

CASTERS, WHEELS, AND ACCESSORIES GUIDE 101

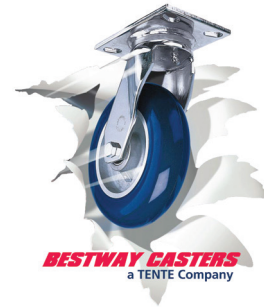


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CASTER TYPES

Swivel and rigid casters

There are two basic caster types, the swivel and rigid [also called fixed] versions.

Swivel caster



Swivel casters rotate and pivot around an upright axle [kingpin]. Consequently, they can be passively guided enabling them to move in all directions.

There are two common versions of swivel casters: the **kingpin** and the **kingpinless** version. A swivel bearing is part of the construction to allow the caster to turn in any direction.

Rigid caster



Rigid casters, also referred to as '**fixed**' casters allow forward and backward movement only.

In applications where both, forward and lateral mobility, is essential, it is advisable to use four swivel casters. If there are no serious restrictions in the turn radius it is acceptable to use two swivel and two rigid casters.

KINGPIN VS KINGPINLESS

Kingpin vs Kingpinless

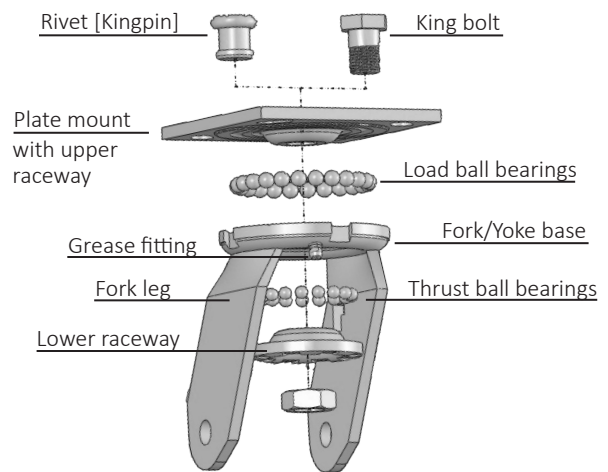
Swivel housings are available as **kingpin** or as **kingpinless**.

Kingpin

Traditional swivel sections are composed of several pieces: a top plate, a kingpin, a lower (thrust) race, a lower (thrust) bearing, an upper (load) race, and an upper (load) bearing.

The kingpin, which is generally a bolt or rivet, holds the other five components together allowing the caster to swivel. The swivel action is centered about the kingpin.

Legs are attached to the bottom side of the upper race, the lower race and bearing serve as a strengthening element, necessary to keep a heavier duty caster together.

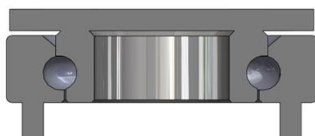
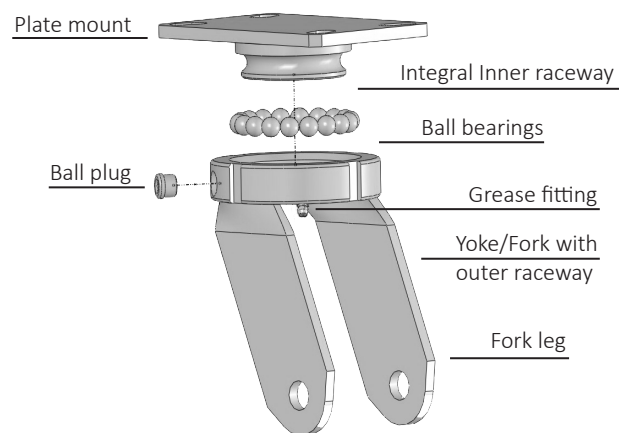


Kingpin cross section

Kingpinless

Compared to the traditional swivel section, a kingpinless swivel section is much simpler. It is constructed of a top plate, typically with a forged inner race, an outer race to which the legs are attached and the ball bearings between the two pieces in a precision machined raceway.

This design eliminates the need for a kingpin, as the name kingpinless implies.



Kingpinless cross section

CONFIGURATIONS

Solutions to fit your application

Some of the most commonly asked questions are:

- Should I use a single wheel caster, dual-wheel [twin-wheel] caster or maybe even a multi-wheel caster?
- What works best for my equipment and its intended application?
- How do I protect the goods being transported and the operators handling the mobile equipment?

The foremost difference is the load capacity. Dual-wheel [twin-wheel] casters have a higher load capacity and offer a smoother ride. The overall load, of equipment and goods, is distributed on a wider surface.

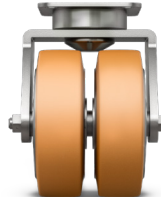
Dual-wheels [twin-wheels] provide easier maneuverability even under tough circumstances. They turn easier since both wheels rotate independently.

Single wheel casters are the economical solution.

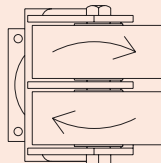
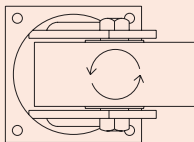
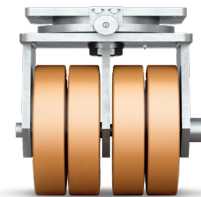
Single wheel



Dual-wheel [Twin-wheel]



Multi-wheel



When turning a twin-wheel model the caster must still pivot around its center point. One wheel rolls in a forward direction while the other rolls backward.

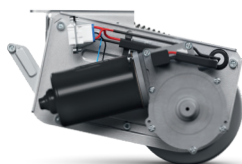
Not only does this require less force, but it also affords greater protection to both the floor surface and the wheel tread.

Spring loaded



Protect goods during transport, provide stability and lower noise levels.

Drive wheels [E-Drive]



When engaged the drive wheel lowers to the floor, rolls forward or backward. Functions as start up aid, or in continuous motion.

Leveling caster



Leveling casters, also called adjustable casters, offer a simple solution to allow an item to be completely stationary or mobile. Lower the leveling pad until it is pressed against the floor and the equipment will stand secure.

This relieves the wheel of the item's weight, makes the item stationary and allows for the cart or table to be adjusted.

HOUSINGS

The material makes a difference

Materials most frequently used in the manufacture of housings are synthetics, steel, or stainless steel. The following criteria are considered in selecting the caster housings:

- load capacity
- environment
- maneuverability
- overall height
- appearance

Plastic / Synthetic



This is a great general purpose caster. Easy to clean and maintain.

Steel



Steel casters are durable, they have low wear and tear and they carry heavy loads.

Stainless steel



Ideal for wet and corrosive environments.
Available in different grades.



GENERAL RULE

Larger offset: lighter load capacity, more wear on the swivel bearing for steady movement.

Smaller offset: heavy duty loads, less wear on the swivel bearing. Less steady movement.

The **offset**, which is the distance between the centerline of the wheel axis and the centerline of the swivel axis is an integral key factor. The amount of offset affects maneuverability, as well as swivel bearing wear.

BRAKE AND LOCKING MECHANISMS

Solutions for every situation

Top lock brake



Prevents the rotation of the wheel.

Directional lock



Restricts swivel motion of the caster in the 0° and 180° position however the wheel will still roll.

Total lock brake



Restricts all motion of the wheel and swivel of the caster.

It is not easy to distinguish between a total lock and a directional lock caster visually; they usually look identical. Caster manufacturers often use color coded brake pedals.

Wheel brake [tread brake]



Prevents the rotation of the wheel.

Side brake [butterfly]



Easy access to set the brake from the side. Side brakes stop only the wheel from turning.

VARIETY

A large variety of brake options is available in the caster and wheel industry. Brakes can be integrated in the housing, and in some cases field installable. Selecting the “correct” type of brake or locking function for your application is important when selecting casters.

BRAKE AND LOCKING MECHANISMS

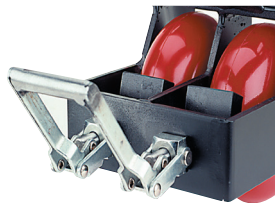
Solutions for every situation

Dead man's brake [safety brake]



An automatic brake that is activated when the operator releases a lever, which immobilizes the cart.

Poly-cam brake [dual-wheel]



Ideal for heavy duty casters. A poly cam handle mounted on the caster activates a plunger preventing the wheel from turning. These brakes may increase the swivel radius.

Electronically locking [E-lock]



Easily lock more than one caster simultaneously with an electronic control. A manual safety lock/un-locking feature assures continuous function even during loss of power.

Positional pin lock



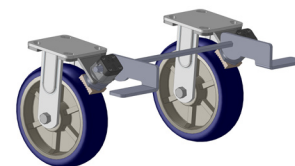
A welded or detachable pull-pin lock that restricts the swivel motion only. It can lock in the 0°, 90°, 180° and 270° positions depending on the manufacturer. Hand or foot options are available.

T-handle brake



This brake consists of a metal "T" handle threaded into a hole in the side of the housing. It is activated by turning. Ideal for heavy casters where a cam style side pedal brake may not provide sufficient locking pressure.

Central locking



The central locking system allows the locking and un-locking of more than one caster simultaneously with the utilization of hex rod and levers. Used on hospital beds, healthcare applications and waste management.

MOUNTING TYPES

Mounting options

Some call them **fittings**, some call them **mountings**. Fittings are an integral part of the caster construction. The correct mounting assures a safe and secure connection between the caster and the equipment. Several different mounting options are available, including: **central locking stems, grip-ring/friction stems, plates, single bolt hole, threaded and solid stems.**

Single bolt hole



Single bolt holes allows use of various length threaded stems.

Grip-ring stem [Friction-stem]



Grip-ring stems are quickly installed. They are common in the furniture industry.

Plate



Plates are available in many different sizes with various bolt hole patterns. Plates are fitted to flat surfaces with four screws.

Threaded stem



Threaded stems, come in a variety of dimensions and allow easy mounting.

Solid stem, round



Round and square stems have a set screw to securely the caster to the equipment, for example table legs.

Solid stem, square



Expandable [round]



Expandable round and square adapters allow for retrofitting in various tube diameters.

Expandable [square]



Wood stem



Wood stems are used on wood furniture and cabinetry. Easy to assemble and retrofit.

Central locking stem



Used exclusively with central locking systems, mostly on hospital beds and high-end waste bins. Stems are actuated via a hexrod and lever system. Available in short and longer sizes.

OPTIONS AND ACCESSORIES

Sweeps - brushes - zerk fittings and more

This category includes accessories, such as FOD [Free of Debris] sweeps and brushes, toe and foot guards, as well as zerk fittings. Every option brings an advantage and additional function to the caster configuration.

Cable pusher [catcher]

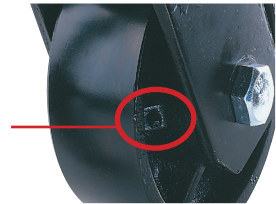


Toe / foot guard



Toe and foot guards provide increased safety in the work place.

Zerk fitting



Zerk fittings allow for easy regreasing of the bearing, thus providing long life and lower wear and tear on the swivel bearing.

Turntable



The turntable consists of two mounting plates, one above and one below a caster swivel section. Ball bearings inside the raceway allow the mounting plates to rotate much like a lazy susan.

Turntables maximize work-space, enable workers to remain in one position and rotate items they're working with.

FOD [Free of debris] sweep



Move debris out of the direction of travel and avoid unnecessary wear and tear to the wheel tread, therefore providing a smoother ride.

CASTER AND WHEEL APPLICATIONS

MEDICAL

The healthcare industry requires safe, reliable and high quality casters, wheels and accessories to protect patients, staff and equipment. Mobility is a requirement for most of the equipment, including hospital beds, stretchers, operating room equipment, utility carts, medication carts, cleaning equipment, X-ray machines, MRI equipment, medical furniture, chairs, food equipment, laundry carts and more.



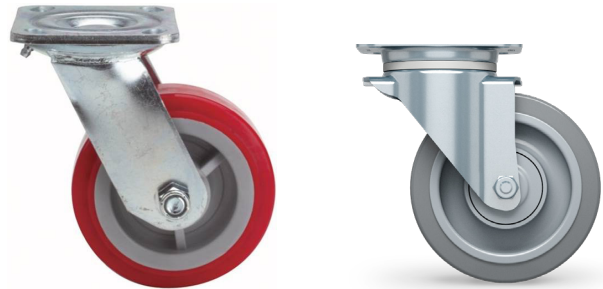
INSTITUTIONAL

This market has a vast range of applications, therefore a large variety of caster and wheel options are required to fulfill every requirement.

High-temperatures, wet and damp environments, chemical resistance, non-marking and non-staining tires, soft and hard wheels and more.

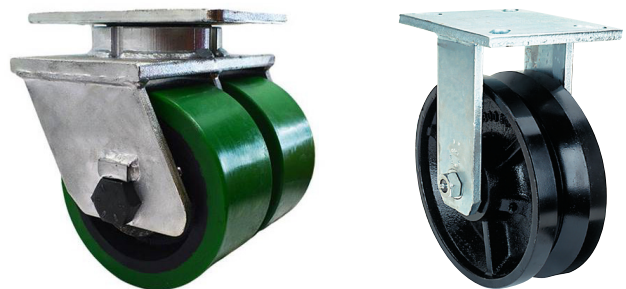
Some casters and wheels in this category have to look their best, therefore modern design features could be a key factor in selecting the right caster for a particular application, for example furniture

Shock absorbing, spring loaded and leveling casters are used on applications carrying sensitive equipment and goods.

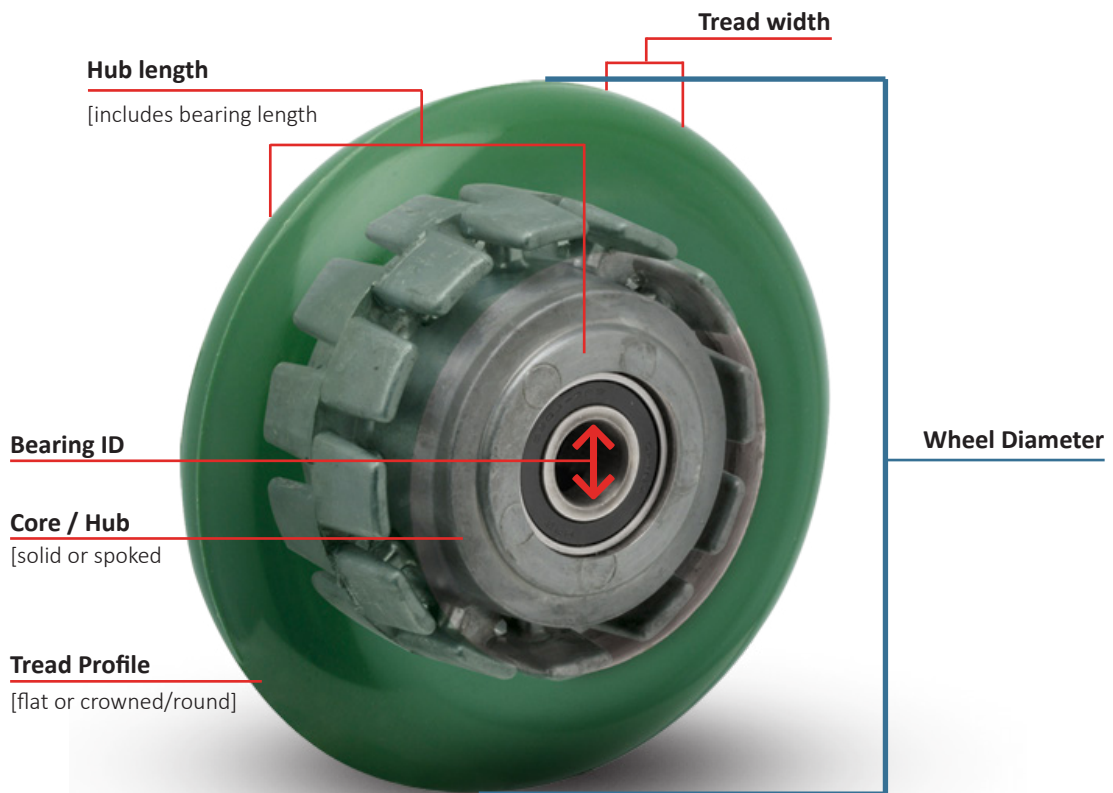


INDUSTRIAL

The industrial market has very specific needs. When selecting the correct caster for an industrial and heavy-duty application several factors have to be considered, including load capacity, environment, weather conditions, surface the application will move on, safety as well as other factors, to protect goods, equipment and most of all operators.



WHEEL ANATOMY



WHEELS

Main wheel types

Composite [Nylon & Elastomer]



- Nylon
- Glass-filled Nylon
- Polypropylene
- Polyolefin
- Elastomer
- Epoxy

Composite wheels are light weight and corrosion resistant. They carry less weight than wheels with metal hubs.

Phenolic



- Standard
- Laminated
- High-Temp

Wheels are molded of heavy macerated or chopped cotton denim, impregnated with phenolic and formed under high pressure and temperature.

Polyurethane



- Poured Polyurethane
- Compression Polyurethane
- Thermoplastic Urethane [TPU]
- ESD Polyurethane [anti-static]

Composed of polyurethane elastomer, open cast or injection molded. Polyurethane tread is chemically bonded to a caster iron core. High capacity polyurethane, non-marking, and delivers quieter operation than standard metal wheels.

Metal



- Cast Iron
- Ductile
- Forged
- Stainless

Metal wheels offer the highest strength and heat resistance of any wheel offering. Great for high load capacities and abusive applications.

Rubber



- Vulcanized
- Thermoplastic Rubber [TPR]
- Monoprene
- Neoprene
- ESD Rubber [anti-static]

Perfect for applications that require floor protection and shock absorption. Available with non-marking tread.



INDUSTRY SUPPORT

TEAM OF EXPERTS



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ICWM [Institute of Caster and Wheel Manufacturers]

Members are the Industry's leading suppliers of casters, wheels, and industrial trailer trucks, platform trucks and towline trucks. They supply caster and wheel solutions worldwide and in virtually every major manufacturing and distribution sector. The association was formed in 1933.

Vision

Connecting the right casters and wheels to the right application.

Mission

Deliver exceptional value to the caster and wheel market through standards development, educational materials and market intelligence.

ICWM members meet regularly to:

- Develop and promote guidelines and standards for casters and wheels
- Prepare and distribute educational and promotional materials
- Collect and disseminate reliable industry statistics



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The Industry That Makes Supply Chains Work

MHI is the nation's largest material handling, logistics and supply chain association. MHI offers education, networking and solution sourcing for members, their customers and the industry as a whole through programming and events.

Vision

To be the authoritative resource for the material handling industry.

Mission

Deliver member value every day.

MHI Snapshot

- 800 members including: material handling and logistics equipment companies, systems and software manufacturers; consultants; systems integrators and simulators; and third-party logistics providers and publishers.
- 17 MHI Industry Groups represent the leading providers in several key equipment and system solution categories.
- Sponsor of the industry-leading ProMat and MODEX events
- MHI provides educational, development, networking and solution sourcing opportunities.



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