

TECHNICAL REFERENCE · PRINT & KEEP

# Caster Ergonomics & Push/Pull Force: How to Reduce

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**Quick answer.** Ergonomic caster spec targets Liberty Mutual Snook limits: 50 lb sustained push force for 90 percent of the male workforce and 35 lb for 90 percent of the female workforce. Push force is set by wheel diameter, tread compound, floor, bearing, swivel offset, raceway, and load distribution. Correctly spec'd casters cut workers' comp claims 40 to 70 percent.

## What Makes an Ergonomic Caster Different

Cart Weight	Standard (4 in, 80A, plain bearing)	Ergonomic (6 in, 95A, sealed)	Reduction
500 lb	45 lb sustained	24 lb sustained	47%
1,000 lb	80 lb sustained	42 lb sustained	48%
2,000 lb	145 lb sustained (2-operator)	76 lb sustained	48%
3,000 lb	210 lb sustained (3-operator)	112 lb sustained (2-operator)	47%
5,000 lb	powered tugger required	180 lb (2-operator, flat)	Manual OK

## How to Measure Push Force

Measurement	Tool / Method	Target (Male 90%)	Target (Female 90%)	Action If Exceeded
Starting force (peak)	Digital force gauge, 3 mph release	under 50 lb	under 35 lb	Upgrade wheel diameter or compound
Sustained force (8 hr)	Digital force gauge, steady roll	under 40 lb	under 28 lb	Upgrade bearing and rig
Lateral (side) force	Force gauge at 45 deg	under 20 lb	under 14 lb	Check plate alignment and brake drag
Initial swivel force	Force gauge, turning start	under 35 lb	under 24 lb	Extend swivel trail or add dual-raceway rig
Sustained swivel force	Force gauge, full turn	under 25 lb	under 18 lb	Upgrade to tapered-roller raceway
Shift drift (AM vs PM)	Same cart, same operator, 8 hr apart	under 15%	under 15%	PM bearings and brake return springs



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