# 9 inputs determine the right shock absorber.

A distributor-facing pre-quote checklist. If the customer answers most of these at the first call, the second call is the quote.

**01**

### What's the load mass at end of stroke, the part, the tooling, the cylinder rod itself?

Mass × impact velocity² × ½ = kinetic energy the shock has to absorb. **Customers consistently underestimate this**: they forget the rod weight, the end-of-arm tooling, and any product the cylinder is carrying. Get total moving mass at end-of-stroke, including the part being moved.

**02**

### What's the cylinder's velocity at the moment of impact?

A 5 kg load at 0.5 m/s = 0.625 Nm; the same load at 1.5 m/s = 5.6 Nm: nearly an order of magnitude difference. **Measure the cylinder's terminal velocity at end of stroke, not its average** : air-driven cylinders accelerate continuously until impact unless metered.

**03**

### Is the cylinder still pressurized and pushing when the rod hits the shock?

If yes, add the drive force × stroke into the energy calc. **A cylinder still delivering 200 lbf at impact** over 25 mm of shock travel adds ~22 Nm of energy on top of the kinetic load. This is the single biggest under-sizing trap.

**04**

### How many cycles per minute is the cylinder running?

Cycle frequency determines whether you need a shock at all (>30 cyc/min is the rule of thumb) and whether you can survive on an under-sized self-compensating model. **Above 60 cyc/min on a dedicated line**, adjustable is the only spec that holds: the self-compensating compromise burns out too fast.

**05**

### Is this a dedicated production line, or a job-shop / mixed-part cell?

Dedicated → adjustable, tune once, longest life. Job-shop → self-compensating, no re-tune required. **The operator-tuning assumption is the hidden cost**; if no one is going to re-tune the shock when the part changes, don't quote adjustable.

**06**

### Is the impact axial onto the shock, or at an angle?

Side-loading the shock plunger destroys the seal fast and voids the warranty. **Impact has to be ±2° of axial**; anything more needs a guided pad on the shock face or an external alignment guide on the cylinder. Photograph the install plane on retrofit jobs.

**07**

### What's the ambient temperature at the install location?

The hydraulic fluid inside the shock thickens cold and thins hot. **Standard shocks are rated -20 to +80 °C**; outdoor, cold-room, or hot-process installs need temperature-rated variants. Cold-start a standard shock at -30 °C and it won't compress on the first hit; the cylinder slams.

**08**

### How is the shock mounted, threaded into the machine, or in a separate bracket?

Thread size + mounting nut style + jam nut clearance all have to match the machine bracket. **Most installs are M12 to M27 threaded** with a single jam nut; flange-mount variants exist for larger capacities. Measure the bracket before quoting; wrong thread is the #1 returns reason.

09

### How will the customer know the shock is wearing out?

Failure mode is degraded deceleration: the cylinder starts slamming again, gradually. **No warning, no leak, no alarm** in most installs. Quote a spare with every shock on a dedicated high-cycle line; replace at the first sign of harder end-of-stroke sound, not when the cylinder finally breaks.