

Air Products' Coil Wound Heat Exchangers (CWHEs)



The best choice for LNG applications



CWHEs provide the highest throughput with greater flexibility and availability than other technologies.

All LNG plants require cryogenic heat exchangers to liquefy natural gas. How do you make the best choice for your LNG facility? After reading and understanding the facts, you will find that CWHEs can provide the highest throughput with excellent heat transfer in a safe, reliable and robust unit.

Air Products' CWHE technology: performance you can count on

In CWHEs, the tubes are wound around a central mandrel in layers, with one or more bundles, depending on the specific project requirements, and housed in a single pressure vessel shell.

An Air Products' CWHE provides:

- High throughput in a single exchanger with a small footprint
- Proven robust, reliable, and safe operation, both onshore and offshore
- Pre-modularized with internal interconnecting piping and internal fluid distribution systems to minimize fieldwork
- Multiple process streams
- Optimum performance when combined with Air Products' liquefaction technology
- Tube circuit design pressures of higher than 105 barg
- Standard product and custom designs available

The capacity you need with compact CWHEs

Whether you need a mid-size LNG train with less than 1 MTPA capacity or a mega LNG train size up to or greater than 8 MTPA, Air Products' CWHE's are designed for high throughput—so you only need one CWHE per train for AP-C3MR™ and AP-SMR™ LNG liquefaction technologies or two per train when AP-X® or AP-DMR™ LNG liquefaction technologies are selected.



Brazed Aluminum Heat Exchangers (BAHXs) are one alternative type of heat exchanger that is used for LNG liquefaction. Table 1 compares BAHX and CWHE

Table 1: Comparison of CWHEs and BAHXs.

	CWHE	BAHX
Footprint	Small	Large
Exchangers needed per train	1 or 2 in series depending on LNG technology chosen	Several manifolded in parallel
Flow distribution piping	Internal	External
Turndown	>20:1 (5% nameplate)	<3:1 (typical) (33% nameplate)
Resistance to thermal stress (which can lead to process leaks)	Higher	Lower
Tube leak protection	Dual containment	Single containment
Consequence of leak	Run until next maintenance period	Immediate repair may be needed
Repairs	From outside using existing platforms (1-2 weeks)	If repairable, removal of coldbox panel and insulation required (3-4 weeks minimum)
Probability of plugging (gap size)	Low (~ 8–12mm)	High (~ 1mm)

Air Products experience: unmatched in the industry

No one has more experience than Air Products in designing, and manufacturing coil wound heat exchangers for LNG. Our unique ability to integrate the liquefaction process and equipment allows us to optimize the facility’s overall performance, cost, operability, and availability. Air Products has manufactured CWHEs installed in over 120 LNG trains at LNG facilities in 20 countries around the world. For more than 50 years, we’ve supplied technology and equipment for small, medium, and large/mega-scale LNG facilities to meet growing market demands and customer requirements. Today, we are the largest and most experienced provider of CWHEs and liquefaction technology to the LNG industry.

Performance you can count on

CWHEs have the highest throughput in the smallest footprint, and are more reliable, with greater flexibility and availability than other technologies.

- Stable operation even at significant turndown
- Excellent resistance to plugging and contaminant breakthrough
- Less prone to tube leaks, and minor tube leaks do not require immediate repair
- Tube repairs can be done without a pressure vessel entry and can be scheduled for a planned major turnaround maintenance period thus avoiding a costly shutdown

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