

QuickGuide Casters & Wheels

There is no simple or formula that can be followed to select the proper caster or wheel for a specific application. The best choice for the longest service life and smooth operation is influenced by several factors, including the environment, impact loading, wheel size, wheel composition and bearing selection. The following are some of the more important factors to consider in your selection process.

1. Load Capacity

Determine the heaviest load that will be supported by the casters. To obtain the minimum caster capacity, divide the load weight by the number of casters under the load. Keep in mind that even if a cart, for example, has 4 casters, there may be situations (uneven floors) where only three of the wheels support the load at any one time. So, to include a safety factor, divide the load weight by one less caster (3 instead of 4 in this case).

2. Operating Surface

Determine the different floor surfaces over which the caster will operate. Rough floors produce more wear on the wheels and caster rigs and can result in uneven load distribution. Even if the floor appears relatively smooth, check for cracks, joints between flooring, and ridges or sills between rooms. Larger wheels may be required to bridge gaps in the flooring or to travel over transitions between flooring.

3. Floor Protection

Proper wheel selection may be a trade off between price, load capacity, and floor protection. The lowest cost wheel may provide the capacity you need, but may be damaging to the floor. Steel wheels have high capacity but may damage some concrete or wood floors. Polymer wheels may offer a lower load rating but offer more protection for floor surfaces. Many rubber wheels can produce marks on finished concrete or linoleum floors. A harder polyurethane or softer non-marking polymer may be the right choice here.

4. Rolling Ease

Regardless of the type of floor surface, the larger the wheel and the harder the wheel, the easier it will be to roll. Roller bearings carry the heaviest loads, but ball bearings are easier to roll. For easiest rolling, use the largest ball bearing wheel with the required capacity.

5. Rolling Speed

Nearly all casters are rated for capacity at walking speed. Higher speeds lower the bearing capacity. A higher speed, power propelled application will significantly reduce the caster load rating. The higher the speed, the lower the capacity. Higher speeds also result in increased forces on the wheel and rig, especially over uneven surfaces. Consult with your dealer for an appropriate safety factor in powered or higher speed applications.

6. Operating Environment

The operating environment can have a significant effect on the life of the wheel and caster rig. Special bearings, finish options and wheel types are available that will accommodate conditions such as dust, high humidity, water, corrosives, extreme temperatures, and rough floor conditions.

7. Wheel Types

- ✓ **Solid Rubber - hard or soft rubber tread molded to hard rubber core**
 - Light to heavy loads on hard surfaces and carpeting, resists oil & water
- ✓ **Mold-On Rubber - rubber tread bonded to cast iron core**
 - Medium to heavy loads on hard & rough floors, quiet, good floor protection
- ✓ **Phenolic - heat set plastic reinforced with macerated canvas**
 - Light to heavy loads on hard surfaces and carpeting, easy rolling, resists chemicals
- ✓ **Polyolefin - molded polypropylene plastic**
 - Light to heavy loads on hard surfaces and carpeting, easy rolling, resists oils & grease
- ✓ **Nylon - white lightweight solid nylon**
 - Light to medium loads on hard or carpeted surfaces, non-marking, resists oils & detergents
- ✓ **Metal - sintered iron, cast iron, or drop forged steel**
 - High capacity on rough & littered floors, easy rolling, high noise, high impact resistance
- ✓ **Mold-On Poly - polyurethane tread molded to aluminum, steel or polypropylene core**
 - Light to heavy loads on hard & uneven surfaces, quiet, max floor protection, resists abrasion

8. Caster Terminology

Caster Size is usually measured by the size of its wheel. For example, a 4" caster would have a 4" wheel -- even though the total overall height of the unit is more than 4" tall.

Casters come in two basic types: **Swivel** and **Rigid**. (Rigid style is also known as "fixed" or "stationary")

Casters are mounted using **Attachments** -- usually a plate that is bolted or welded in place, or a stem that is inserted into tubing. The attachment is important because the caster must be securely fastened to operate correctly.

Axle.

The bolt that runs through the wheel and also the bolt through the swivel rig (a.k.a. *kingpin*).

Bearing.

A bearing is the moving part that allows the wheel to roll and the caster to swivel. It refers to both the swivel bearing (a.k.a. *raceway*), and wheel bearing which can be ball, roller or sleeve type.

Bolt Holes.

The holes in the top plate allowing the caster to be mounted on the cart. (Usually come in fixed spacing)

Bore.

The hole through the middle of a wheel.

Brake.

Just like the emergency brake on a car -- when applied, it helps prevent the wheel from rolling.

Capacity.

The weight the caster will safely hold when rolling. (a.k.a. *load capacity*).

Caster.

A wheel with a swivel or rigid attachment, fastened under a heavy object to make it easier to move.

Diameter.

The wheel diameter of a caster.

Fastening.

The method of mounting a caster to the cart, dolly or equipment. (i.e., top plate, threaded stem, etc.).

Hub.

The center core of a wheel.

Hub Length.

The length of the bore of a wheel. The *hub length* is usually wider than the *tread*.

Kingpin.

The axle that holds the fastening to the caster body and allows the unit to swivel.

Load Capacity.

The weight the caster will safely hold when rolling.

Overall Height.

The total vertical height of the caster, from the floor to the top of the mounting plate, or the base of the stem.

Rigid.

A caster that doesn't swivel, but still rolls forward and back. Also known as a "fixed" or "stationary" caster.

Stem.

A fastening that usually fits into tubing for the caster to be mounted.

Swivel Lock.

Device to lock the swivel, making the caster act as a rigid.

Swivel Raceway.

One or two rows of ball bearings which bear the weight of the caster and allow the unit to swivel.

Swivel Radius.

The horizontal distance from the center of the kingpin to the trailing edge of the wheel. This determines the "sweep" of a caster as it pivots -- to make sure the wheel doesn't strike something as it turns.

Thread Guard.

A small piece of metal or plastic that fits over the wheel bearing to help prevent threads, dirt, and other materials from getting into the wheel. Not to be confused with "tread".

Tread.

The part of the wheel that rolls on the ground. Not to be confused with "thread".

Tread Width.

The width of the wheel tread.

Wheel.

You're kidding, right?

For questions or help with Caster & Wheel Applications:

Call Preferred Equipment Resource at 800-711-8698, e-mail us at: info@prefEQ.com, or visit our website: www.prefEQ.com.