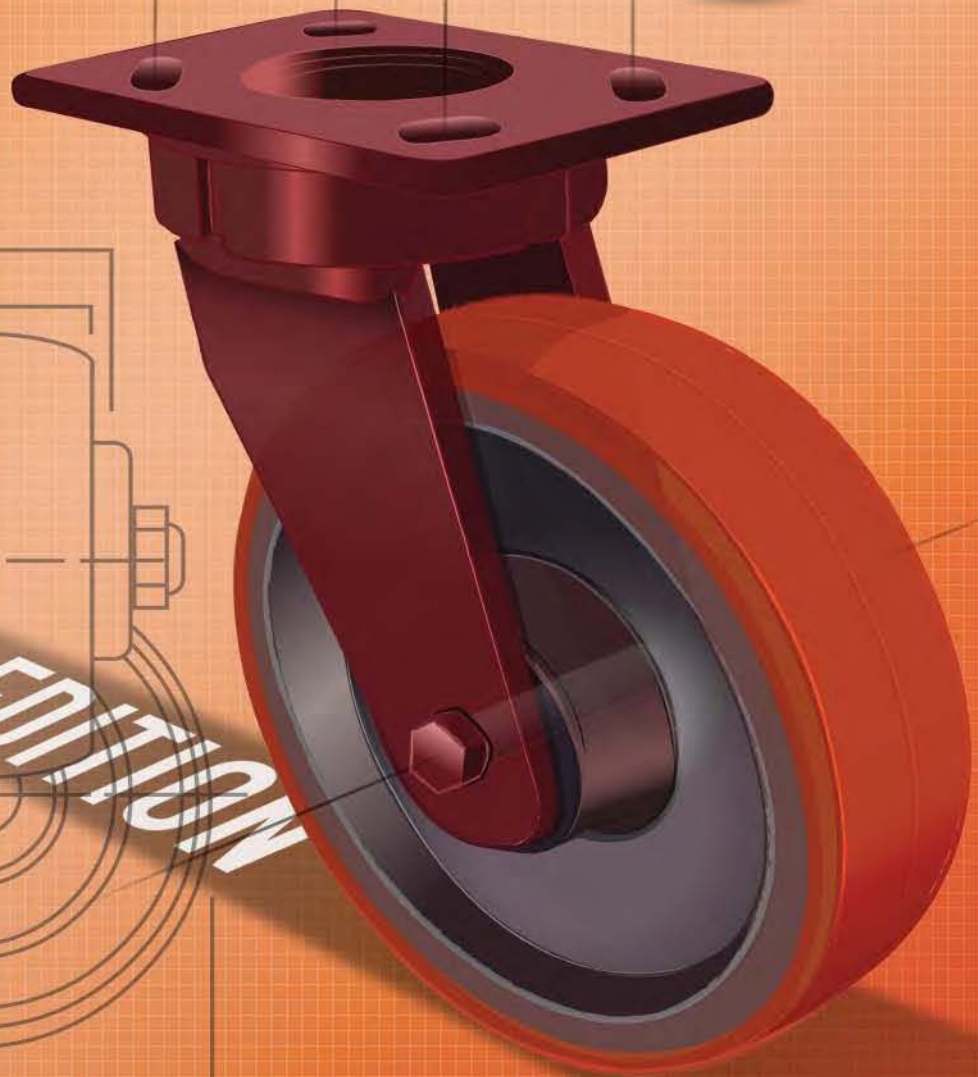


Castor wheel
manufacturers



BAZROLL INTERNATIONAL LTD

Tel: 01249 822 222

www.bilgroup.eu

BIL CASTORS & WHEELS DIVISION

Baz-Roll Products started life in 1973 as a distributor of castors and wheels. It has since evolved into a division of a larger group of companies headed by Baz-Roll International (BIL) which today manufactures its own range of BIL branded product.

The BIL Group have a team of experienced staff that are able to help and advise you with your product needs. With a full complement of externally-based field sales staff supported by a dedicated team at our head office in Calne, we are able to provide excellent service and support.

With continuing investment in tooling and machinery, a comprehensive range of BIL branded quality product has been created, much of which is assembled and distributed from our UK headquarters in Wiltshire. At BIL we manufacture

in large production batches to achieve economies of scale and to ensure that we keep sufficient stock levels in the UK to service both our domestic and European customers.

Consistent growth and solid performance have followed on from various major infrastructure upgrades over time. These include investment in one of the most advanced ERP systems available; doubling the size of our UK stockholding to over 1,400 square metres; investing in stock valued at over £2,000,000; appointing a quality manager in China to oversee production of certain BIL ranges; the construction of a purpose-built castor and wheel testing facility at our Calne site, which opened in September 2007 and a brand new production area that has recently been unveiled in January 2010. An ongoing process of investment and development is planned for the future.

BIL company headquarters



Quality, innovation and service

The philosophy and brand values for BIL are – quality, innovation and service. At BIL we are continually striving to further improve our product range and also the level of service to customers, both in the UK and across the EU...

...at BIL we never stand still.

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Guide to wheels and castors ...	10
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The test room at Calne



BIL QUALITY GUARANTEE

In order to ensure that the high quality of systems, procedures and product are consistently maintained, all stock is accounted through our computerised, bespoke, auto-batch-trace facility. This ensures items held and assembled in the UK can be traced back to source for reporting and investigation.

Quality systems are ISO 9001:2000 accredited and BIL overseas quality managers supervise our production partners, using BIL designed tooling, resulting in consistency and quality. Our purpose-built UK test facility carries out batch checks to BS EN 12527:1999 and BS EN 12528:1999 standards, for good measure, on the pressed steel ranges.

The BIL policy of continual research and development is the basis for innovative products that are perfect for the applications they are designed for.

Our high quality products are shipped to customers all over continental Europe – with very competitive lead times from our large UK distribution centre in Calne. All our mainland UK deliveries will generally arrive next working day (certain postal codes may be subject to an additional charge).



BIL quality is delivered rapidly across Europe



BIL Headquarters, Calne



QUALITY TESTING

at our purpose built test facility, Calne

Dynamic test

Defined in BS EN 12530/12532:1999 sect. 5.9 & BS EN 12527:1998 sect. 4.8
TEST OBJECTIVE

To verify that a load capacity under dynamic application will not cause damage or excessive wear to prejudice the performance of the castor under test. This test applies to castors for institutional applications, to 0.83m/sec (3kph), and general industrial applications involving speeds up to 1.1m/sec (4 kph).

TEST APPARATUS

This consists of a circular smooth steel track which revolves at set speeds under the castor which is held correctly fixed by its normal bolts while being subject to various loadings. There are rectangular metal obstacles 100mm wide set on the track spaced between 1 and 3 metres apart alternately 45° left and 45° right to the running direction. Their height varies dependent on castor tread hardness – measured as either $\geq 90^\circ$ Shore A: 2.5% of D or $< 90^\circ$ Shore A: 5% of D – and they have rounded edges between 1.5mm and 8mm radius.

TEST PROCEDURE

This is composed of pre-defined continuous running periods followed by one minute pauses after which the direction of rotation must be reversed for the next period of rotation. The castor should run under load until it has passed the required number of obstacles after which these are removed and the test proceeds until the pre-requisite number of revolutions are completed – all to BS EN standard.



Rotational test bed, Calne



Linear test bed, Calne

Long distance running test

TEST OBJECTIVE

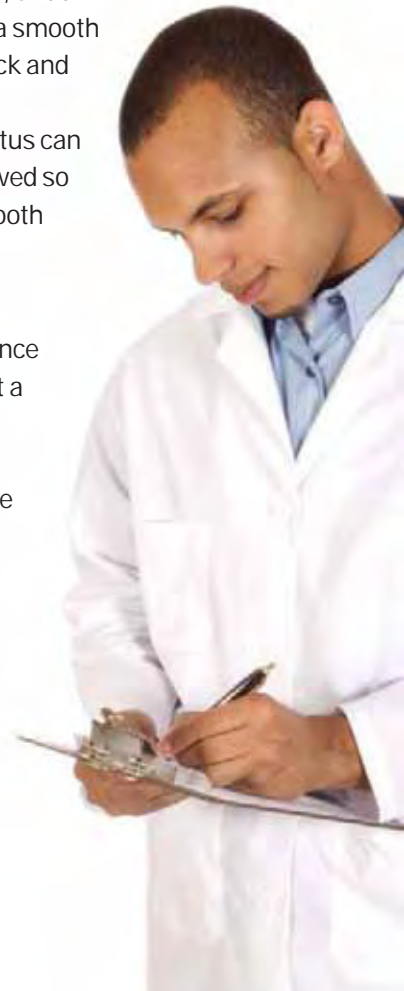
To determine castor performance over long distance running so as not to cause damage or excessive wear or to prejudice the performance of the castor under test.

TEST APPARATUS

This consists of a linear machine to which the castor is fixed by its normal bolts, under various loadings, centrally over a smooth steel plate which then moves back and forth by one metre horizontally. Alternatively the circular apparatus can be used with the obstacles removed so the castors run on the clean, smooth steel surface.

TEST PROCEDURE

This involves a continuous sequence of cycles, followed by a pause, at a set rate per minute, and then repeated with varying loads and for varying time limits. Each cycle consists of a path of one metre forward and a one metre return stroke.



TRACTIVE RESISTANCE

a guide to wheel selection

The accompanying graph has been produced to assist with the selection of wheels where the tractive resistance (TR) or effort required to move a load is of prime importance.

It should be noted that with hard tread wheels, the initial TR is dependent on the floor surface. Small imperfections in the floor surface will increase the initial effort required to commence movement. However, soft tread wheels are not affected to the same degree. The graphs relate to good floor conditions.

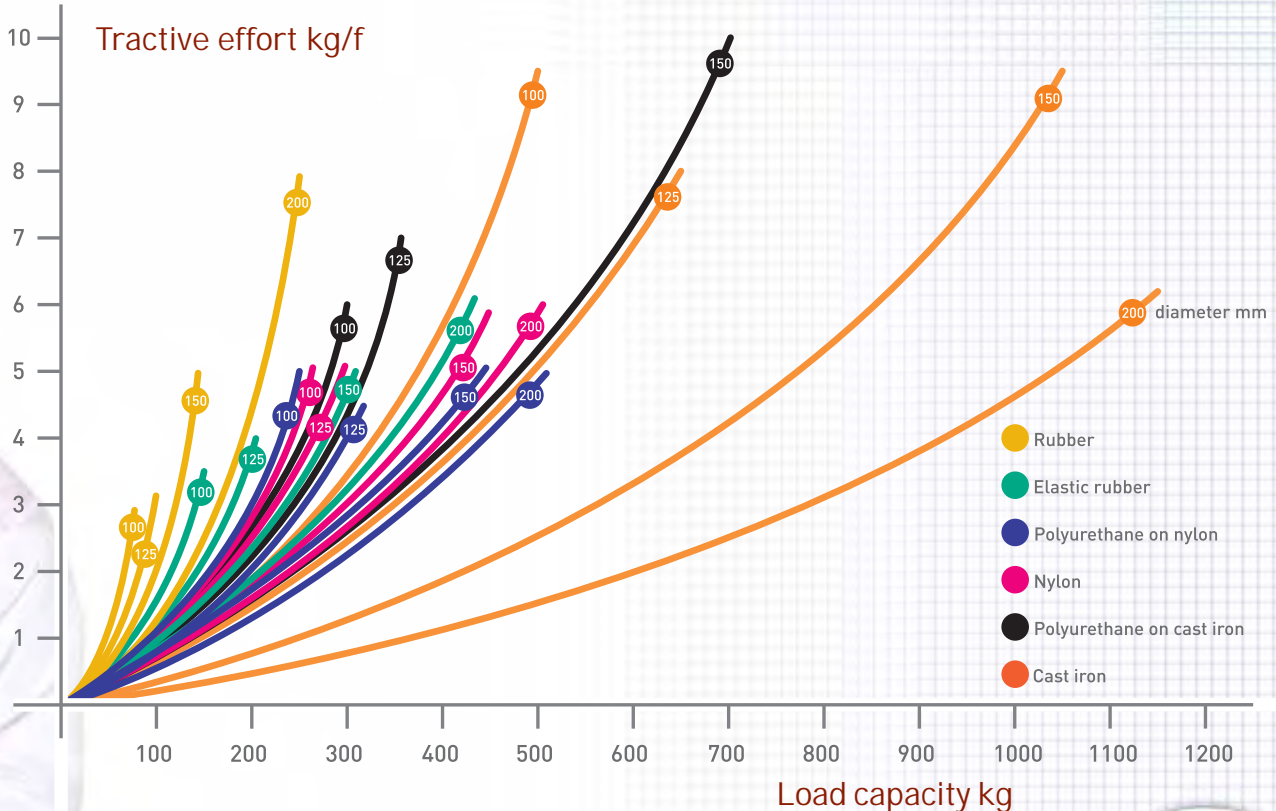
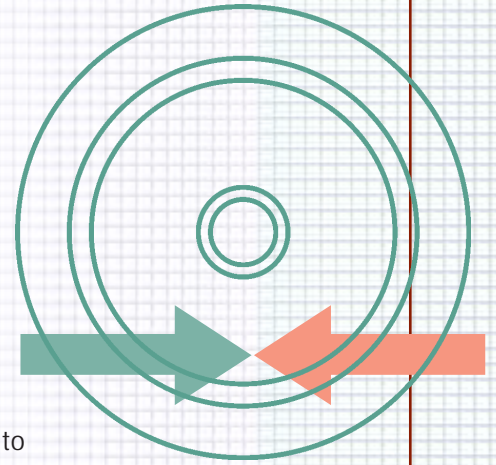
To start a load moving, a person can exert a force of approximately 18 kg/f, but this would be difficult to maintain for even a short period. Investigations have shown that a figure of 12kg/f is the maximum that can be used for continuous effort. Moreover, they are only able to maintain this effort over fairly short distances, and over

longer lengths of travel he cannot be expected to maintain a force of more than 6 kg/f.

The graph only relates to roller bearing* wheels in line with the direction of travel. When two or more wheels in swivel castors are transverse, i.e. 90° to the line of travel, the TR will initially be up to about seven times higher than those in line.

Resilient tyred wheels supporting static loads for long periods can develop a small flat spot on the tread. These normally roll out after the first revolution, but it is essential to allow for a higher starting load.

*As a general rule for plain-bearing wheels the effort required should be multiplied by a factor of two.



How tractive efforts change for various types and sizes of wheel under increasing loads



CHEMICAL RESISTANCE

a guide to the resistance of BIL wheels to certain chemicals or substances

Tyre/wheel type	Rubber on steel disc	Rubber on cast iron	Rubber on nylon/polyprop.	Poly-urethane on cast iron	Poly-urethane on nylon	Nylon	Polyprop.	Phenolic	Cast iron
Acetic acid 50%	E	F	E	F	D	D	A	A	F
Acetone	F	A	F	F	F	A	A	A	A
Ammonia solution (weak)	E	C	C	C	C	C	A	F	A
Bleach solution	B	D	C	D	D	C	A	F	A
Butanol	F	F	F	C	C	A	A	NDA	A
Carbon tetrachloride	F	E	E	D	D	A	D	A	A
Diesel oil	D	D	D	C	C	A	C	NDA	A
Edible oils	B	B	B	NDA	NDA	A	A	A	A
Ethanol	E	E	E	D	D	A	A	NDA	A
Hydrochloric acid (up to 30%)	F	F	F	F	D	D	A	A	F
Hydrochloric acid (up to 40%)	F	F	F	F	E	E	A	A	F
Hydrogen peroxide (30%)	B	E	E	F	E	E	B	A	F
Hydrogen sulphide	NDA	B	B	D	D	B	A	A	A
Machine oil	F	F	F	NDA	NDA	NDA	A	NDA	A
Methanol	F	F	F	F	F	B	A	NDA	A
Mineral oils	F	E	B	A	A	A	A	A	A
Motor oils	F	F	F	C	C	NDA	A	NDA	A
Nitric acid (10%)	F	F	F	F	F	F	A	F	F
Paraffin	C	A	A	NDA	NDA	A	A	A	A
Petrol	F	F	F	B	B	A	D	NDA	A
Phosphoric acid (10%)	F	F	F	F	F	F	A	A	F
Seawater	A	A	A	C*	A	A	A	A	A
Soap solution	A	A	A	B	B	A	A	A	A
Sodium bicarbonate	A	A	A	B	B	A	A	NDA	A
Sodium hydroxide sol. (10%)	B	A	A	B	B	A	A	F	A
Sulphuric acid (up to 50%)	D	F	F	F	F	F	A	A	F
Trichloroethylene	F	F	F	E	E	B	D	NDA	A
Water	A	A	A	B	B	A	A	A	A
White spirit	B	D	D	NDA	NDA	B	C	NDA	A

*Nylon can be a porous substance by nature and if used in wet conditions can expand causing wheels to seize.

NDA = no data available

The resistance properties exhibited by the wheel are graded on a scale of **A** to **F** with **A** being high resistance and **F** being low resistance. Where resistance to corrosion is implied in the table, this refers to a wheel being immersed in the chemical for a prolonged period. Splashes or short exposure to the chemical or substance may extend the life of a wheel beyond the indicated level.

CONVERSION GUIDE

metric to imperial and vice versa

Length

One inch	=	25.4 millimetres
One foot	=	30.48 centimetres
One yard	=	0.9144 metres
One mile	=	1.609 kilometres
One millimetre	=	0.039 inches
One centimetre	=	0.0328 feet
One metre	=	1.094 yards
One kilometre	=	0.621 miles

Area

One square inch	=	6.54 square centimetres
One square yard	=	0.8361 square metres
One square mile	=	2.589 square kilometres
One acre	=	4047 square metres
One square centimetre	=	0.155 square inches
One square metre	=	1.196 square yards
One square kilometre	=	0.386 square miles
One hectare	=	2.471 acres

Weight

One ounce	=	28.349 grammes
One pound	=	0.4536 kilogrammes
One stone	=	6.35 kilogrammes
One cwt	=	50.8 kilogrammes
One ton	=	1.016 metric tonnes
One gramme	=	0.035 ounces
One kilogramme	=	2.2 pounds
One kilogramme	=	0.157 stones
One kilogramme	=	0.0197 cwts
One kilogramme	=	1.02 decanewton
One metric tonne	=	0.984 tons
One Newton	=	10.2 kilogrammes

Volume

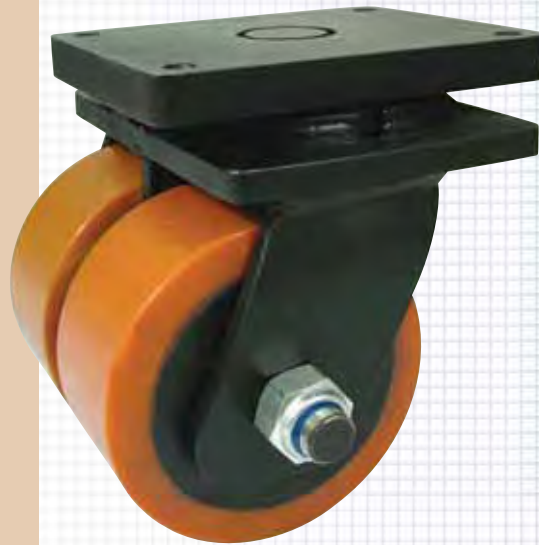
One cubic inch	=	16.38 cubic centimetres
One cubic foot	=	28.316 cubic decimetres
One pint	=	0.568 litres
One imperial gallon	=	4.546 litres
One cubic centimetre	=	0.061 cubic inches
One cubic decimetre	=	0.035 cubic feet
One litre	=	1.76 pints
One litre	=	0.22 imperial gallons

Temperature

Centigrade/Celsius	=	$(F - 32) \times 0.55$
Fahrenheit	=	$(C \times 1.8) + 32$



inches or
centimetres



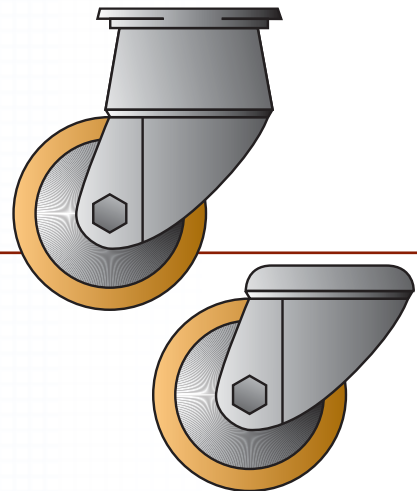
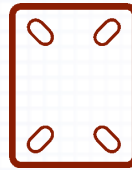
pounds or
kilogrammes



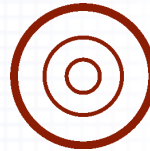
A QUICK GUIDE TO CASTORS & WHEELS

Mountings

Top plate – commonest fixing with four boltholes to spread the load over the swivel head.



Single bolthole – limited to loads of up to 320 kg having a fastener through the centre of the swivel head. Can be fitted with either threaded stems or round/square expanding sockets to fit in tubes.

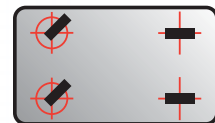


Loadings

The effect of uneven floors due to cracking, joints or gullies must be allowed for when assessing the required load rating of a castor. The degree of such defects will determine the extra shock loads acting on the castors.

CASTOR CONFIGURATIONS – these will also effect load calculations as, when moving, one or other castors may float on uneven floors removing its share from the loading. An allowance for this must be made, and so the castor load capacities are listed below, along with the uses and characteristics of each configuration.

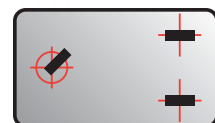
Two swivel + two fixed – when pushed with the two fixed castors leading, this offers the best load control with good steering on straight runs and cambers. Suitable for most loads. Castor capacity at least 33% of total gross load.



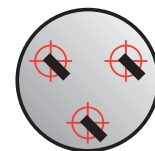
Four swivel – for maximum manoeuvrability. Difficult to control on straight runs, cambers and uneven surfaces, particularly with heavy loads – to overcome this fit directional locks. Castor capacity at least 33% of total gross load.



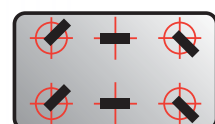
One swivel & two fixed – for easy manoeuvrability. Suitable only for small trolleys with light loads. Stability can be a problem so loads must be distributed evenly. Castor capacity at least 40% of total gross load.



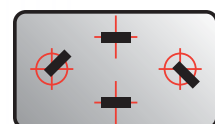
Three swivel – for maximum manoeuvrability. Can be difficult to control on straight runs, cambers and uneven surfaces. Suitable only for small trolleys with light loads. Castor capacity at least 40% of total gross load.



Four swivel & two fixed, centrally pivoting – usually used on long trolleys to optimise control and manoeuvrability. The two central fixed castors are usually one size larger, or the same size as the swivel and fitted with 25mm packing under the top plate. Castor capacity for the fixed castors at least 50% of total gross load. Swivel castor loads will vary.



Two swivel & two fixed, centrally pivoting – similar to the above but less stable if the load is not evenly distributed. The two central fixed castors are usually one size larger, or the same size as the swivel and fitted with 25mm packing under the top plate. Castor capacity for the fixed castors at least 50% of total gross load. Swivel castor loads will vary.



Wheels

Castor wheels are designed to be supported on both sides and intended for use on units with manual propulsion of up to 4mph. The extra stresses of powered towing should only be considered with specialist advice. Wheels are categorised into two groups – hard tread and soft tread...



HARD TREAD WHEELS – the easiest to push as they have least tractive resistance. The main disadvantage is that they are noisy and can wear floors excessively. The main types of hard wheels are as follows...

Cast iron & steel – combine shock resistance with long life and economy. Temperature range -40°C to +300°C

Nylon – has high load capacity, is light and clean and causes little floor damage. Temperature range -40°C to +80°C

Polypropylene – has good load capacity but not the abrasion or fracture resistance of nylon. Operational temperature range -20°C to +80°C

Phenolic – very hard, abrasion and fracture resistant but liable to wear and chipping. High operational temperature range up to +350°C

SOFT TREAD WHEELS – are resilient generally resulting in less noise, marking and floor wear. Tractive resistance is however much higher. New development grades of polyurethane and rubber have increased load capacities while reducing tractive resistance...

Solid rubber – the basic wheel, although new thermoplastic grades are harder wearing and low cost. Temperature range -20°C to +60°C

Elastic rubber – has a high load capacity and wear resistance with a smooth soft-cushioned ride. Temperature range -20°C to +60°C

Polyurethane – has a very high load capacity with abrasion, tear and chemical resistance and a soft ride. Temperature range -30°C to +90°C

Pneumatic – has excellent shock absorption working well on rough, uneven surface like grass or gravel. Temperature range -20°C to +60°C

High temperature – wheels now available with rubber tyres suitable for use in the temperature range -30°C to +250°C

Bearings

The choice of bearing is determined by the application, working environment and loading levels...

Plain bearings – are mainly used in low load, intermittent applications.

Disadvantages include axle wear and squeaking in dusty or wet conditions.

Roller bearings – are simple in construction, robust and excellent for regular use with light to medium loads working at low speeds.

Ball journal – precision construction bearings for higher loadings with moderate to high radial forces. Suitable for manual or low-speed powered towing.

Taper roller bearings – are mainly used with larger diameter castors for the highest loads and most arduous applications including towing.

Sintered bronze – or other metals, are a type of plain bearing used for high temperature applications to minimise friction and wear.

Teflon sleeve – are another type of plain bearing used to reduce friction but generally used on lighter loads than sintered bronze.

WHEEL BEARING KEY

Plain	
Roller	
Ball journal	
Taper roller	
Sintered bronze	
Teflon sleeve	



BIL PRODUCTION

the latest technology



CUSTOMER SERVICE

powered by SAP



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Castors

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BZTW

41-60mm
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BZD

40-125mm
30-100kg 18

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BZA

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2BZA

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BZC

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LOW LEVEL

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WNP
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150-600kg 106



WPN
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100-1100kg 107



WENP
80-200mm
210-500kg 108



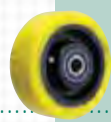
WPU
100-200mm
200-300kg 109



WPA
80-200mm
200-800kg 110



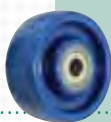
WPT/WSPT
50-500mm
80-4500kg 111



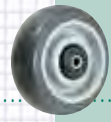
WRPTA
100-200mm
350-775kg 112



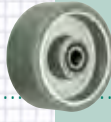
WPK
125-200mm
500-700kg 113



WPUA
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WAPA
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