# 316L Stainless Steel Tube & Manifold Assemblies

## Rigid coolant distribution for fuel cell stations and data centre cold plates

Stainless steel tube replaces long runs of flexible hose in the main coolant circuit. Tube is cut, bent and welded to the assembly drawing, then electropolished, flushed and pressure-tested. A fixed geometry holds its bore, drops less pressure than hose of the same length, and does not age in service.



Welded flange and tube fittings



Supply and return manifold bars, welded ports on fixed pitch

## Key features

### 316L wetted parts

Tube, forged fittings and flanges in 316L. 304 where the coolant is not aggressive.

### Bent to the drawing

CNC bending to the assembly drawing; port spacing, bend radius and end cut held per part.

### Orbital TIG welding

Ports and flanges welded under argon; the weld map is kept against the assembly serial number.

### Electropolished bore

Wetted surface electropolished and passivated for low-conductivity coolant.

### Borescope on every joint

Internal view of each weld and bend before the assembly is closed and packed.

### 16 bar for 3 minutes

Every assembly water-tested at 16 bar for three minutes; no weep at any joint.

### Helium leak test

Helium sniff at the joints where the order calls for a leak-tight assembly.

### Flushed, capped, bagged

Ultra-clean flush, dried, ends capped and bagged per assembly.

## How it is built

### Forming

Tube cut to length, bent on CNC, ends squared and deburred. Small-bore line for a single stack; large manifold body for multi-stack parallel systems.

### Joining

Ports, bosses and flanges welded by orbital TIG under argon. Joint numbers and welding parameters are recorded per assembly.

### Finishing

Heat tint removed, bore electropolished and passivated, then flushed to the cleanliness agreed at order and capped.

## Where it is used

### Data centre CDU and rack manifolds

Supply and return manifolds, cold-plate drops and CDU-to-rack runs in AI and HPC halls.

### Stationary fuel cell plant

Main coolant distribution between stacks, radiators and pumps in containerised or skid-mounted stations.

### Energy storage liquid cooling

PACK-level distribution, where a rigid line replaces a long flexible hose run.

## Matched to your layout

### Bore to the coolant flow

Tube bore is sized from stack power and coolant flow, so a line built for one station does not throttle the next size up.

### Port pitch to the rack

Port count and spacing follow the cold-plate layout in the hall, not a catalogue pitch.

### Length to the skid

Assemblies are drawn against the station layout, so the line arrives with the bends, offsets and flanges it needs.

## Technical data

Rows below are what the assembly is built and tested to. Tube diameter, port layout and material grade come from the drawing agreed at order.

| Parameter | Value |
|---|---|
| **Wetted material** | 316L stainless steel; 304 on request |
| **Tube size** | Built to drawing — outside diameter, wall thickness and length per assembly |
| **Connections** | Welded flange, threaded port, weld stub, quick coupling |
| **Working pressure** | Design to 16 bar |
| **Pressure test** | Water at 16 bar, held 3 minutes, on every assembly |
| **Leak test** | Helium sniff at joints where specified |
| **Wetted surface** | Electropolished and passivated |
| **Coolant** | Deionised water or water-glycol, conductivity ≤ 5 µS/cm |
| **Cleanliness** | Ultra-clean flush and dry; ends capped before packing |
| **Marking** | Part number, serial number and date code on the assembly |
| **Documentation** | Material certificate, weld record and test report per assembly |

## Manufacturing and inspection

| # | Check | Method | What it proves |
|---|---|---|---|
| 1 | **Dimensional** | Drawing dimensions, port spacing, bend angles | The assembly fits the skid without rework. |
| 2 | **Borescope** | Internal view of every weld and bend | No spatter, burn-through or obstruction left in the bore. |
| 3 | **Hydrostatic** | Water at 16 bar, held 3 minutes | No weep at the joints and no permanent deformation. |
| 4 | **Helium** | Sniff test at the joints | Tightness at the leak rate agreed in the order. |
| 5 | **Cleanliness** | Flush and dry; particle check on request | Bore clean enough for cold plates and low-conductivity coolant. |

## Ordering information

- Send the assembly drawing, or the port layout, bore and overall envelope. We return a drawing for approval before any tube is cut.
- State the coolant, working pressure, and whether the line is pressure-tested only or also helium-tested.
- State the cleanliness level, and whether material certificates to EN 10204 3.1 are required.

## What ships with each assembly

| | | |
|---|---|---|
| Material certificate EN 10204 3.1 | Weld map and parameters | Hydro test report |
| Helium test report | Dimensional report | Cleanliness record |

## Standards referenced

| | | | | |
|---|---|---|---|---|
| **GB/T 14976** Stainless tube | **ASTM A269** Welded austenitic tube | **ISO 9606-1** Welder qualification | **EN ISO 15614-1** Welding procedure | **IATF 16949** Supplier QMS |

**Note** Dimensions, port layout and material grade are confirmed against the approved drawing at order. Test pressure and leak rate are stated on the report shipped with each assembly. Specifications are subject to change without notice.