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Caster Load Ratings Explained (With Safety Factors)

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Quick answer. Caster load ratings are three numbers, not one: static capacity (load at rest), dynamic capacity (repeated rolling load at a reference speed), and shock capacity (momentary peak before deformation). Buying by the headline static number ignores the two ratings that determine service life. For demanding applications, procurement should apply up to a 4x safety factor over calculated per-caster load.

Static, Dynamic, and Shock: Definitions

Rating Type	Definition	Test Method	Typical Failure Mode
Static	Max stationary load, no deformation	Compression hold 1 hour	Wheel flat-spot, axle bend
Dynamic (ICWM)	Rolling load at 3 mph for 8 hr/day	Ergonomic test track	Bearing wear, tread chunk-out
Dynamic (ANSI MH31.1)	Rolling load at 4 mph on smooth floor	ANSI test dynamometer	Bearing, tread
Shock (momentary)	3x static for <1 second	Drop-test from height	Rig plate deform, axle snap
Shock (repeated)	1.5x static, 10,000 cycles	Impact-drop cycling	Fatigue crack at rig welds
Fatigue	Static rating, 1M cycles	Rolling fatigue stand	Bearing race pitting

Load Rating vs Application Matrix

Application	Governing Rating	Why	Typical Safety Factor
Stationary equipment (machine bases)	Static	No rolling; deformation is the failure mode	2x
Manual carts (hand-pushed)	Dynamic (ICWM)	Slow speed, continuous rolling	3x
Tugger-towed carts	Dynamic (ANSI)	Higher speed, longer runs	4x
AGV/AMR fleet	Dynamic + fatigue	24/7 operation, 1M+ cycles	5x
Impact-loaded (loading docks)	Shock (momentary)	Drop-and-roll peaks	3x on shock
Heavy-industrial with crane loading	Shock (repeated)	Repeated impact from crane-drop loading	3x on shock cycle



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