Gas Springs — Force Sizing That Works, Length Logic and Mounting Rules

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How to size a gas spring from the lid's weight and geometry (the one formula plus the 10–15 % overcome margin), reading references as force–rod–length, why rod-down mounting decides lifetime, end-fitting choices, temperature effects on force, and what never to do with a pressurised spring.

References read force – rod – length

Stock rows carry the whole geometry in the name: a 250 N spring with 19 mm body over 1028 mm extended length, or the strut pattern 500 N / 150 mm stroke / 8 mm rod with M8 eye ends and its 300 mm-stroke sibling. The force stamped is the extension force near full extension (F1); compression force runs higher by the spring's progression (~1.2–1.4× across the stroke). With 5,500-plus gas-spring rows stocked, nearly any force-length pair exists off the shelf — the work is choosing it honestly.

Sizing a lid in four lines

Required total force at the springs "H (lid weight × distance from hinge to lid's centre of gravity) ÷ (number of springs × perpendicular distance from hinge to the spring's line of action) — the lever arithmetic that makes a 20 kg hatch need 2 × 400 N springs when the springs mount close to the hinge.

Add 10–15 % so the lid self-rises the last degrees and holds firmly open; subtract nothing for optimism.

Stroke and lengths: extended length "H geometry at full open, compressed length must still fit at closed — extended "H compressed + stroke " overlap; check both positions on the drawing, not one.

Mounting-point choice tunes feel: closer to the hinge = more force needed but faster assist onset; the classic layout has the spring near-perpendicular to the lid at mid-travel.

Rules that decide lifetime

Rod down (or within ~60° of it) at rest: the internal oil then lubricates the seal every cycle — rod-up mounting is the single biggest life-shortener and the first question when springs die young.

No side load: eye ends with ball sockets or clevises must articulate freely; a twisted mount scores the rod, and a scored rod bleeds gas within months.

Temperature moves force "H 3–4 % per 10 K: a spring sized indoors fails to hold a hatch at " 20 °C and slams fingers at +60 °C; size for the service temperature band.

Never open, heat or crush one — 100+ bar of nitrogen lives inside; worn-out units are drilled by trained hands or returned, not binned whole.

Replacement reads off the old unit: force (printed), centre-to-centre extended, stroke, rod/body diameters and end fittings — eye, clevis, ball-stud being interchangeable families (metric thread sizes per the thread reference).

Enquiries quote within 24 hours from the stamp or the lid's numbers (weight, hinge-to-CG, mounting sketch); dampers, locking variants and stainless builds for washdown sit in the same stocked range.

Frequently asked questions
How do I calculate the gas spring force for a hatch?Lever balance: lid weight times hinge-to-centre-of-gravity distance, divided by springs count times the hinge-to-spring-line perpendicular distance — then add 10–15 % so it self-opens the final arc. The stamped Newton value near full extension is what you match.Why did my gas springs fail within a year?Mounted rod-up, nine times out of ten — the seal then runs dry and the nitrogen bleeds. Rod-down (±60°) at rest, free-articulating end fittings and an unscored rod are the whole longevity recipe.What do the numbers on a gas spring mean?Force in newtons (extension force near full stroke), then the geometry: rod and/or body diameter and lengths — the stocked rows read e.g. 500 N, 8 mm rod, 150 mm stroke, M8 eyes. Centre-to-centre extended length is the fitment-critical figure.Will a stronger spring fix a lid that won't stay open?Only if force was genuinely short — equally often the geometry is wrong (spring too close to the hinge at full open) or the spring has bled. Measure holding force before upsizing; an oversized spring makes closing a wrestling match.Can gas springs be refilled or adjusted?Some industrial types carry a valve for professional re-gassing or down-adjustment (releasing pressure to tune force); sealed commodity struts are replace-only. Never improvise — the charge is high-pressure nitrogen.

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