

Air-heated Vaporizers

Linde Engineering

Linde



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Introduction.

Lead VAP - The new Generation

Save energy costs & investments with the new generation of Lead VAP for cryogenic gases. A full range of ambient air heated vaporizers in different versions and for different customer applications.

Design

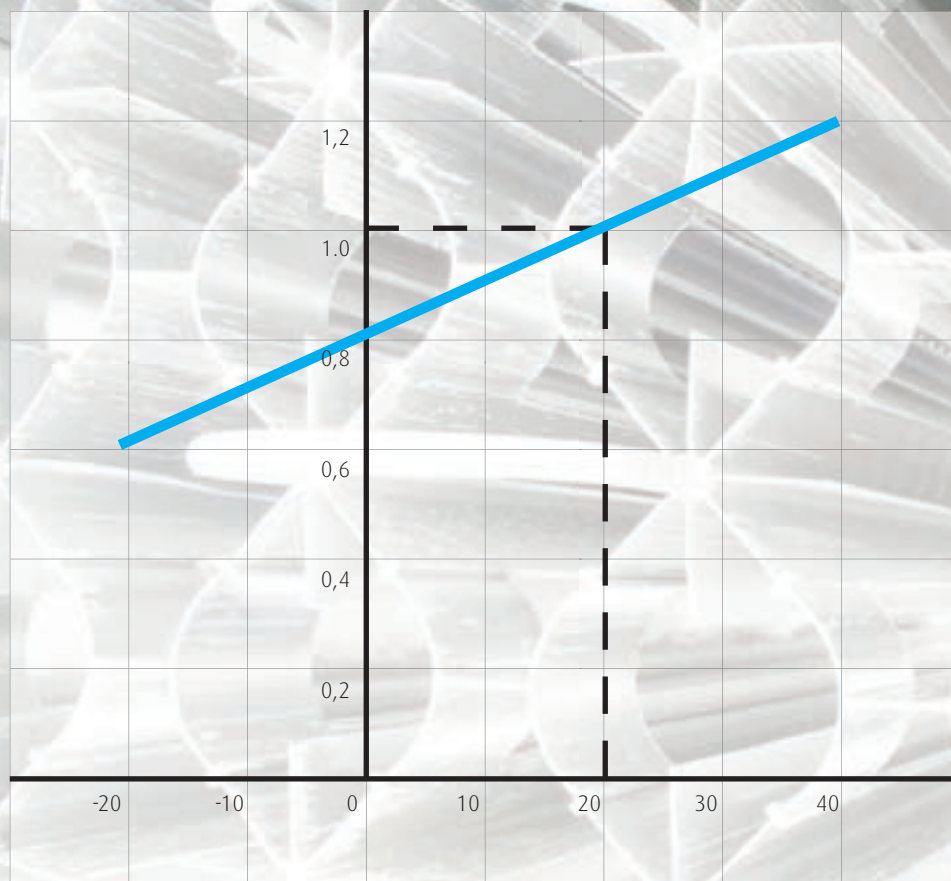
- According to PED 97/23/EG; CE-marked
- Max. allowable working pressure 40 bar
- Cleaned for Oxygen service
- Wind-loads up to 160 km/h
- Seismic requirements acc. to UBC-Zone 4
- Low pressure drop
- Efficient fin tube design
- Optimised external and internal surfaces

Benefits

- Maintenance-free aluminium design
- Low weight
- Corrosion and temperature resistant
- Easy to assemble
(no welding or brazing required)
- Screwed connections at in- and outlet for models up to 350 Nm³/h
- Space-saving design, intensive convection
- Long lifetime
- Short or high-leg version
(short version=600 mm, long version=900 mm)

Conversion factors

as a function of the ambient temperature



Conversion factors for different fluids

Fluid

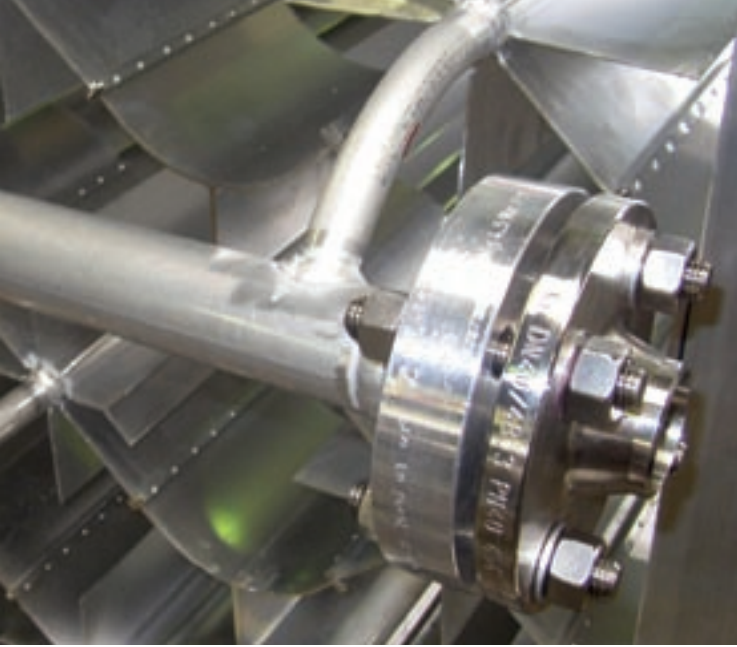
| | |
|-----------------|------|
| H ₂ | 1,75 |
| Ar | 1,15 |
| N ₂ | 1 |
| O ₂ | 0,92 |
| CH ₄ | 0,76 |

Ambient temperature in °C

Lead VAP Technical data

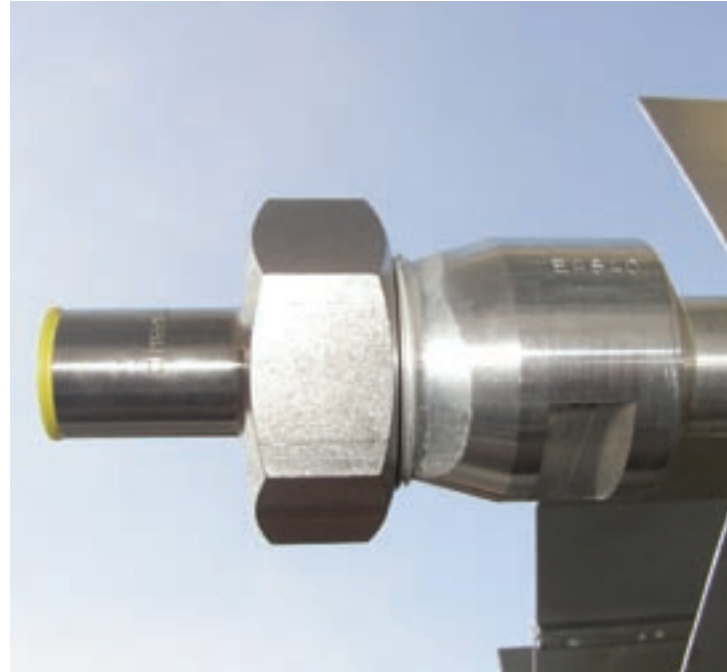
| Type | Technical data sheet | Nominal capacity ^{*1)} N ₂ in Nm ³ /h | Connections | Dimensions approx. L x W x H (m) | Weight empty (kg) |
|-------------|----------------------|---|--|-------------------------------------|----------------------|
| L 40-4 F3 | 10/2005 | 65 | Screwed: M40x2 and pipe connection: 21,3 x 1,5 socket welding end ø 18 mm | 0,58 x 0,58 x 3,85 | 59 |
| L40-8 F3 | 10/2005 | 130 | Screwed: M40x2 and pipe connection: 21,3 x 1,5 socket welding end ø 18 mm | 1,12 x 0,67 x 3,85 | 112 |
| L40-12 F4-S | 10/2005 | 260 | Screwed: M40x2 and pipe connection: 21,3 x 1,5 socket welding end ø 18 mm | 1,24 x 0,94 x 4,85 | 250 |
| L40-12 F4-L | | | | 1,24 x 0,94 x 5,15 | 255 |
| L40-16 F4-S | 10/2005 | 350 | Screwed: M40x2 and pipe connection: 33 x 2,4 socket welding end ø 28 mm | 1,24 x 1,24 x 4,85 | 320 |
| L40-16 F4-L | | | | 1,24 x 1,24 x 5,15 | 325 |
| L40-16 F6-S | 10/2005 | 520 | Flange: DN40 PN40 | 1,24 x 1,24 x 6,85 | 443 |
| L40-16 F6-L | | | | 1,24 x 1,24 x 7,15 | 450 |
| L40-24 F6-S | 10/2005 | 800 | Flange: DN40 PN40 | 1,84 x 1,24 x 6,85 | 635 |
| L40-24 F6-L | | | | 1,84 x 1,24 x 7,15 | 645 |
| L40-30 F6-S | 10/2005 | 1000 | Flange: DN40 PN40 | 1,84 x 1,54 x 6,85 | 780 |
| L40-30 F6-L | | | | 1,84 x 1,54 x 7,15 | 790 |

*1) The capacity is based on an ambient temperature of 20°C, 70 % rel. humidity, 15°C temperature difference between ambient and gas outlet temperature at a continuous 8-hours-operation.



Flange connection DN 40 PN40

Screwed: M40x2 and pipe connection



Lead VAP - The new generation of all aluminium vaporizers ensures maximum air circulation due to optimized fin and vaporizer geometrics.

Standard clip-on VAP's

| Type | Sketch drawing | Nominal capacity ^{*1)} N ₂ in Nm ³ /h | Connections | Dimensions approx. L x W x H (m) | Weight empty (kg) | Frame |
|-------------|----------------|---|---|-------------------------------------|----------------------|---------|
| L 40-2 F2,5 | 33-19186 | 28 LOX 30 LIN 35 LAR | Screwed: M40x2 and pipe connection: 21,3x1,5 socket welding end ø 18 mm | 0,63 x 0,28 x 2,74 | 55 | without |
| L40-4 F2,5 | 33-19187 | 55 LOX 60 LIN 70 LAR | | 1,67 x 0,28 x 2,74 | 110 | |
| L40-8 F2,5 | 33-19188 | 110 LOX 120 LIN 140 LAR | | 1,67 x 0,52 x 2,74 | 150 | |

*1) The capacity is based on an ambient temperature of 20°C, 70 % rel. humidity, 15°C temperature difference between ambient and gas outlet temperature at a continuous 8-hours-operation.

Clip-on VAP



Special VAP models for high purity gases – stainless steel lined

| Type | Sketch drawing | Nominal capacity ^{*1)} N ₂ in Nm ³ /h | Connection (HQ-Design) Inlet/Outlet | Dimensions approx. L x W x H (m) | Weight empty (kg) |
|----------------|----------------|---|---|-------------------------------------|----------------------|
| L40-4 F3 HQ | 01/2006 | 40 | Pipe connection: 21,3x2 | 0,58 x 0,58 x 3,85 | 75 |
| L40-8 F3 HQ | 01/2006 | 85 | Pipe connection: 21,3x2 | 1,12 x 0,67 x 3,85 | 140 |
| L40-12 F4-L HQ | 01/2006 | 170 | Pipe connection: 21,3x2 | 1,24 x 0,94 x 5,15 | 310 |
| L40-16 F4-L HQ | 01/2006 | 230 | Pipe connection: 21,3x2 | 1,24 x 1,24 x 5,15 | 400 |
| L40-16 F6-L HQ | 01/2006 | 340 | Pipe connection: 48,3x2 | 1,24 x 1,24 x 7,16 | 550 |
| L40-24 F6-L HQ | 01/2006 | 530 | Pipe connection: 48,3x2 | 1,84 x 1,24 x 7,16 | 800 |
| L40-30 F6-L HQ | 01/2006 | 660 | Pipe connection: 48,3x2 | 1,84 x 1,54 x 7,16 | 980 |

*1) The capacity is based on an ambient temperature of 20°C, 70 % rel. humidity, 15°C temperature difference between ambient and gas outlet temperature at a continuous 8-hours-operation. / Remark: Vaporizer leg version -L = 900 mm

Special VAP models for high pressure and pressure build-up

| High pressure vaporizer | | | | | | |
|-----------------------------|----------------|---|----------------------------------|-------------------------------------|----------------------|------------------|
| Type | Sketch drawing | Nominal capacity ^{*1)} N ₂ in Nm ³ /h | Connection | Dimensions approx. L x W x H (m) | Weight empty (kg) | Frame |
| L 400-6 F 3,0 | 22-12220 | 95 LOX 100 LIN 115 LAR | see option: flange set | 1,6 x 0,8 x 4,0 | 231 290 | without incl. |
| L 400-30 F 4,3 | 33-92/12 V | 560 LOX 600 LIN 690 LAR | see option: flange set | 2,5 x 2,4 x 5,4 | 1650 | incl. |
| Pressure build-up vaporizer | | | | | | |
| Type | Sketch drawing | Design | Connection | Weight empty (kg) | Frame | |
| LD 40-4 F 1,6 | 33-18962 | Al-Fin Tubes | Braze-on flange DN 40 / PN 40 | 90 | incl.. | |
| LD 40-4 F 1,5 HQ | 33-19054 | Al-Fin Tube with stainless steel inner pipe | Pipe connection 60,3 x 2mm | 90 | incl.. | |
| LD 40-5 F 2,0 | 33-17206 | Al-Fin Tubes | Braze-on flange DN 40 / PN 40 | 44 | incl.. | |
| LD 40-5 F 4 | 33-17206 | Al-Fin Tubes | Braze-on flange DN 40 / PN 40 | 44 | incl. | |

*1) The capacity is based on an ambient temperature of 20°C, 70 % rel. humidity, 15°C temperature difference between ambient and gas outlet temperature at a continuous 8-hours-operation.

Designing Processes – Constructing Plants

Linde's Engineering Division continuously develops extensive process engineering know-how in the planning, project management and construction of turnkey industrial plants.

The range of products comprises:

- Petrochemical plants
- Synthesis gas plants
- Hydrogen plants
- Gas processing plants
- Natural gas plants
- Air separation plants
- Cryogenic plants
- Environmental protection plants
- Pharmaceutical plants
- Furnaces for petrochemical plants and refineries.

Linde and its subsidiaries manufacture:

- Cold boxes
- Spiral-wound heat exchangers
- Plate-fin heat exchangers
- Specialized butterfly valves and actuators.

More than 3,800 plants worldwide document the leading position of Linde Engineering Division in international plant construction.

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