9 inputs determine the right cylinder.

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 stroke length the machine cycle actually needs?**

Stroke is the first sort. **Under ~100 mm in tight envelope** → compact. **Standard stroke (100-600 mm)** → ISO 15552 or NFPA tie-rod. **500-2,500 mm in a short installed length** → rodless. Get the stroke before talking brand.

02 **What bore size does the load require?**

Bore + supply pressure = available force. **Force = π × (bore/2)² × PSI × 0.9** for a typical rod cylinder. A 2" bore at 100 PSI gives ~280 lbf push; a 3" bore at the same pressure gives ~640 lbf. Don't undersize: friction and side-load eat 10-20% of the calculated force in real installs.

03 **What's the mounting style the machine bracket is built for?**

Foot mount, flange, clevis, trunnion, pivot: the bracket dictates the cylinder, not the other way around. **If the customer is replacing an existing cylinder, photograph the mounting before quoting.** Wrong mounting style is the #1 returns reason on cylinder orders.

04 **Is there side-load on the rod, or pure axial push-pull?**

Tie-rod and compact cylinders are built for axial loads only. **Any meaningful side-load → heavy-duty cast** (SMC CA2) or an external linear-bearing guide. Side-loading a standard cylinder bends the rod within months and the seal fails right after.

05 **Does the rod need to maintain angular orientation through the stroke?**

Standard round-rod cylinders allow free rotation of the rod under load, for most jobs that's fine. **If the tool, jig, or end-effector can't be allowed to spin**, spec a non-rotating cylinder (SMC MB) or add external anti-rotation hardware.

06 **Is this cylinder going into a PLC-controlled cycle that needs position feedback?**

If yes, every cylinder gets a position sensor (or two: end of retract + end of extend). **SMC cylinders ship with a magnetic piston ring as standard**; the sensor snaps into the body groove and wires direct to PLC input. Reed switch under 2 Hz, solid-state above 2 Hz.

07 **Is this a new install, or a replacement on an existing North American machine?**

Replacement on an existing Parker, Bimba, or Numatics installation **defaults to NFPA tie-rod** for drop-in dimensional match. New install with no legacy constraint → ISO 15552 (AIGNEP for value, SMC for spec). Don't quote ISO as a Parker replacement; the bolt pattern won't line up.

08 **What's the cycle rate, strokes per minute under typical duty?**

Cycle rate drives seal life and sensor selection. **High-cycle duty (above 60 strokes/min) wants premium seal kits** and solid-state position sensors, not reed switches. Quote a rebuild kit as a preventive spare on any cylinder cycling more than 30/min.

09

Is the cylinder in a washdown, food-contact, or chemically aggressive environment?

Standard NBR seals don't tolerate FDA-grade lubricants or aggressive washdown chemistry. **Food-contact or harsh-environment installs need FKM or food-grade seal packs** and often stainless rod plating. Spec the rebuild kit in matching seal material at the same time as the cylinder.