

LEADWAVE water bath vaporisers offering high robustness, performance and reliability.



Concept Complementing our wide range of industrial gases, we also produce equipment to vaporise and store these gases on site. We offer a broad spectrum of technologies to support all customer volume and gas needs. Our standard ambient air-heat vaporisers come in a variety of designs and models for low-volume requirements. These cost-efficient and convenient solutions are ideal for air gas evaporation capacities up to approximately 500 Nm³/h.

Rounding off our portfolio at the higher end of the spectrum, we also deliver standardised Linde LEADWAVE water bath vaporisers. Suited to capacities in excess of approx. 500 Nm³/h, these special coil-wound heat exchangers are typically used in petrochemical and cryogenic applications to vaporise liquefied gases such as oxygen, nitrogen, argon, ethylene, propylene and natural gas.

If a standardised LEADWAVE solution is not the perfect fit or if customers require a solution that can handle different fluid combinations, we also deliver tailored water bath vaporisers.

Design LEADWAVE is a high-performance, reliable and robust system. It features a number of design highlights.

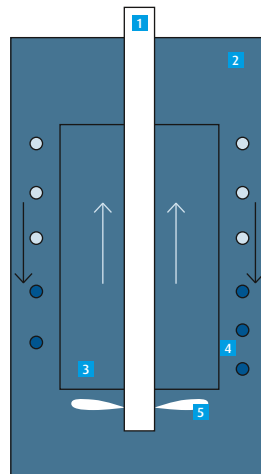
- The water bath is used as a buffer medium to store the thermal energy needed for vaporisation
- As a buffer medium, water is easy to handle and readily available
- The heated water bath can be operated anywhere between 0 and 100% of the nominal capacity
- The spring-type heat exchanger withstands abrupt and alternating loads
- Different heat sources can be used for the water bath, including warm water above 15 °C and steam
- LEADWAVE can be combined with standard Linde storage tanks (LITS)
- LEADWAVE comes with a variety of customisation options

Operation Natural draft versus forced draft operation

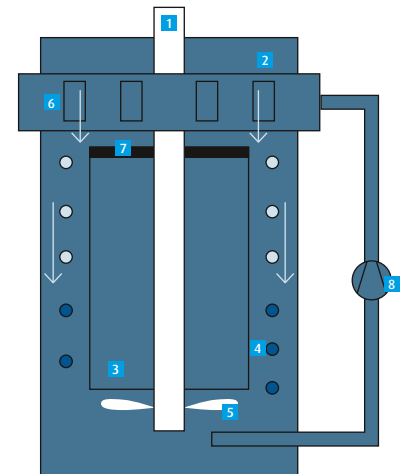
Our LEADWAVE water bath vaporisers work in two different modes depending on capacity and start-up requirements.

The first is natural draft operation. Here the temperature differential creates a natural flow. Hot steam is injected at the base; thus creating a natural water circulation around the heat exchanger bundle. Due to reduced water velocity, this operation mode requires a greater heat exchanger surface and a slightly longer start-up time but it has the advantage of low capital outlay as no additional pumps are required.

Steam heat water bath vaporiser - natural circulation



Steam heat water bath vaporiser - forced circulation



1 Steam lance 2 Vessel 3 Mandrel 4 Bundle 5 Steam jet 6 Ring distributor 7 Mandrel blocked 8 Forced circulation pump

In forced draft operation, an external pump is used to propel the water stream around the heat exchanger tubes. Here, the mandrel is closed to guide the water directly through the heat exchanger bundle. Higher water velocity increases heat exchange efficiency, making these models ideal for high vaporisation volumes. In addition, forced draft mode starts up in less than 30 seconds.

Benefits

- Excellent solution for stand-by or discontinuous operation
- Availability of full capacity within seconds
- Reliable operation anywhere from 0 to 100 percent of nominal capacity
- Load range from approximately 500 Nm³/h up to 50,000 Nm³/h
- Multiple heating sources supported (e.g. steam and warm water)

Choice of models

The LEADWAVE series is available in different models and with different options. Either steam or warm water can be used as the energy source.

LEADWAVE model overview

Energy source	Response time	Pressure build-up vaporiser	Vaporisation volume Nm ³ /h N ₂ ¹⁾	LEADWAVE type	Diameter in mm	Height in mm
Steam	> 30 sec. with natural draft design	No	1,500	LEADWAVE 15.1	610	3050
			3,000	LEADWAVE 30.1	700	2940
			5,000	LEADWAVE 50.1	890	2630
			10,000	LEADWAVE 100.1	1070	3011
			20,000	LEADWAVE 200.1	1405	3785
			40,000	LEADWAVE 400.1	1915	3800
			50,000	LEADWAVE 500.1	2110	3910
		Yes	1,500	LEADWAVE 15.2	610	3440
			3,000	LEADWAVE 30.2	700	3440
			5,000	LEADWAVE 50.2	890	3220
			10,000	LEADWAVE 100.2	1070	3785
			20,000	LEADWAVE 200.2	1405	4480
			40,000	LEADWAVE 400.2	1915	4630
			50,000	LEADWAVE 500.2	2110	4630
	< 30 sec. with forced draft design	No	20,000	LEADWAVE 200.3	1235	4200
			40,000	LEADWAVE 400.3	1780	5200
			50,000	LEADWAVE 500.3	1890	5360
		Yes	20,000	LEADWAVE 200.4	1235	4885
			40,000	LEADWAVE 400.4	1780	6100
		No	500	LEADWAVE 5.5	324	2160
			1,500	LEADWAVE 15.5	508	2750
1,500			LEADWAVE 15.5a	508	3030	
6,000			LEADWAVE 60.5	610	3900	
6,000			LEADWAVE 60.5a	610	3900	
Water	Tank designed as pressure vessel to be integrated in client's cooling water system	Yes	500	LEADWAVE 5.6	324	2350
			1,500	LEADWAVE 15.6	508	3060
			1,500	LEADWAVE 15.6a	508	3430
			6,000	LEADWAVE 60.6	610	4500
			6,000	LEADWAVE 60.6a	610	4500

1) Standard design is based on the vaporisation of nitrogen at 10 bara and an outlet temperature of +20 °C. Multiply the vaporisation volume by a factor of 1.144 for oxygen.

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