Air Liquide
creative oxygen

Turbo-Brayton

for small scale methane liquefaction

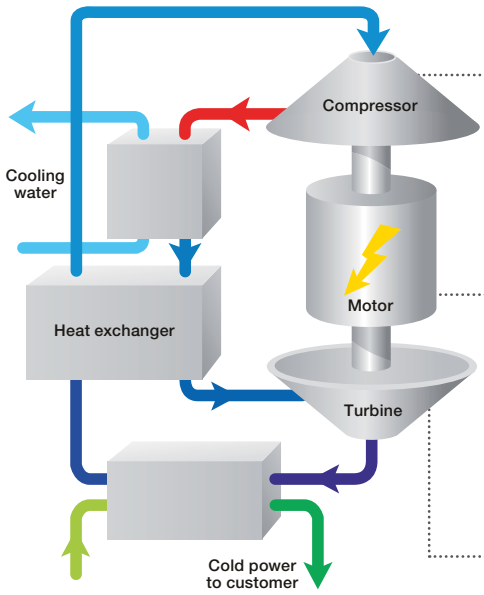
The Air Liquide Turbo-Brayton cooling system is an optimal solution for natural gas liquefaction. Combining performance, reliability and compactness, it can be used for liquefying biogas, natural gas or flare gas as well.

Key benefits of the Turbo-Brayton liquefaction system

- Integrated solution with feed gas pretreatment
- No feed gas losses
- **Low installation cost and time:** plug and play, compact (low footprint and weight)
- **Maintenance-free** for 5 years
- **Unmanned operation**, fully automatic
- **Cold power available instantaneously** (less than 5 min) from stand-by mode
- **Multi-sources liquefaction:** biogas, natural gas, flare gas
- Flash and boil off are avoided thanks to methane subcooling, no water cooling
- Utility-free: no compressor, no oil, no nitrogen
- Safe technology: inert process gas, no refill of process gas required
- Mobile system, fully integrated with feed gas pretreatment
- Low electrical consumption and high efficiency on all operate range from 0 to 100% turn down

Reverse Turbo-Brayton principle

Air Liquide's innovative reverse Turbo-Brayton process essential innovation concerns the assembly of all active elements on a single shaft.



1 Centrifugal compressor

- High efficiency
- Oil-free

2 High-speed synchronous motor and active magnetic bearings

- Direct drive
- No gear box
- High compacity
- Contact free
- Unsurpassed lifetime

3 Centripetal expander

- More than 50 years experience in the design and manufacture of expanders
- High efficiency

A high efficiency solution

Air Liquide's Turbo-Brayton cooling systems are designed to be both energy efficient and flexible.

- Cryogenic expander power recovery
- Centrifugal compressors and expanders
- Direct drive motors
- Motor's speed adjusts automatically to match the load and operating conditions
- Partial load: electrical consumption is linear with liquefaction production

Turbo-Brayton liquefaction range

Name	Liquefaction range (*TPD: Ton Per Day — USGPD: US Gallons Per Day*)	Electrical consumption	Weight *(t)*	Footprint *(L x W x H) (m)*
TBF-350	0 — 11 TPD / 6,500 USGPD	390	17	11 x 1.7 x 3
TBL-525	0 — 20 TPD / 11,900 USGPD	625	30	12 x 3.5 x 3.5
TBL-875	0 — 33 TPD / 19,700 USGPD	1,031	40	13.5 x 4.5 x 4
TBL-1225	0 — 50 TPD / 29,900 USGPD	1,563	42	13.5 x 5 x 4

Expected values given for 15°C cooling water.

Contacts

Air Liquide
Advanced Technologies

2, rue de Clémencière
BP 15 – 38360 Sassenage, France
Phone: +33 4 76 43 62 11
E-mail: gcom.alat@airliquide.com
www.advancedtech.airliquide.com

www.airliquide.com

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A world leader in gases, technologies and services for Industry and Health, Air Liquide is present in 80 countries with approximately 66,000 employees and serves more than 3.6 million customers and patients.