

Nitrogen Purging for Brazing Refrigerant Lines — Why, How Much Flow, and the Fittings That Make It Easy

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What happens inside a refrigerant line brazed without nitrogen, the purge flow that prevents it, how to rig a purge from a nitrogen regulator through charging hoses with the catalogue's BSP-to-flare adapters, and pressure-test practice after the torch work.

What the oxide costs

Copper heated to brazing temperature in air grows a black cupric-oxide scale on the bore. In service that scale flakes off and migrates: into the expansion valve orifice (plant starves, superheat hunts), into the EEV stator gap, onto compressor suction screens, and into POE oil where it catalyses acid chemistry. Modern plants with electronic expansion valves and microchannel coils are far less tolerant of debris than the TEV plants of old — which is why every OEM's warranty text now says "brazed under inert gas". The cure costs almost nothing: a gentle flow of oxygen-free nitrogen (OFN) through the line while it is hot keeps the bore bright.

How much flow

The purge needs to displace oxygen, not to blow: excessive flow cools the joint and can blow pinholes through molten filler. Working practice: purge the section generously first (several volume changes), then braise with a whisper — of the order of 2–5 L/min through the section, maintained from before the torch touches until the joint is below oxidation temperature (dull black, no red). Vent the far end through a loose flare nut or Schrader-depressed core so pressure never builds behind the molten alloy. On long runs, purge continuously joint-to-joint rather than re-purging per joint.

Rigging the purge

The standard rig is: nitrogen bottle !' two-stage regulator with low-pressure gauge !' flow restrictor or needle valve !' 1/4" SAE charging hose !' the line. Regulators terminate in BSP on most European bottles, so the adapters that live in the braze kit are the BSP-to-flare pieces stocked in the catalogue: 1/4" BSP × 1/4" flare and 3/8" BSP × 1/4" flare. Entry to the circuit is wherever a service port exists: gauge port of a rotalock valve, a Schrader access tee (1/4" tee with Schrader port; couplings with ports in 1/2", 5/8", 3/4", 7/8" let you build ports where none exist), or a piercing valve on retrofit work (1/4" flare for 3/8" pipe — replaced by a proper joint afterwards).

After the torch: strength and tightness testing

Nitrogen does double duty as the test gas. EN 378 practice: a strength/tightness test of the assembled section with OFN (never oxygen, never the refrigerant itself for strength testing) at the pressure the standard assigns to the plant's design pressure and category, joints checked with bubble fluid, then held to prove no decay before evacuation. Regulator safety: a refrigeration circuit must never see full bottle pressure — set the regulator deliberately, use a relief-protected test manifold on high-pressure CO2 work, and open bottle valves slowly. Log the test pressure, duration and result; that record is what the F-gas verifier and the class surveyor ask to see.

Kit list

OFN bottle + two-stage regulator + the BSP/flare adapters above

Charging hoses dedicated to nitrogen (no oil contamination)

Schrader tools: MV-3900 core remover to pull cores for full-bore purge and faster evacuation

Bubble fluid, heat-blanket for nearby components, and the brazing alloys from the alloy guide

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