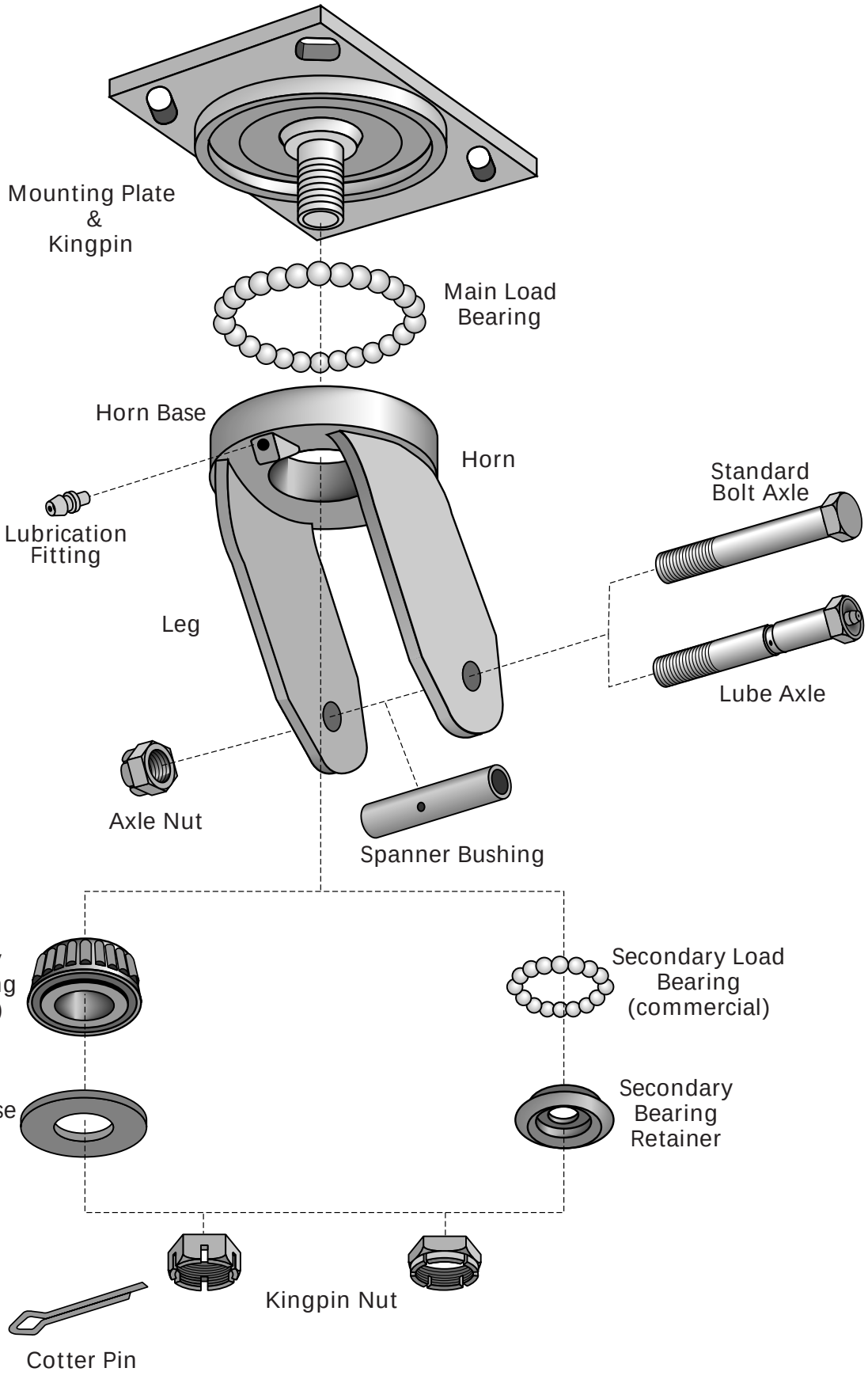
CASTER TERMINOLOGY



CASTER TERMINOLOGY

Capacity - The maximum load per caster or wheel recommended for intermittent operation over smooth floors at speeds of 3 m.p.h. or less. (Gross weight should be divided by the number of casters or wheels on which it is distributed.)

Caster Size - A loose term for classifying casters, based on the nominal diameter of the wheel. For example: a "6 inch caster" is any caster having a 6 inch diameter wheel.

Component Thrust - Designates side forces exerted on a swivel caster and properly counteracted by the secondary load bearing.

Direct Thrust - Designates those downward forces exerted on a caster by the load, and counteracted by the main load bearing.

Durometer - A measure of the hardness of resilient tread wheels.

Face - The width of the wheel tread cross-section, measured at the base of the tread rather than at the point of floor contact.

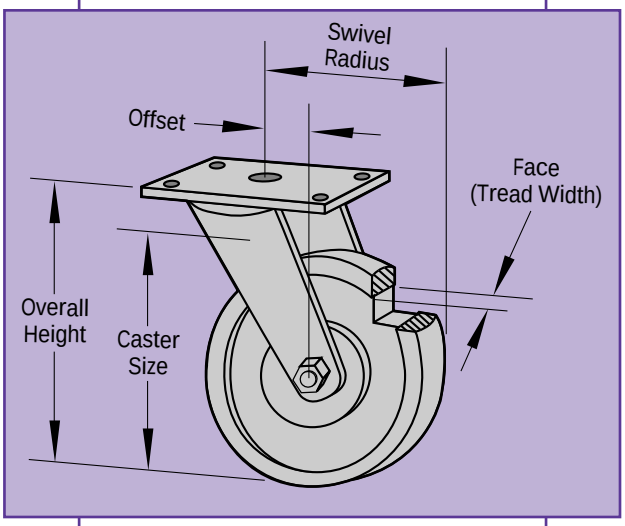
Horn - The caster part which comprises legs, plus a base (horn base of swivel caster or mounting plate of rigid).

Horn Base - The flat part at the top of the horn from which the legs extend. Serves as lower raceway for main load bearing, and may provide a seat or upper raceway for secondary load bearing.

King Pin - A rivet, or threaded stud or bolt with nut, that holds the mounting plate and horn assembly of a swivel caster together. Forged as an integral part of mounting plate on higher quality casters for maximum rigidity and strength.

King Pin Nut - The nut on the bottom of a threaded king pin or bolt that permits the disassembly or adjustment of swiveling components; a maintenance feature of better casters not found with rivet type king pins.

Legs - The axle support brackets extending down from the horn base of a swivel caster, or from the mounting plate of a rigid caster.



Main Load Bearing - The row of steel balls or rollers that swivels the horn base in relation to the mounting plate of a swivel caster, and counteracts direct thrust.

Mounting Plate - The flat base, usually with four bolt holes, that forms the top of a caster and permits attachment by bolting or welding to a flat surface.

Offset - (swivel lead) The perpendicular distance between the vertical centerlines of the king pin and the axle of a swivel caster. Larger offsets afford easier swiveling, shorter offsets greater strength.

Overall Height - The vertical distances from the top of the caster mounting plate to the bottom of the wheel.

Raceway - A surface in which bearing balls or rollers rotate.

Retaining Washer - A steel washer pressed into the hub ends of some roller bearing wheels to hold the bearing in place.

Rig - A swivel or rigid caster assembly less wheel, that may or may not include axle, nut or spanner bushing.

Rockwell C - System for measuring hardness of metals.

Rollability - Ease of starting and rolling, measured by drawbar pull. This is determined by load, floor conditions, and type and size of wheels and bearings.

Secondary Load Bearing (Commercial) - The row of steel balls that rides in the raceway between the horn base and secondary bearing retainer of a swivel caster to counteract component thrust. It is this bearing that characterizes the popular "double ball race" caster.

Secondary Load Bearing (Precision) - A precision self contained bearing, usually a tapered roller bearing, operating between the horn base and the king pin of a swivel caster. Constitutes the most efficient means of assisting swivel action by counteracting component thrust.

Spanner Bushing - A non-rotating sleeve of seamless steel tubing that fits over the axle in many casters. Serves the dual purpose of providing a smooth inner raceway for the wheel bearings, and strengthening the caster by permitting the legs to be tightened against it.

Swivel Radius - The horizontal distance from the centerline of the caster king pin to the outer edge of the wheel (a measure of clearance required to swivel a caster 360°).

Thrust Washer - A steel washer between the hub ends of the wheel and the inside of the caster legs.

Yoke - Alternate term for horn.

CHOOSING THE PROPER CASTER OR WHEEL

How To Specify Casters For Direct Replacement

When existing casters of acceptable performance are in use, furnish a part number. Our Expert Customer Service Department can recommend an accurate, direct replacement.

Note: Send us a sample for free no obligation identification. Sample returned freight prepaid same day if necessary.

How To Specify Casters For New Applications

1. How much load capacity is required?

   Divide the load capacity needed by the number of casters being used to get the capacity per caster.

   Example:
   1,000 lbs. total load ÷ 4 casters used = 250 lbs. per caster.

   Will the load be subject to shock or impact, or will the application involve towing?

2. What diameter and tread width is required?

   The best and easiest way to improve rollability is to choose the largest diameter wheel that is practical for the application.

3. Type of mounting required?

   A. If plate mount, what is the top plate and bolt hole pattern?

   If the casters are being welded, the above dimensions are not critical.

   B. If stem mount, type of stem (i.e. threaded, grip ring, expandable).

   1. Outside dimension of tubing?

   2. Inside dimension of tubing?

   3. Gauge or thickness of tubing?

   4. Actual stem dimensions?

   Note: See page 130 for tubing and pipe sizes, wire gauge chart, and decimal cross references.

4. Is the overall height critical? Refer to page 7.

5. What is the operating environment?

   See Wheel Material Selection Guide and Wheel Characteristics Selection Guide on pages 10, 11 & 12.

   Some applications may require special wheel materials, bearing types or swivel and rigid horn types (i.e. temperature extremes, moisture, caustic chemicals, variance in floor condition).

How To Specify Wheels For Direct Replacement

1. When existing wheels of acceptable performance are in use, furnish a part number. Our Expert Customer Service Department can recommend an accurate, direct replacement.

   Note: Send us a sample for free no obligation identification. Sample returned freight prepaid same day if necessary.

How To Specify Wheels For New Applications

1. How much load capacity is required?
   Divide the load capacity needed by the number of wheels being used to get the capacity per wheel.

   Example:
   1,000 lbs total load ÷ 2 wheels used = 500 lbs. per wheel.

2. What diameter and tread width is required?

3. What hub length is required and is it offset or symmetrical?

4. What is the bore size?

5. What type of bearing is required?

6. What is the operating environment?

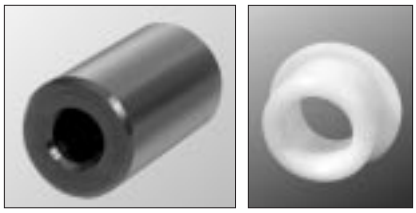
   See Wheel Selection Guide on page 10.

7. Do you need component parts to mount wheel?
   See Component Parts on pages 101 to 103.

WHEEL BEARINGS

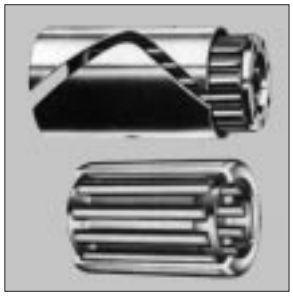
Precision Tapered Roller Bearings

Ideal for heavy duty caster applications because their tapered faces will handle any combination of downward and side forces. Used in various swivel assemblies as well as in wheels. Two bearings are installed per wheel, one in each side of the hub, consisting of a cup (hardened and ground outer raceway) and cone (roller assembly). Spanner bushings are not employed since adjustment requires tightening caster legs against the bearing assembly. Tapered bearings extend overall hub length of the wheel itself by approximately 1/4".



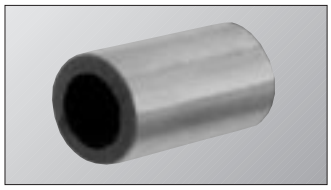
Delrin®

(Registered DuPont trademark.) Sometimes referred to as plastic or celcon. For environments detrimental to metal bearings, acetyl resin bearings offer chemical and corrosion resistance. Delrin® is a standard offering in certain wheels, as either a sleeve or flange type bearing. Plastic bearings can be custom machined and installed in most other wheels on request. Note: flange type bearings extend actual hub length of wheel approximately 3/16".



Roller Bearings

Most popular anti-friction bearing for industrial equipment. Consists of a cage-type roller assembly, and an outer race that may be separate or integral see on page 103. We most often use hardened and ground steel roller bearings for maximum loads and life. (Note: plastic retaining washers or other components may be used unless we are advised of a high-heat application.)

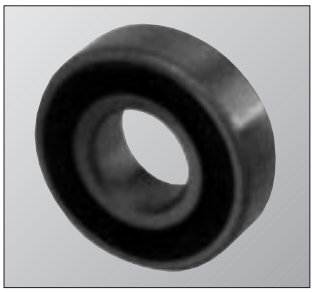


Self Lubricating

A sleeve, usually of sintered iron or oil-impregnated bronze, is press-fit into the wheel bore. Lacks the ease of movement anti-friction bearings provide, but practical for light loads where re-lubrication is a problem. (A light application of oil or graphite improves rollability and extends bearing life.)

Ball Bearings

The standard ball bearings referred to in this catalog are the unground radial type, intended for light to medium duty service. on special order we can supply light or heavy duty precision ball bearings for both radial and thrust loads, in configurations including flanged, sealed, square bores, extended inner raceways, and wide inner raceways with self-locking collars.



Precision Ball Bearings

This type of bearing consists of a hardened outer raceway and inner raceway, separated by a concentric ring of hardened steel balls. This bearing is used in pairs and is usually press fitted into a deep pocket of a wheel that has high load, and high speed capabilities. This type of bearing is primarily used to carry radial loads only.

Plain Bore

The term applied to running, machine bored wheels, directly on an axle; hence, the absence of a bearing. Suitable for light or seldom moved loads, where ease of starting and rolling is not too important or where price is a dominant factor. Except for roller bearing bores, we normally machine "plain bore" wheels 1/64" oversize for good running fit. Closer tolerance machining available at extra cost.

Wheel Material Selection Guide

Full-Pneumatic Wheel Assemblies

Page 71

Smoothest ride over rough terrain. All are tube type.

Semi-Pneumatic Wheels

Page 71

Versatile wheel offering solutions to a multitude of applications.

Soft Rubber-SR

Page 73

Traditional composition hard core with soft tread. Very quiet ride for modest cost.

Mold-On Rubber-MR

Page 74

Traditional cushioned rubber tread vulcanized to a cast iron core. Quiet and floor protective.

Santoprene® -SP

Page 72

Patented by Monsanto, this thermoplastic rubber is mechanically and chemically bonded to a polyolefin core. Tread is grey non-marking.

Polyurethane Iron Core-PI

Page 78

3⁄8” to 1⁄2” thick polyurethane tread is chemically bonded to a cast iron core. Low rolling resistance and good floor protection.

Polyurethane Severe Duty-PS

Page 79

Combines class 1030 close grained grey iron casting with premium polyurethane tread for severe duty and shock applications. 1" thick thread on tapered bearing wheels.

Solid Urethane-KT

Page 77

This solid cast urethane wheel offers quiet operation combined with high load capacity and unequaled abrasion and wear resistance.

Polyurethane on Polyolefin-PP

Page 80

Injection molded polyurethane tread is mechanically and chemically bonded to a polyolefin core. Lighter than polyurethane treads on steel or aluminum cores.

Polyurethane Aluminum Core-PA

Page 75

Premium polyurethane mechanically and chemically bonded to a reinforced aluminum core. Offers high capacity, good floor protection and looks sharp.

Advanced Elastomer-AE

Page 76

High abrasion resistance. Withstands chemicals, greases and solvents. Very low rolling resistance for a resilient wheel.

Polyolefin-PB/PW

Page 81

Injection molded polyolefin is available in black or white color. Offers good load capacity and water resistance at a low cost.

Wheel Material Selection Guide continued

Hard Rubber-HR

Page 84

This one piece wheel is made of a molded hard rubber composition. Good load ratings and resists flat spotting.

Phenolic-PH

Page 82

Single piece phenolic resin compound molded with macerated canvas under extreme pressure and heat.

Reinforced Thermoplastic-RT

Page 83

Specially blended, reinforced thermoplastic. Excellent rollability and impact resistance will not absorb water. Above average chemical and solvent characteristics.

Cast Iron-SS

Page 86

Sometimes called semi-steel because of scrap steel content. Couples high capacity with long service life.

V-Grooved-VG

Page 89

Used on inverted angle iron for tracking applications. Available in many sizes and capacities.

Flanged Wheel-FW

Page 90

Designed to run on parallel tracks. Face and flange machined for concentric, smooth mobility.

Grey Iron-GI

Page 85

Close grained class 1030 casting makes this wheel ideal for shock and impact loads that will cause standard cast iron wheels to crack or shatter.

Heavy Duty Ductile Iron-HD

Page 85

Heavily sectioned rims and solid web design ensures long service life in the most severe of applications.

Forged Steel-FS

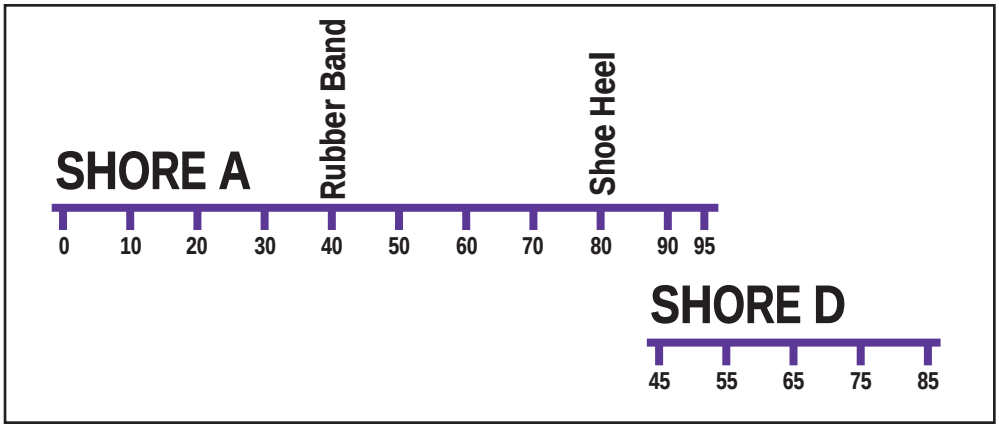
Page 88

Indestructible in normal applications. Longest service life. Used where floor protection is a secondary consideration.

WHEEL CHARACTERISTICS SELECTION GUIDE

Wheel Type		Load Capacity to lbs. (KGS)	Durometer	Temperature Range	Abrasion Resistance	Impact Resistance	Floor Protection	Noise Reduction	Moisture Resistance
Full-Pneumatic Wheel Assemblies	PN	675 (307)	55A	-20° to +100°F	Medium	Low	Very Good	Very Good	Medium
Semi-Pneumatic Wheels	SN	600 (273)	75A	0° to +100°F	Low	Low	Good	Good	Medium
Soft Rubber	SR	300 (135)	70A	-40° to 158°F	Low	Low	Good	Good	Low
Mold-On Rubber	MR	3020 (1359)	70A	-30° to 160°F	Low	Low	Good	Good	Low
Santoprene®	SP	700 (315)	75A	-40° to 230°F	High	Medium	Very Good	Very Good	High
Polyurethane Iron Core	PI	9000 (4050)	95A	-45° to 180°F	High	Medium	Good	Fair	Medium
Polyurethane Severe Duty	PS	4800 (2160)	95A	-45° to 180°F	High	High	Very Good	Good	Medium
Solid Urethane	KT	1500 (675)	55D	-50° to 180°F	High	High	Very Good	Fair	Very High
Polyurethane on Polyolefin	PP	1000 (450)	90A	-45° to 180°F	High	Medium	Good	Good	Medium
Polyurethane Aluminum Core	PA	1500 (675)	95A	-40° to 160°F	High	High	Good	Fair	Medium
Advanced Elastomer	AE	1200 (545)	68D	-50° to +212°F	Very High	Very High	Very Good	Good	Very High
Polyolefin	PB/PW	800 (360)	95A	-20° to 230°F	Medium	Medium	Fair	Poor	Very High
Hard Rubber	HR	600 (270)	95A	-40° to 158°F	Medium	Medium	Fair	Poor	Low
Phenolic Resin	PH	8000 (3600)	—	-45° to 250°F	Medium	Medium	Fair	Poor	Low
Reinforced Thermoplastic	RT	1400 (630)	65D	-20° to 250°F	Medium	High	Fair	Poor	Very High
Cast Iron	SS	3500 (1575)	—	-45° to 800°F	High	Medium	Poor	Poor	High
Grey Iron	GI	4000 (1800)	—	-45° to 800°F	Very High	Very High	Poor	Poor	High
Heavy Duty Ductile Iron	HD	10000 (4500)	—	-45° to 800°F	Very High	Very High	Poor	Poor	High
Forged Steel	FS	15000 (6750)	—	-45° to 800°F	Very High	Very High	Poor	Poor	High

DUROMETER CHART



ROLLABILITY CHART

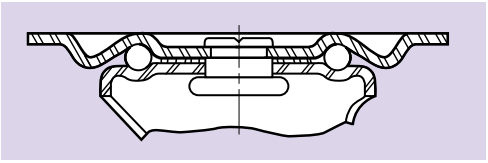
Sustained Rolling Force is the number of pounds of force that needs to be applied to keep the unit rolling.
Breakaway Force is the number of pounds of force that needs to be applied to start the unit rolling.

Wheel Type		Wheel Size	Sustained Rolling Force	Breakaway Force
Full-Pneumatic Wheel Assemblies	PN	6 x 2	6.5	13
Semi-Pneumatic Wheels	SN	6 x 2	6	12
Soft Rubber	SR	6 x 2	12	24
Mold-On Rubber	MR	6 x 2	11.2	22.4
Santoprene	SP	6 x 2	9.5	19
Polyurethane Iron Core	PI	6 x 2	6.2	13.5
Polyurethane Severe Duty	PS	6 x 2	7.	14.
Solid Urethane	KT	6 x 2	5.1	10.2
Polyurethane on Polyolefin	PP	6 x 2	7.2	14.4
Polyurethane Aluminum Core	PA	6 x 2	6.5	13

Wheel Type		Wheel Size	Sustained Rolling Force	Breakaway Force
Advanced Elastomer	AE	6 x 2	3.5	7.0
Polyolefin	PB/PW	6 x 2	3.4	6.8
Hard Rubber	HR	6 x 2	1.2	2.4
Phenolic Resin	PH	6 x 2	1	2
Reinforced Thermoplastic	RT	6 x 2	1.2	2.4
Cast Iron	SS	6 x 2	0.8	1.6
V-Grooved	VG	11	11	11
FW Flanged	FW	11	11	11
Grey Iron	GI	6 x 2	0.8	1.6
Heavy Duty Ductile Iron	HD	6 x 2	0.7	1.4
Forged Steel	FS	6 x 2	0.7	1.4

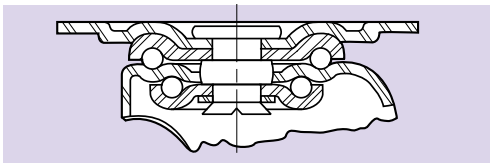
Note: Based on 500 lbs. per wheel. Wheels have roller bearings.

SWIVEL BEARING DESIGNS



Single Ball Race

Most basic of possible swivel constructions, this economical and low height caster depends on an accurately curved raceway to contact a single row of balls. Because of its minimal ability to withstand thrust against the king pin, this construction is not recommended where shock exists, but is nevertheless found in the world's most popular "dolly" casters.

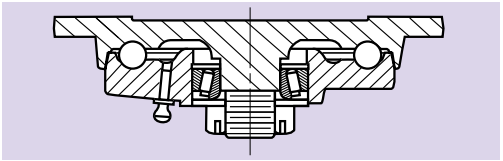


Double Ball Race

Two sets of hardened and polished steel balls rotate in machined or pressure-coined raceways. The upper raceway absorbs direct thrust, while the lower raceway surrounds the king pin to absorb side forces (component thrust). Raceways are hardened as required by the load rating, and king pins may be of the bolt or rivet type.

King Pin-Free

Unique design whereby a single row of ball bearings run between laterally facing, machined raceways. Eliminates the traditional king pin found in virtually all other swivel assemblies.



Commercial Load and Precision Thrust Bearing

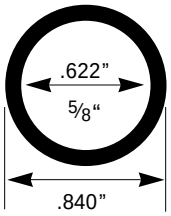
A set of hardened and polished steel balls rotate in a machined raceway (flame hardening recommended for continuous service). Radial thrust is absorbed by a precision tapered roller bearing.

CONVERSION TABLES

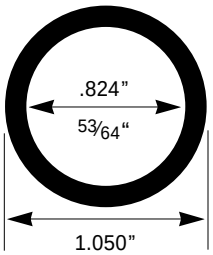
Standard Iron Pipe Sizes.

These drawings are actual size. To determine pipe size, match pipe with the proper size drawing below.

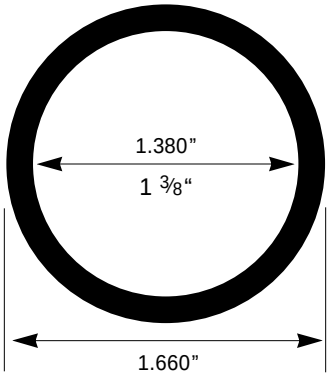
½" Pipe



¾" Pipe



1 ¼" Pipe



DECIMAL CROSS/REFERENCE CHART

1/64	.0156	17/64	.2656	33/64	.5156	49/64	.7656
1/32	.0132	9/32	.2812	17/32	.5312	25/32	.7812
3/64	.0468	19/64	.2968	35/64	.5468	51/64	.7968
1/16	.0625	5/16	.3125	9/16	.5625	13/16	.8125
5/64	.0781	21/64	.3281	37/64	.5781	53/64	.8281
3/32	.0937	11/32	.3437	19/32	.5937	27/32	.8437
7/64	.1093	23/64	.3593	39/64	.6093	55/64	.8593
1/8	.1250	3/8	.3750	5/8	.6250	7/8	.8750
9/64	.1406	25/64	.3906	41/64	.6406	57/64	.8906
5/32	.1562	13/32	.4062	21/32	.6562	29/32	.9062
11/64	.1718	27/64	.4218	43/64	.6718	59/64	.9218
3/16	.1875	7/16	.4375	11/16	.6875	15/16	.9375
13/64	.2031	29/64	.4531	45/64	.7031	61/64	.9531
7/32	.2187	15/32	.4687	23/32	.7187	31/32	.9687
15/64	.2343	31/64	.4843	47/64	.7343	63/64	.9843
1/4	.2500	1/2	.5000	3/4	.7500	1	1.000

WIRE GAUGES

1	.300
2	.284
3	.259
4	.238
5	.220
6	.203
7	.180
8	.165
9	.148
10	.134
11	.120
12	.109
13	.095
14	.083
15	.072
16	.065
17	.058
18	.049
19	.042
20	.035
21	.032
22	.028
23	.025
24	.022
25	.020
26	.018
27	.016
28	.014
29	.013
30	.012
31	.010
32	.009
33	.008
34	.007

To find the inside diameter of tubing, multiply the gauge of the metal by 2 and subtract from O.D. of the tubing.

[O.D. - (2 x gauge) = I.D]

Example: 1" 18 gauge
2 x .049 = .098 subtract from 1.000 = .902 I.D.