Swagelok Tube Fittings — Part Number Key and Size Chart

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How a Swagelok tube fitting part number is built — material prefix, tube size in sixteenths or metric with the M, body style digits, end connection — decoded against worked examples (SS-400-6, SS-6M0-1-4, SS-810-1-8), the two-ferrule principle and why single-ferrule copies fail, fractional and metric size tables with wall-thickness limits, pull-up practice (1-1/4 turns, gap gauge, retightening), mixing rules between makers, and the adjacent valve and gauge programme.

The short version

A Swagelok number is a sentence: material prefix, tube size code, body style, end connection(s). SS-400-6 reads: 316 stainless (SS), 1/4 in. tube (4 sixteenths), union (-6). SS-6M0-1-4 reads: 316 stainless, 6 mm tube (6M0), male connector (-1), 1/4 in. NPT thread (-4). SS-810-1-8: 1/2 in. tube (8), male connector, 1/2 in. NPT. Once the grammar is learned, every fitting on a panel can be read from its stamp.

Tube size code: sixteenths of an inch for fractional, millimetres + M for metric. 2 = 1/8", 4 = 1/4", 6 = 3/8", 8 = 1/2", 10 = 5/8", 12 = 3/4", 16 = 1"; 3M = 3 mm, 6M = 6 mm, 10M = 10 mm, 12M = 12 mm. Fractional and metric fittings are different parts — a 6 mm tube in a 1/4 in. fitting is a leak with a certificate of confusion.

The two-ferrule mechanism is the product. The back ferrule drives and hinges, the front ferrule seals and grips with a colleted action that does not torque the tube. Pull-up is geometric, not torque-based: 1-1/4 turns from finger-tight on sizes 1/4"/6 mm and up (3/4 turn below), verified with the gap gauge, and remakeable many times with the retightening procedure.

Tube quality is half the joint. Fully annealed seamless or welded-and-drawn tube, hardness comfortably below the fitting's, surface free of scores, wall thickness inside the maker's table for the pressure — ordered with the fittings, not found on site.

Mixing makers is a policy decision, not a shrug. Swagelok, Parker A-LOK/CPI, Ham-Let, Hy-Lok et al. build to the same envelope but certify their systems complete; the conservative rule — and most operators' written rule — is: no mixed components within one joint; whole joints of either maker on the same panel are fine.

1. The part number grammar, with worked examples

Segment | Codes | Notes |

Material prefix | SS = 316 SS; B = brass; S = carbon steel; M = Monel; HC = Hastelloy C; T/PFA = polymer lines | First block before the dash |

Tube size | Sixteenths: 2, 4, 6, 8, 10, 12, 16; metric: 3M, 6M, 8M, 10M, 12M, 18M, 25M | The number the wrench size follows |

Body style | 0 after metric size (6M0) marks the metric series; then -1 male connector, -2 female connector(by family), -3 union tee, -4 cross (as 4-way), -6 union, -7 female connector, -9 union elbow, -P plug, -C cap, -R reducer | The style digits are the fitting's function |

End connection | -2 = 1/8 NPT, -4 = 1/4 NPT, -6 = 3/8 NPT, -8 = 1/2 NPT (on connector styles); RT suffixes for BSPT, RS/RP for parallel BSP variants | Second size block on connectors |

Worked example | Reads as |

SS-400-6 | 316 SS, 1/4 in. tube union |

SS-810-3 | 316 SS, 1/2 in. tube union tee (e.g. the SS-1610-3 is the 1 in. big brother) |

SS-6M0-1-4 | 316 SS, 6 mm tube, male connector, 1/4 in. NPT |

SS-1610-P | 316 SS plug for a 1 in. tube fitting port |

SS-1210-P | Same, 3/4 in. size |

Valves follow their own families on the same grammar — the SS-4MG metering valve (1/4 in.), its 1/8 in. sibling SS-2MG and the bellows-sealed SS-4BMG read material + size + family letters the same way.

2. Size tables: fractional and metric

Code | Tube OD | Common walls (seamless 316) | Typical duty |

2 | 1/8 in. | 0.028–0.035 in. | Gauge lines, analysers |

4 | 1/4 in. | 0.035–0.065 in. | The instrumentation standard |

6 | 3/8 in. | 0.035–0.065 in. | Impulse lines, gas supplies |

8 | 1/2 in. | 0.049–0.083 in. | Hydraulic-adjacent, sampling mains |

6M | 6 mm | 1.0–1.5 mm | The metric instrumentation standard |

10M | 10 mm | 1.0–1.5 mm | European panels |

12M | 12 mm | 1.0–2.0 mm | Supply headers |

The fitting's pressure rating assumes the tube's: ratings tables pair each OD/wall with an allowable working pressure (a 1/4 in. x 0.035 in. 316 line sits in the 5,000 psi class; thin-wall metric tube considerably lower), and gas service pushes wall thickness up the table for ferrule bite. The tube table in the maker's catalogue is the binding document — and thread identification for the other end of connectors lives in our BSP/NPT/metric thread chart.

3. Make-up: the part people get wrong

Cut square, deburr inside and out, mark the insertion depth. Hacksaw and deburrer, not an abrasive wheel that work-hardens the end.
Bottom the tube in the fitting. The mark proves it stayed bottomed during make-up.
Finger-tight, then 1-1/4 turns for 1/4 in./6 mm and larger (3/4 turn for the small sizes), holding the body hex with a second wrench.
Gauge the gap. If the gap gauge enters between nut and body, the joint is not made up — the inspection that takes two seconds and ends arguments.
Remakes: insert until the front ferrule seats, then snug past the original position slightly (the published retightening practice); ferrules stay with their tube forever.

What the mechanism refuses to forgive: dirt in the counterbore, tube not bottomed, torque-based make-up habits imported from compression plumbing, and hard tube that the ferrules cannot bite. On gas duty, leak-test with the proper fluid and accept zero bubbles — the instrument specification guide covers the loops these lines serve, and the calibrator guide the low-range leak-hunting that bad joints sabotage.

4. Interchange and alternatives, honestly

System | Mechanism | Interchange position |

Swagelok | Two-ferrule | The reference; complete-system certification |

Parker A-LOK | Two-ferrule | Geometrically compatible class; operators' rules still forbid mixing within a joint |

Parker CPI | Single-ferrule | Different mechanism; never mix components with two-ferrule systems |

Ham-Let, Hy-Lok, Hoke Gyrolok | Two-ferrule / single by family | Same policy: whole joints only, per the site's written standard |

DIN 2353 cutting ring | Bite-type on metric tube | A different world (hydraulics) — covered in the hydraulic fitting finder |

The defensible position for a plant or vessel: pick a primary system, write the no-mixed-joints rule, and hold spares of that system's ferrules and nuts per size. Where an installed base is mixed (every older vessel), survey by stamp — the part number grammar above reads any panel — and standardise forward rather than ripping out working joints.

5. Specifying and buying

A quotable line: system (Swagelok or accepted equivalent-class), material (316 default; 6Mo/Monel/Hastelloy for aggressive media with the 316-vs-304 logic behind it), tube size code, fitting style, end connection with thread standard explicit (NPT vs BSPT bites exactly here), quantity — plus the tube itself (OD, wall, material, annealed condition, mill certificate per EN 10204 3.1 where the piping class asks). Panels order by the kit: fittings, tube, gauge, deburrer, spare ferrule/nut sets per size.

How buying works at cballast. We quote instrumentation fittings, valves and tube by part number or by the decoded attribute set, with material certificates where specified, from Swagelok-class systems per the site's standard. Accounts are vetted at onboarding; first order prepaid; established accounts on credit terms with repeat discounts; public bodies and utilities invoiced against purchase order from the first order. RFQs to sales@cballast.com.

Frequently asked questions

How do I read a Swagelok part number?Material prefix, tube size, style, end connection. SS-6M0-1-4: 316 stainless, 6 mm tube (6M0), male connector (-1), 1/4 in. NPT (-4). SS-400-6: 316 stainless, 1/4 in. tube (4 sixteenths), union (-6). Fractional sizes count sixteenths of an inch; metric sizes carry an M.
What do the 1-1/4 turns mean on make-up?The published pull-up from finger-tight for sizes 1/4 in./6 mm and larger (3/4 turn below that): the geometry that swages the ferrules correctly. It is a rotation specification, not a torque — verify with the gap gauge, and never "another quarter turn for luck".
Can Swagelok and Parker A-LOK parts be mixed?Within one joint: no — that is both makers' position and nearly every operator's written rule, because each certifies its system as a whole. Whole joints of different systems on the same panel coexist fine. Single-ferrule systems (CPI class) must never share components with two-ferrule joints at all.
What tube should I use with 316 tube fittings?Fully annealed, high-quality seamless or welded-and-drawn 316/316L, hardness below the ferrule's bite requirement, smooth and score-free, with wall thickness from the maker's pressure table (0.035–0.065 in. covers most 1/4–3/8 in. instrument duty; 1–1.5 mm the metric equivalents). Order tube and fittings together with the mill certificate.
Are reused ferrules acceptable?Ferrules stay married to their tube: a made-up joint can be remade many times by seating and snugging per the retightening practice, but ferrules never transfer to new tube, and new ferrules never go onto tube swaged by another system.
Who supplies Swagelok-class fittings and valves by part number?cballast.com quotes fittings, metering and shutoff valves, and instrument tube by part number or attribute set, with certificates where the class requires. Send the stamped numbers or the panel list to sales@cballast.com.

References and related guides

Sources referenced: Swagelok tube fitter's manual and catalogue data (part numbering, pull-up, gap gauge, retightening); tubing data tables for allowable working pressure; ASTM A269/A213 tube specifications; ASME B1.20.1 (NPT) and ISO 7/ISO 228 (BSP) threads; operators' instrumentation standards on system mixing.

BSP, NPT and metric thread chart

Hydraulic fitting finder — BSPP, BSPT, JIC, ORFS, DIN 2353

Specifying instruments — pressure, temperature, level, flow

Stainless 304 vs 316 — marine grade comparison

EN 10204 material certificates — 2.1, 2.2, 3.1, 3.2

Questions on a stamp, a size or a remake: write to sales@cballast.com. We answer whether or not you buy from us.

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