	21	-	15	145 ±0.2	4x13	175	124	4000	3000

HEVI-LOAD 5,6 • DIE LIFTERS

HEVI - LOAD 5

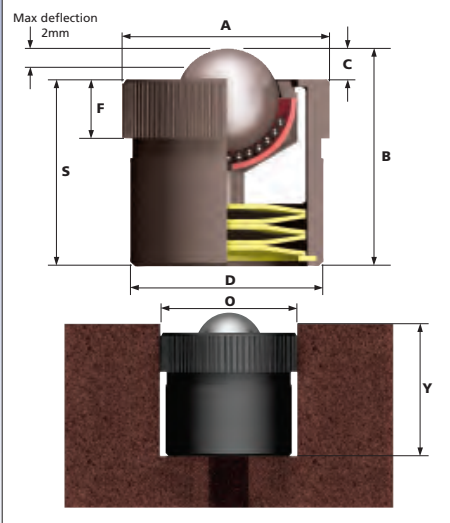
Features: High load capacity, greater shock loading protection. Screw fixing collar for Ø38.1mm and Ø50.8mm ball units only, for secure fixing in ball down applications.

*Ball units 7107, 7108 and 7109 incorporate the shell ball design and have no seal with a chemical black finish for Types 13 and 16.



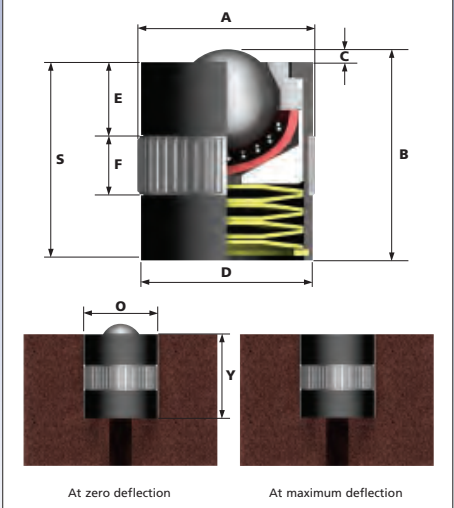
HEVI - LOAD 6

Features: Compact, interference fitting, greater shock loading protection. Finish: chemical black housing for Types 13 and 16.



DIE LIFTERS

Features: Tolerance ring for interference fitting for ball up and ball down fitting. Greater shock loading protection. Finish: chemical black housing for Types 13 and 16.



PATTERN	REF No.	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)												DYNAMIC LOAD CAPACITY (kg)					
				A	B	C	G	H	L	O	P	W	Y	Z	SUPPORT LOAD (Kg)		LOAD FOR MAXIMUM DEFLECTION (kg)		MAXIMUM DEFLECTION (mm)		
				Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	P.C.D. or Centres of Fixing Holes	Tapped Hole Size	Overall Length	Seating Hole Diameter	Thread Size	Collar Diameter	Minimum Hole Depth	Nut Clearance Diameter	TYPE 13	TYPE 16	TYPE 13	TYPE 16			
														Carbon Steel Bearings, Zinc Plated Pressings	Stainless Steel Bearings, Zinc Plated pressings	Carbon Steel Bearings, Zinc Plated Pressings	Stainless Steel Bearings, Zinc Plated pressings				

HEVI-LOAD 5	7107*	12.7	0.067	32.2	20.6	3.5	-	47.0	22	M8	20.6	23.8	16	7	7	30	30	2
	7108*			31.8										15	15	35	35	
	7109*			32.2										25	25	40	40	
	7138	25.4	0.517	61.9	44.5	5.6	-	77.0	46	M10	38.1	58.7	22	7	7	100	100	3.2
	7132			61.5										25	25	110	110	
	7133			60.7										45	45	120	120	
	7134			61.9										70	70	125	125	
	7135			81.0										90	90	210	210	
	7136			79.8										140	140	245	245	
	7139	38.1	0.795	81.0	50.8	6.1	-	98.4	52	M16	59.8	77.8	32	180	180	270	270	5.6
	7137			81.0										230	230	310	310	
	7155			115.5										225	225	630	630	
	7158			121.3										310	185	685	380	
	7159			128.2										460	230	765	410	
	7156			127.0										565	375	830	685	
	7160	50.8	0.813	146.1	101.6	13	50.8 ±0.2	3x M5	62	M16	59.8	121.4	44	690	460	875	660	6.3
	7157			156.4										760	565	910	745	
	7178			179.4										795	335	1370	660	
	7175			177.4										1000	685	1615	955	
	7176			174.6										1235	830	1785	1030	
	7177			171.5										1560	930	1950	1520	

DIMENSIONS (mm)							
A	B	C	D	F	O	S	Y
Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Knurl Thickness	Seating Hole Diameter	Base to Top of Body	Minimum Hole Depth

HEVI-LOAD 6	7105	12.7	0.078	25.6	28.5	3.1	25.4	8	25.4 +0.15 +0.05	25.4	26.5	25	25	40	40	2
-------------	------	------	-------	------	------	-----	------	---	------------------	------	------	----	----	----	----	---

DIMENSIONS (mm)							
A	B	C	D	E	F	O	Y
Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Top of Body to Groove	Groove Width	Seating Hole Diameter	Base to Top of Body

DIE-LIFTERS	DL-24	12.7	0.074	24.5	30	1.5	23.9	9	10.5	24.1	28.5	28.6	40	40	90	90	1.5
	DL-30	15.8	0.127	30.5	36	1.5	29.9	12	10.5	30.1	34.5	34.6	60	60	110	110	1.5
	DL-40	25.4	0.320	40.5	48	1.5	39.8	12	10.5	40.1	46.5	46.6	100	100	175	175	1.5
	DL-50	30	0.660	50.5	60	1.5	49.9	15	12.3	50.1	58.5	58.6	335	200	585	465	1.5
	DL-70	38.1	2.000	71	80	2	70	19	19	70.2	78	78.1	500	325	720	570	2

SPRING LOADED UNITS

ALWAYS spring loaded units are used in applications such as:-

Guillotines; Presses; Moulding Machines; Tool Bases; Press Brakes; Shock Loading applications.

Spring loaded ball units reduce damage caused by shock loads. They also allow for dimension changes due to temperature and self-adjust to evenly distribute loads.

1507, 1508 and 1509 Units

These units incorporate a plastic scraper seal, which keeps debris outside the ball unit.

Spring loaded ball unit sizes Ø31.7mm, Ø39.7mm and Ø50.8mm have dirt exit holes as standard. All other spring loaded ball units have felt or foam seals as standard.

Spring loaded ball units can be used as die-lifters, inverted or at an angle.

See pages 24 and 25 for details of our Hevi-Load spring loaded ball units and Die-Lifter ball units.

Completely stainless steel (Type15) spring loaded ball units also available upon request with reduced support loads and depress loads.

Spring loaded ball units with ball sizes of Ø25.4mm also available upon request with nylon load ball and stainless bearings (Type 14).

The Type 14 ball units are suitable for light load applications and when object surface protection is required.

The 1507 and 1509 ball units have 2mm thick pressed steel flanges.

Do not remove the circlip on any of the spring loaded ball units.

* Other loads available upon request.

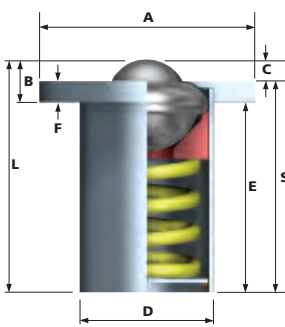
5320 / 5330 / 5345

The 5320 / 5330 / 5345 ball units are assembled with standard 522-0 or 530-0 or 545-0 Euro ball unit (see pages 16-17). The ball units have a dirt exit hole.

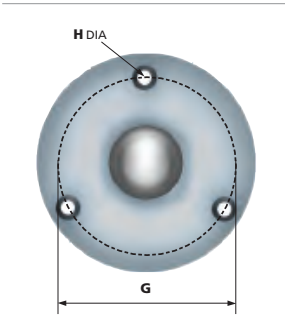


LARGE TOP FLANGE

Features: Large top flange fixing. Low profile. The 1507 has a pressed steel flange 2mm thick similar to Small Top Flange image below.

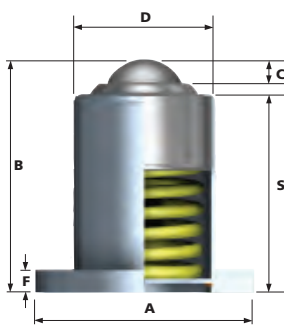


(1018 shown here)

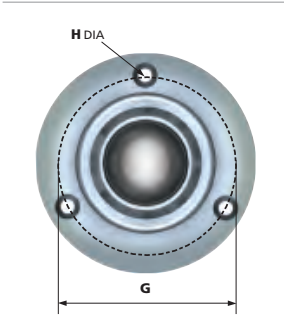


LARGE BOTTOM FLANGE

Features: Large bottom flange fixing. High profile.

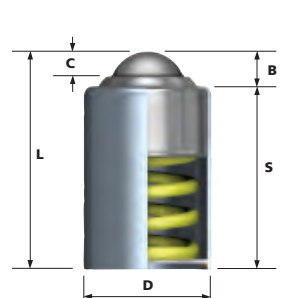


(1032 shown here)



PLAIN BODY

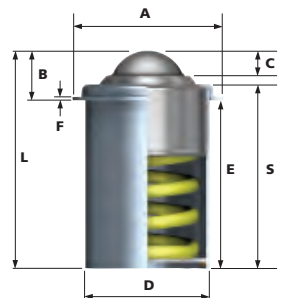
Features: Plain body. Low profile.



(1508 shown here)

SMALL TOP FLANGE

Features: Small flange. Low profile.



(1509 shown here)

REF No.	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)									
			A	B	C	D	E	F	G	H	L	S
			Maximum Diameter	Working Height of Ball	Ball Exposure Above Outer Ring	Body Diameter	Distance Under Flange to Base	Flange Thickness	P.C.D. or Centres of Fixing Holes	Hole Diameter of Fixing Holes & No. of Fixing Holes	Overall Height	Base to Top of Body

SUPPORT DYNAMIC LOAD (kg)	LOAD TO FULLY DEPRESS (kg)
TYPE 13 Carbon Steel Bearings, Zinc Plated Pressings	
TYPE 16 Stainless Steel Bearings, Zinc Plated Pressings	

LARGE TOP FLANGE

3011	19	0.42	66.6 +0.0 -1.0	11.4	3.5	36.5	51.6	7.9	50.8 ±0.2	3x 7	63	59.5
1018	25.4	0.57	75 +0.0 -1.0	13.8	5.9	44.5	53.3	7.9	60.3 ±0.2	3x 7	67.1	61.2
1507	25.4	0.40	71.3	19.3	6.7	44.5	52.9	2	60.4 ±0.2	2x 5.1	72.2	61.3
1028	31.7	1.16	89 +0.0 -1.0	17	7.5	60.0	77.5	9.5	73 ±0.2	3x 7	94.5	87
2010	39.7	2.04	101.6 +0.0 -1.0	17.7	8.2	69.8	90		85.7 ±0.2	3x 9	107.7	99.5
4008	50.8	5.1	152.4 +0.0 -1.0	25.7	13.0	101.6	114	12.7	127 ±0.2		139.7	126.7

10	30
35	100
50	130
100	180
170	410

LARGE BOTTOM FLANGE

3012	19	0.42	66.6 +0.0 -1.0	65.1	4.7	36.5	-	7.9	50.8 ±0.2	3x 7	-	55.6
1510	25.4	0.45	75 +0.0 -1.0	72.9	6.7	44.5	-	7.9	60.3 ±0.2	3x 7	-	47
1032	31.7	1.02	89 +0.0 -1.0	95.3	7.7	60.0	-	9.5	73 ±0.2	3x 7	-	84.9

10	35
50	130
100	200

5320 / 5330 / 5345

5320	22.2	0.26	50	18.5 ±0.2	4	39	33	14	-	-	51.5	47
5330	30	0.52	62	24.4	6.6	48.2	45.6	17.7	-	-	70	63.3
5345	44.45	1.40	85	35.6	11.4	66.4	64.9	24.2	-	-	100.5	89.1

72	160*
141	201
232	420

* Other loads available upon request.

PLAIN BODY

3009	19	0.26	-	9.5	4.7	36.5					65.1	55.6
1016	25.4	0.38	-	11.9	6.3	44.5					70.6	58.7
1508	25.4	0.38	-	12.5	6.7	44.5					72.9	60.4
1026	31.7	0.86	-	10.4	7.7	60.0					94.5	87
2008	39.7	1.46	-	12.7	9.1	69.8					107.6	94.9
4006	50.8	4.2	-	13	13	101.6					139.7	126.7

10	35
35	140
50	130
100	200
170	410

SMALL TOP FLANGE

3010	19	0.30	45 +0.0 -1.0	11.4	3.5	36.5	51.6	7.9			63	59.5
1017	25.4	0.44	50 +0.0 -1.0	13.8	5.9	44.5	53.3				67.1	61.2
1509	25.4	0.39	56	19.3	6.7	44.5	52.9	2			72.2	61.3
1027	31.7	0.99	75 +0.0 -1.0	17	7.5	60.0	77.5	9.5			94.6	87.1
2009	39.7	1.8		17.7	8.2	69.8	90				107.7	99.5
4007	50.8	4.4	114.3 +0.0 -1.0	25.7	13	101.6	114	12.7			139.7	126.7

10	30
35	100
50	130
100	180
170	410

General Spring Rating Tolerance ±10%
General Tolerance unless stated ±0.3mm

TUFF SERIES HEAVY DUTY UNITS

ALWAYS TUFF SERIES Heavy Duty units are built to provide a long working life and to withstand harsh conditions.

They have a solid machined body with chrome steel bearings and incorporate both dust seal and dirt exit hole (except No. 0519).

They provide a higher load capacity than standard units.

Solid steel body for attachment purposes, but not shock loading. Body chemical black finish for types 13 and 16.

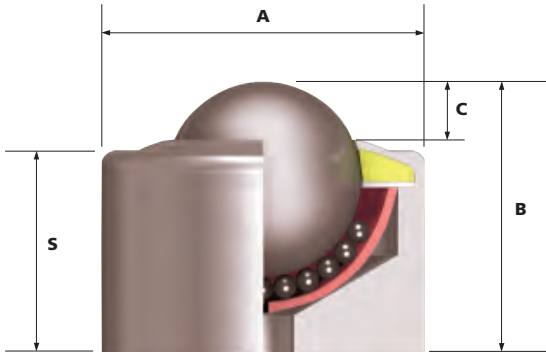
All units are machined using CNC machines from one piece of steel, therefore flanges and threads are integral.

ALSO AVAILABLE

All patterns (i.e.: 21,22,23 and 24) of ref nos 0519, 3019 and 1019 are available with a nylon main ball (Type 14) ideal for light load and reduced marking

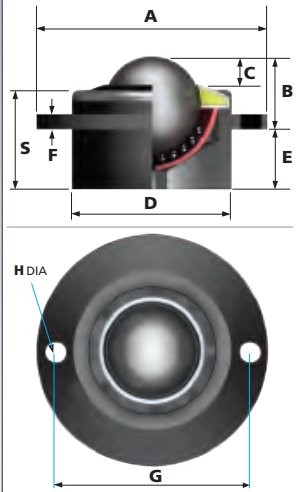
TUFF HEAVY DUTY 21

Features: Plain solid machined body.



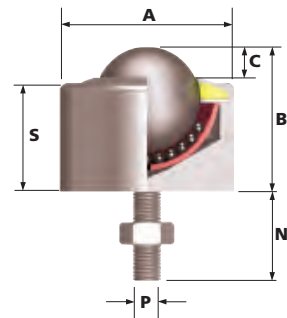
TUFF HEAVY DUTY 22

Features: Flange fixing either by using rivets or screws.



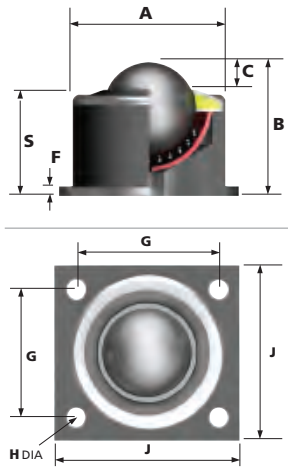
TUFF HEAVY DUTY 23

Features: Bolt, drilled hole fixing. Maximum tightening torques range from 10Nm for M6 to 20Nm for M12.



TUFF HEAVY DUTY 24

Features: Bottom flange fixing either by using rivets or screws. Drilled hole fixing.



REF No.	BALL SIZE (mm)	WEIGHT (KGS)	DIMENSIONS (mm)													DYNAMIC LOAD CAPACITY (kg)		
			A	B	C	D	E	F	G	H	J	N	P	S	TYPE 13	TYPE 15	TYPE 16	
			Maximum Diameter	Working Height of Ball	Ball Exposure above Outer Ring	Body Diameter	Distance Under Flange to Base	Flange Thickness	Centres of Fixing Holes	Hole Diameter of Fixing Holes	Major Flange Size	Length of Thread	Thread Size	Base to Top of Body	Carbon Steel Bearings, Zinc Plated Pressings	Stainless Steel Bearings and Pressings	Stainless Steel Bearings, Zinc Plated Pressings	

0519-21	12.7	0.036	20	20	2	-	-	-	-	-	-	-	-	17	25	25
0519-22		0.051	32	12		20	8	4	26 ±0.2	3.5	-	-	-	17		
0519-23		0.042	20	20		-	-	-	-	-	-	28	M6	17		
0519-24		0.096	20	25		-	-	6	24 ±0.2	6.5	35	-	-	22		

3019-21	19	0.120	30	30	4	-	-	-	-	-	-	-	-	26	50	50
3019-22		0.168	50	14		30	16	5	40 ±0.2	5	-	-	-	26		
3019-23		0.124	30	30		-	-	-	-	-	-	25	M8	26		
3019-24		0.220	30	35		-	-	6	31 ±0.2	6.5	44.5	-	-	31		

1019-21	25.4	0.177	35	35	7	-	-	-	-	-	-	-	-	28	125	125
1019-22		0.282	60	20		40	15	5	49 ±0.2	5	-	-	-	28		
1019-23		0.190	35	35		-	-	-	-	-	-	40	M8	28		
1019-24		0.294	35	40		-	-	6	35 ±0.2	7	50	-	-	33		

1029-21	31.7	0.486	50	45	8	-	-	-	-	-	-	-	-	37	250	250
1029-22		0.584	75	24		50	21	5	62.5 ±0.2	5	-	-	-	37		
1029-23		0.500	50	45		-	-	-	-	-	-	40	M10	37		
1029-24		0.740	50	50		-	-	8	49 ±0.2	7	63.45	-	-	42		

2019-21	39.7	0.850	60	55	9	-	-	-	-	-	-	-	-	46	500	250
2019-22		0.960	84	27		60	28	5	72 ±0.2	6	-	-	-	46		
2019-23		0.900	60	55		-	-	-	-	-	-	50	M12	46		
2019-24		1.350	60	60		-	-	10	60 ±0.2	7	80	-	-	51		

To order, specify REF N° and TYPE, i.e. 0519-21-13. General Tolerance unless stated ±0.3mm

FIXING CLIPS

ALWAYSE provide a complete range of fixing clips designed specially for use with their ball transfer units.

They lock the unit securely in position without the need for special tools or machinery.

Some standard clips are described here. Special designs can also be provided, please ask for details.

The effectiveness and security of ball units attached by means of fixing clips can be influenced by size of fixing holes, table thickness and ball unit tolerances.

CL11 (stock item)

Available in three sizes only to suit ball units with body diameters of 36mm, 45mm and 62mm.

CL12 (made to order)

This clip will fit under the flange of any of our ball units that have parallel sides. If any particular size of clip is not in stock there may be a minimum order charge. Fixing hole sizes on application.

On certain units it is possible to machine a recess to retain the clip in the body of the ball unit. These units must have a solid steel body, are not stock items and are only manufactured to specific orders.

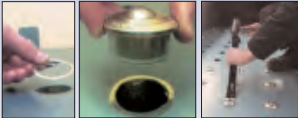
CL13 (stock item)

These are to be used with ball units with a body diameter of 24mm only.

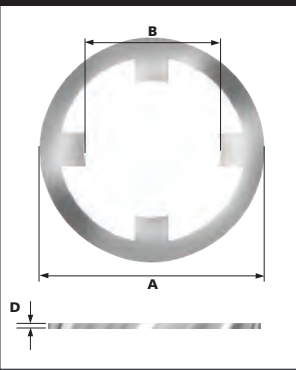
CL14 (stock item)

Stocked for body diameter of 24mm, 36mm, 45mm and 62mm. This clip was designed for fixing ball units from the top face of a ball platform. The clip can also be used for fixing the ball unit from underneath the ball platform if clip CL11 is not suitable. The preferred table top material thickness for maximum effectiveness of the CL14 range of clips is 2mm to 4mm. The CL14 fixing clips can be used for thicker materials with a slight reduction in clip effectiveness. For maximum clip effectiveness the seating hole size should be on the minimum tolerance and the table top material thickness should be 4mm. Please see page 17 for seating hole sizes

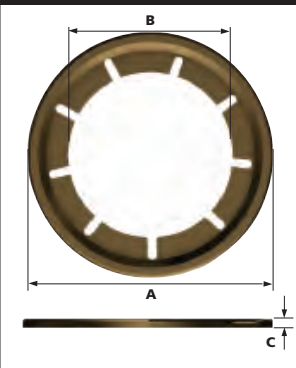
CL14 fixing clips must be placed into the seating hole first, before the ball unit is fitted.



CL11



CL13



CL15 (made to order)

A circlip type clip used mainly for solid machined body units. The circlip is fitted from underneath the ball unit and is available in many sizes.

Ball units with circlip grooves are not ex stock items. The standard circlip is self colour spring steel, but plated circlips can be offered where corrosion resistance is required.

FITTING CL12 AND CL14 FIXING CLIPS

When fitting ball units with CL12 or CL14 fixing clips, do not strike the load ball to press the unit into position.

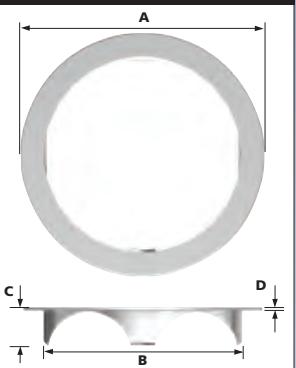
Instead, apply an even force onto the ball unit's body using a tube or similar tool.

Installation and removal tools can be supplied to ensure the correct installation of ball transfer units for the CL12 and CL14 fixing clip range. Details of the installation and removal tools are available upon request.

CL12



CL14



CL15



REF No

CL11



Material: Stainless Steel AISI 304
Finish: Self Colour

Ref No.	Flange diameter A	Inside diameter B	Material Thickness D
CL11-22	Ø71.1	Ø35.9	0.7
CL11-30	Ø71.1	Ø44.9	0.7
CL11-45	Ø72.6	Ø61.2	0.7

CL11 CLIP TO BE USED WITH THE FOLLOWING BALL UNITS

CL11-22	CL11-30	CL11-45
522-0, 522-4 and 522-6 (pages 16 & 17)	530-0, 530-4 and 530-6 (pages 16 & 17)	545-0, 545-4 and 545-6 (pages 16 & 17)
800-22 and 810-22 (pages 18 & 19)	800-30, 805-30 806-30, 807-30 and 810-30 (pages 18 & 19)	800-45, 805-45 and 810-45 (pages 18 & 19)

CL12



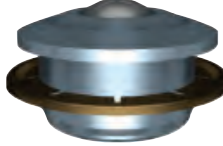
Material: Stainless Steel Spring Steel
Finish: Self Colour

CL12 CLIP TO BE USED WITH THE FOLLOWING BALL UNITS

1007	515-0, 515-4, 515-6 522-0, 522-4, 522-6 530-0, 530-4, 530-6 545-0, 545-4, 545-6 (Pages 16 & 17)	6025-2 and 6025-4 (Pages 20 & 21)	7104, 7124 7125, 7152 and 7171 (Pages 22 & 23)
(Pages 8 & 9)			
0519-22, 2019-22, 1019-22, 1029-22 and 2019-22 (Pages 28 & 29)	810-15, 800-22 810-22, 800-30 805-30, 810-30 800-45, 805-45 806-30, 807-30 810-45 and 800-60 (Pages 18 & 19)	3010, 3011, 1017 1018, 1509, 1507 1027, 1028, 2009 2010, 4007 and 4008 (Pages 26 & 27)	

CL12 fixing clip sizes available upon request

CL13



Material: Carbon Spring Steel
Finish: Bronze Finish

Ref No.	Flange diameter A	Inside diameter B	Length C
CL13-15	Ø41.4	Ø23.4	3.2

The CL13-15 fixing clip can be used with the 515-0, 515-4 and 515-6 ball units (pages 16-17) and also the 810-15 ball unit (pages 18 and 19).

CL14



Material: Carbon Spring Steel
Finish: Zinc Plated
Please see page 17 for seating hole sizes

Ref No.	Flange diameter A	Body outside diameter B	Length C	Material Thickness D
CL14-15	Ø30.9	Ø24.7	6.0	0.3
CL14-22	Ø44.5	Ø36.7	7.0	0.3
CL14-30	Ø54.9	Ø45.7	7.0	0.3
CL14-45	Ø74.0	Ø62.7	7.0	0.3

CL14 CLIP TO BE USED WITH THE FOLLOWING BALL UNITS

CL14-15	CL14-22	CL14-30	CL14-45
515-0, 515-4 and 515-6 (pages 16 & 17) 7104 (pages 22 & 23) 810-15 (pages 18 & 19)	522-0, 522-4 and 522-6 (pages 16 & 17) 800-22, 810-22 (pages 18 & 19)	530-0, 530-4 and 530-6 (pages 16 & 17) 800-30, 805-30, 806-30 807-30 and 810-30 (pages 18 & 19) 1017, 1018, 1507 and 1509 (pages 26 & 27) 1724 (pages 22 & 23)	545-0, 545-4 and 545-6 (pages 16 & 17) 800-45, 805-45 and 810-45 (pages 18 & 19)

CL15



Material: Carbon Spring Steel and
Stainless Steel Spring Steel
Finish: Self Colour

CL15 CLIP TO BE USED WITH THE FOLLOWING BALL UNITS

1004	7104, 7124, 7125 7152 and 7171 (pages 22 & 23)	0519-22, 3019-22, 1019-22 1029-22 and 2019-22 (pages 28 & 29)
(pages 8 & 9)		
810-15, 800-22, 810-22 800-30, 805-30, 810-30 800-45, 805-45, 810-45 and 800-60 (pages 18 and 19)	3010, 3011, 1017, 1018 1509, 1507, 1027, 1028 2009, 2010, 4007 and 4008 (pages 26 and 27)	

Ball units with circlip grooves are available on request
CL15 fixing clip sizes available upon request

To order, specify REF N° i.e. CL11-22.
For CL12 and CL15 clips specify REF N° and ball unit REF N° i.e. CL12,1007.

TEE BLOCKS, DIE TABLES

TEE BLOCKS

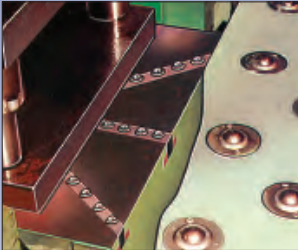
Single Minute Tool and Die Changing

Our comprehensive range of tee blocks and spring loaded ball transfer units, set into the bed of your power press or machine tool, will allow effortless positioning of tooling but still allow rigid clamping.

We supply tee blocks for both standard and non-standard tee slots the length, pitch, ball height etc. being dependant on tool weight and profile.

Other sizes available on request.

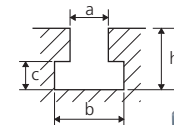
Standard Finish is chemical black.



TEE BLOCKS

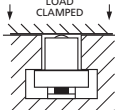
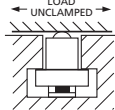
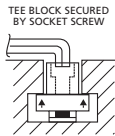
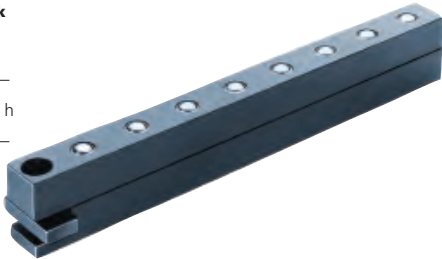
Tee blocks can be designed and manufactured to suit particular applications. See pages 24 & 25 for our range of Die Lifter ball units.

Standard Tee Block Slot Proportions



DIN 650

a	b	c	h
22	37	16	38
24	42	18	42
28	46	20	48
36	56	25	61



QUICK CHANGE DIE TABLES

For all types of moulding and stamping applications.

They allow quick, easy tool changing with storage close to the machine. All tables are fully guarded. Access to the machine via a lift-up gate if required.

Custom designed to your specific requirements, installation is carried out by our engineers.

NOTE - safety rails should be fitted where there is the possibility of loads rolling off.



QUICK CHANGE DIE TABLES

