

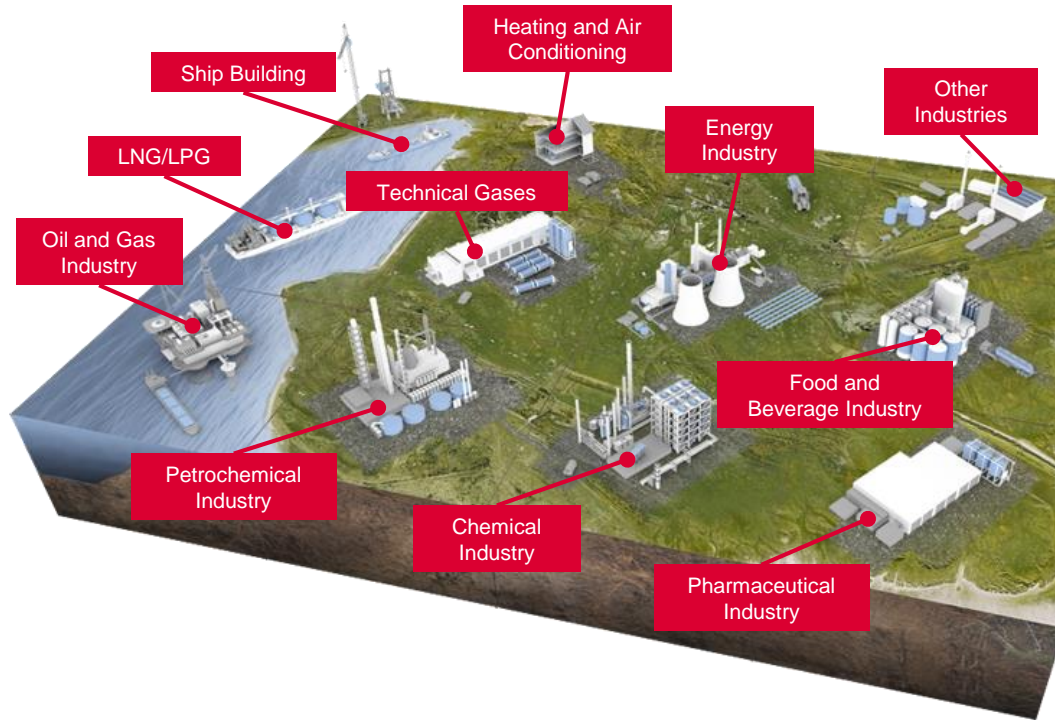
Application Areas

All application for LESER safety valves



Application Areas. All fields of application for LESER safety valves.

1. [Overview](#) | 2. [Oil & Gas](#) | 3. [Petrochemical](#) | 4. [Chemical](#) | 5. [Pharmaceutical](#) | 6. [F & B](#) | 7. [Energy](#) | 8. [Technical Gases](#) | 9. [LNG/LPG](#) | 10. [Ship Building](#) | 11. [HVAC](#) | 12. [Other](#)

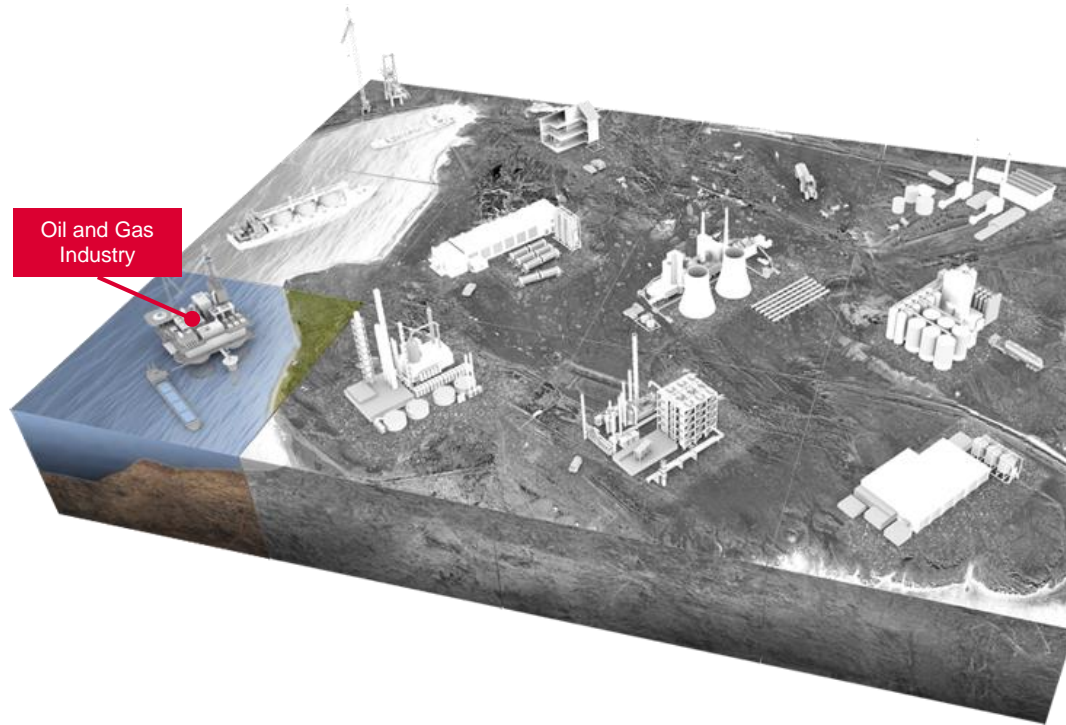


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Oil and Gas Industry. Upstream / Downstream.

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Oil and Gas Industry. Upstream / Downstream.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. Pharmaceutical | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

LESER safety valves are **used by leading companies** in the upstream (exploration, production and transportation) and downstream (cracking) **oil and gas industry**.



Applications	LESER references (examples)
<ul style="list-style-type: none">■ Pressurized vessels■ Thermal expansion in piping systems■ Pressure-increasing stations■ Christmas trees	<ul style="list-style-type: none">■ BP plc■ Keppel Corporation■ Petrobras S.A■ PetroChina Ltd■ Petronas■ Royal Dutch Shell plc■ Saudi Aramco■ Total S.A.■ Wintershall GmbH■ NEUMAN & ESSER■ Joh. Heinr. Bornemann GmbH■ SPX Flow Technology■ Lewa GmbH




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Oil and Gas Industry. Upstream / Downstream.

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LESER understands the requirements of the oil and gas industry and can therefore offer **optimal safety for the plant and lower lifecycle costs.**

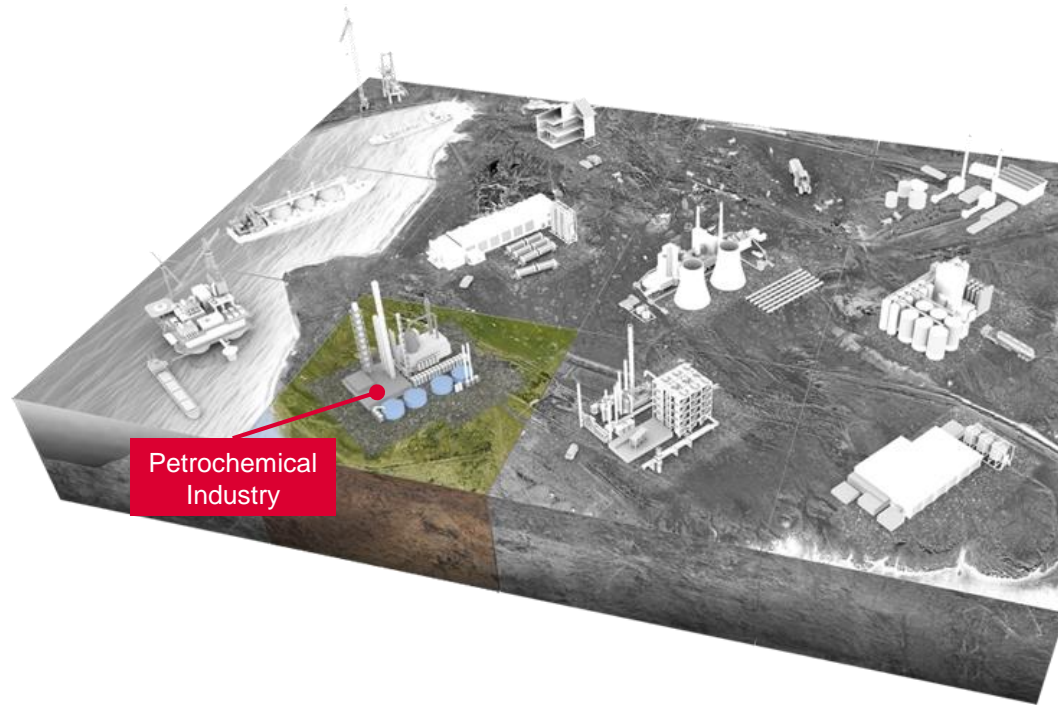
Requirements	LESER Product Solution
<ul style="list-style-type: none">■ High valve capacity at low weight and size■ Corrosive environment (e.g. sea water)■ High pressures and backpressures■ Comprehensive documentation and customer-specific inspections	 <ul style="list-style-type: none">■ API■ Complies to delivery specification API 526■ Alloys (e.g. Duplex, Hastelloy) with short delivery times
	 <ul style="list-style-type: none">■ Compact Performance■ For high pressure up to 850 bar■ For small capacities e.g. in thermal expansion
	 <ul style="list-style-type: none">■ High Efficiency (POSV)■ Pilot-operated safety valve■ Operating pressure close to set pressure■ Low weight and height

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Petrochemical Industry.

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Petrochemical Industry.

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LESER safety valves are **used by leading companies in the Petrochemical Industry worldwide.**



Applications	LESER references (examples)
<ul style="list-style-type: none">■ Pressurized vessels■ Thermal expansion in piping systems■ Pressure-increasing stations■ Rectification columns	<ul style="list-style-type: none">■ BP plc■ Chevron Corporation■ Conoco Phillips Company■ Exxon Mobil Corporation■ Petrobras S.A.■ Petronas■ Royal Dutch Shell plc Petrobras■ Saudi Aramco■ SABIC■ Total S.A.

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Petrochemical Industry.

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LESER understands the requirements of the Petrochemical industry and can therefore offer optimal safety for the plant and lower lifecycle costs.

Requirements

- High valve capacity at low weight and size
- High pressures and backpressures
- Comprehensive documentation and customer-specific inspections

LESER Product Solution



API

- Complies to delivery specification API 526
- Alloys (e.g. Duplex, Hastelloy) with short delivery times



Compact Performance

- For high pressure up to 850 bar
- For small capacities e.g. in thermal expansion



High Efficiency (POSV)

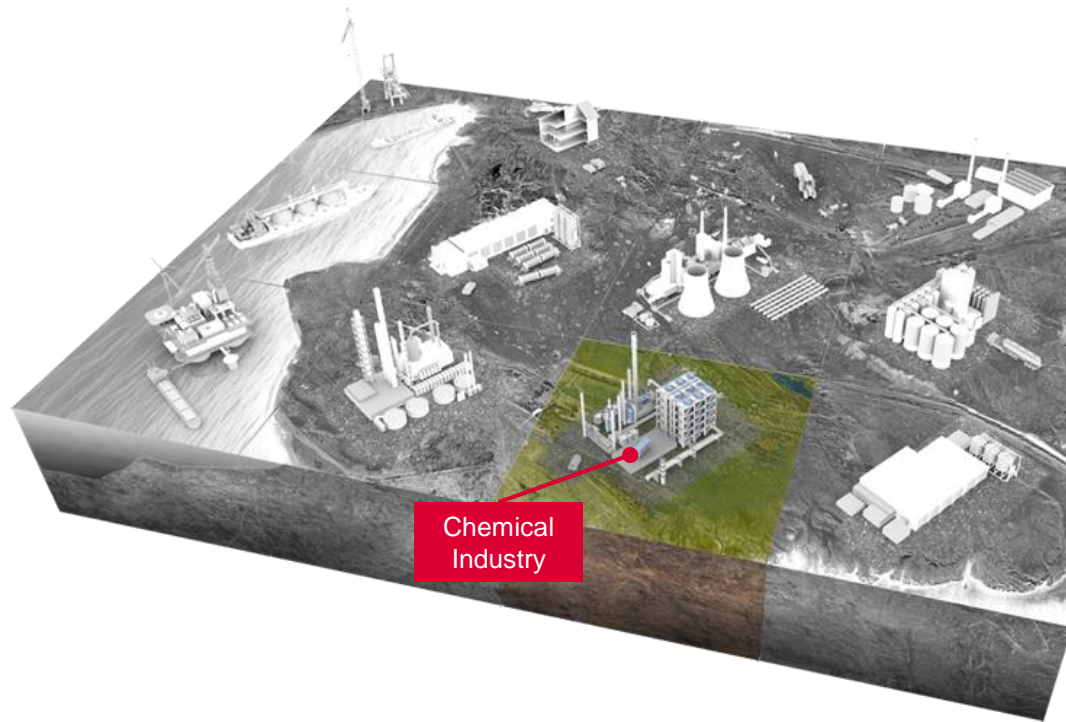
- Pilot-operated safety valve
- Operating pressure close to set pressure
- Low weight and height

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Chemical Industry.

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Chemical Industry.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. **Chemical** | 5. Pharmaceutical | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

LESER safety valves are **used by leading companies in the chemical industry** for a **variety of applications with gas, steam and liquid.**



Photos courtesy of Chemiepark Hoechst



Applications

- Pressurized vessels
- Thermal expansion in piping systems
- Pressure-increasing stations
- Chemical reactors or autoclaves

LESER references (examples)

- Akzo Nobel N.V.
- BASF SE
- Bayer AG
- Dow Chemical Company
- Eastman Chemical Company
- Evonik Industries AG
- Merck KGaA
- Sinopec Yangyi Company
- Solvay S.A.
- Wacker Chemie AG
- Yihsheng

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Chemical Industry.

1. [Overview](#) | 2. [Oil & Gas](#) | 3. [Petrochemical](#) | 4. **[Chemical](#)** | 5. [Pharmaceutical](#) | 6. [F & B](#) | 7. [Energy](#) | 8. [Technical Gases](#) | 9. [LNG/LPG](#) | 10. [Ship Building](#) | 11. [HVAC](#) | 12. [Other](#)

LESER has been **working with leading chemical companies for decades** and could therefore **develop a range of products ideally suited to their needs.**

Requirements

- Wide product range for gas, steam and liquid
- Lower total costs of ownership and easy maintenance
- Suitability for aggressive and toxic media

LESER Product Solution

- All LESER valves have Single Trim (identical internal parts for steam/gas/liquids) for economical maintenance



High Performance

- High blow-off capacity in comparison to valve size
- Universal valve for many applications



Critical Service

- PTFE for highly-corrosive media
- Economical alternative to high-alloyed materials



Compact Performance

- For high pressure up to 850 bar
- For small and medium capacities (e.g. thermal expansion)

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Chemical Industry. Urea Plants.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. **Chemical** | 5. Pharmaceutical | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

LESER valves are **used by Urea plants and licensors around the world.**
In close cooperation with the industry, LESER developed an **application solution for the protection of the highly corrosive Carbamate in the synthesis reactor.**



Applications

- Protection of the Urea Synthesis Reactor
- CO₂ – Compressor
- NH₃ - Pump (liquid)
- Stripper
- Recirculations

LESER references (examples)

- Stamicarbon B.V.
 - Tierra del Fuego/ Argentina
 - Wushen/ China
 - Hulun Buir/ China
- Uhde GmbH
 - Damietta/ Egypt
 - Arzew/ Algeria
- Uraca
- Räcklebe & Totz
 - SKW Piesteritz/ Germany

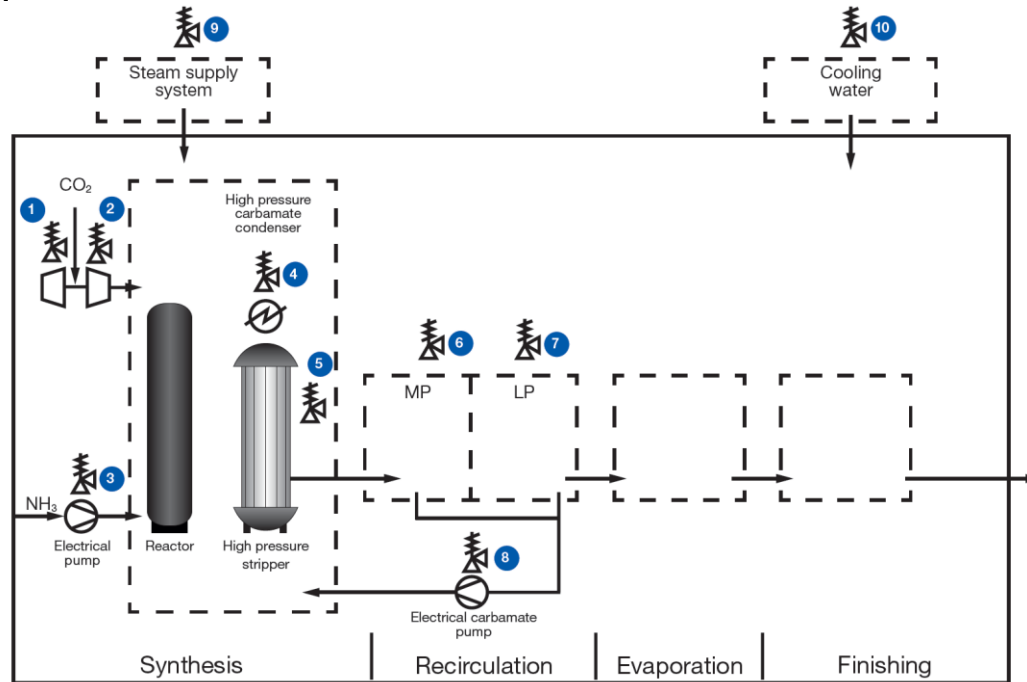
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Chemical Industry. Urea Plants.

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Setup of a Urea plant:



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Chemical Industry. Urea Plants.

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LESER has more than ten years experience with steam purging. This experience is the basis for the **innovative refinement of the steam purging for the Urea synthesis protection.**

Requirements

- Prevention of corrosion
- Prevention of crystallisation of the carbamate
- High set pressures
- High temperatures

LESER Product Solution



API in Urea Synthesis Configuration

- Corrosion-resistant materials
- Minimized steam requirement
- Only one steam cycle necessary
- Permanently steam purged



API

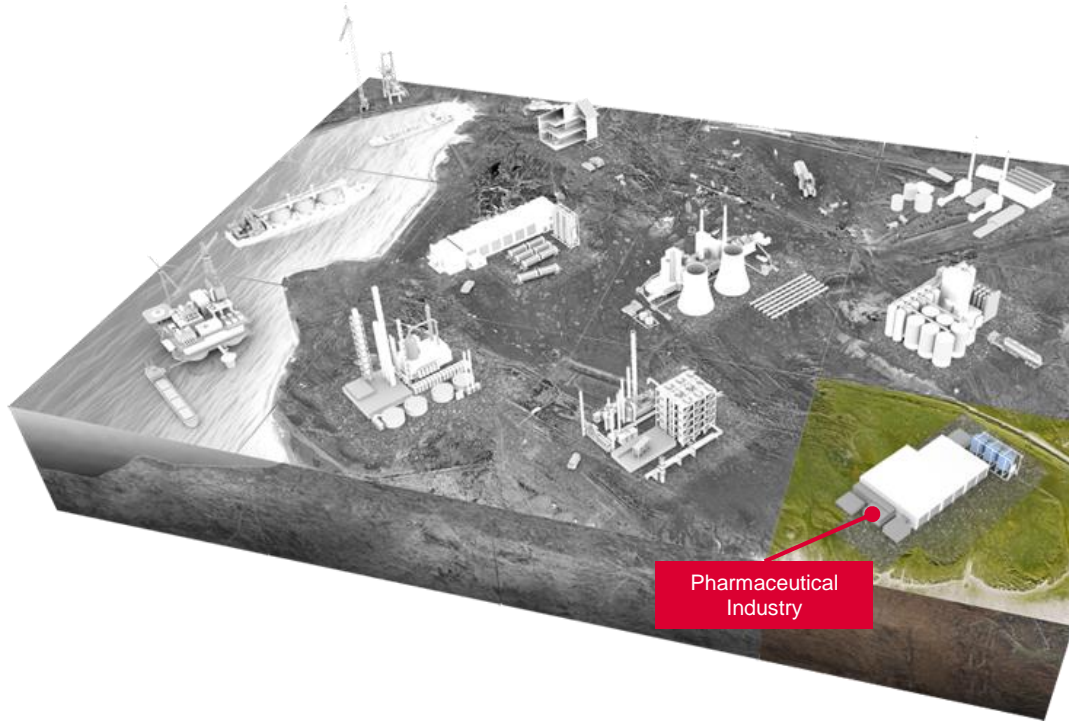
- Suitable for a wide range of applications throughout the urea plant
- Alloys (e.g. Duplex, Hastelloy) with short delivery times

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Pharmaceutical Industry.

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Pharmaceutical Industry.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. **Pharmaceutical** | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other



LESER safety valves are **used by leading companies in the Pharmaceutical Industry** which fulfill all the special **requirements regarding the cleanability, materials and documentation**. LESER provides safety valves **for all hygienic applications as well as for utilities**.

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Pressurized vessels■ Piping systems■ Reaction vessels■ Filling stations	<ul style="list-style-type: none">■ AstraZeneca plc■ Bayer AG■ Boehringer Ingelheim AG & Co. KG■ F. Hoffmann-La Roche AG■ Fresenius Medical Care Ag & Co. KGaA■ L`Oreal S.A.■ Merck KGaA■ Novartis International AG■ Pfizer Inc.

Pharmaceutical Industry.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. **Pharmaceutical** | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

LESER has more than ten years experience with steam purging. This experience is the basis for the **innovative refinement of the steam purging for the Urea synthesis protection.**

Requirements

- Excellent cleanability
- Regulation-compliant materials
- Wide range of aseptic connections

LESER Product Solution



Clean Service

- Low dead space
- Made of stainless steel in industry-specific surface grades
- Elastomer bellows



Compact Performance

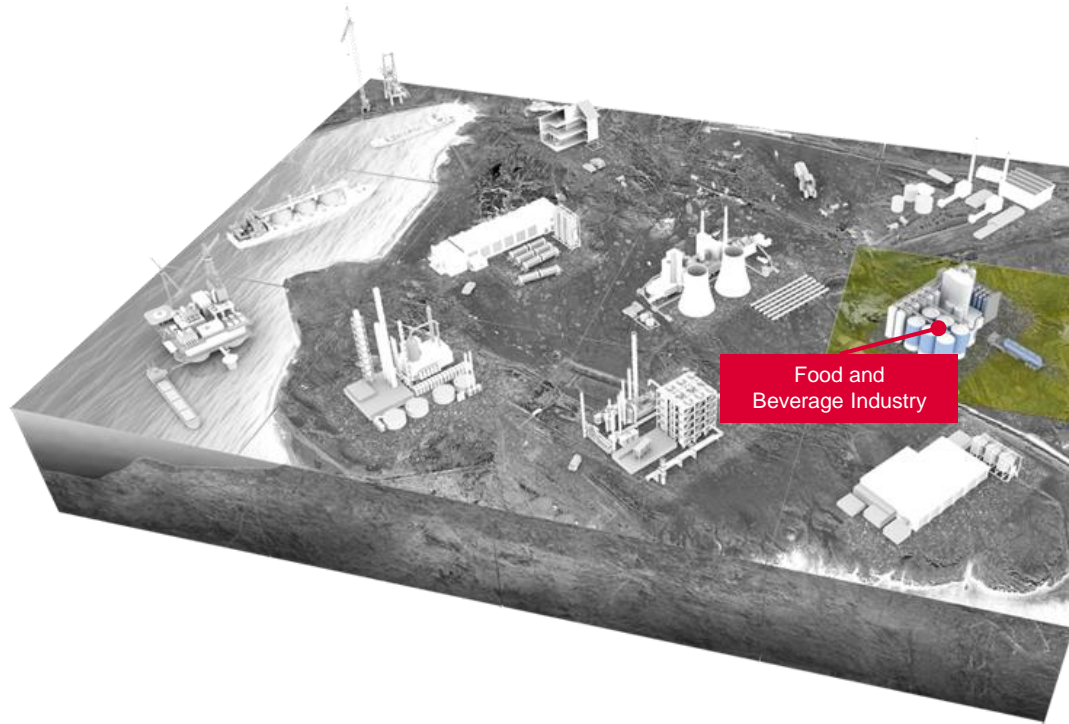
- For high pressure up to 850 bar
- For small capacities e.g. in thermal expansion

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Food and Beverage Industry.

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Food and Beverage Industry.

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LESER offers safety valves which **fulfill all the special requirements regarding the cleanability and tightness of the food and beverage industry.** LESER provides safety valves for all **hygienic applications as well as for utilities.**

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Sterilized Vessels■ Solidifying media■ Filling stations	<ul style="list-style-type: none">■ Anheuser Busch Companies, Inc.■ GEA Group AG■ Guinness Brewery■ Krones AG■ Nestlé S.A.■ Procter & Gamble Company■ PepsiCo, Inc.■ Tetra Pak International S.A.■ Unilever N.V.

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Food and Beverage Industry.

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LESER understands the requirements of the food and beverage industry and can therefore offer **optimal safety for the plant and lower lifecycle costs.**

Requirements

- Good cleanability
- Approvals for global application
- Lower total costs of ownership
- Smaller valve size
- Simple and sturdy design

LESER Product Solution



Clean Service

- Low dead space
- Made of stainless steel
- Optional pneumatic lifting

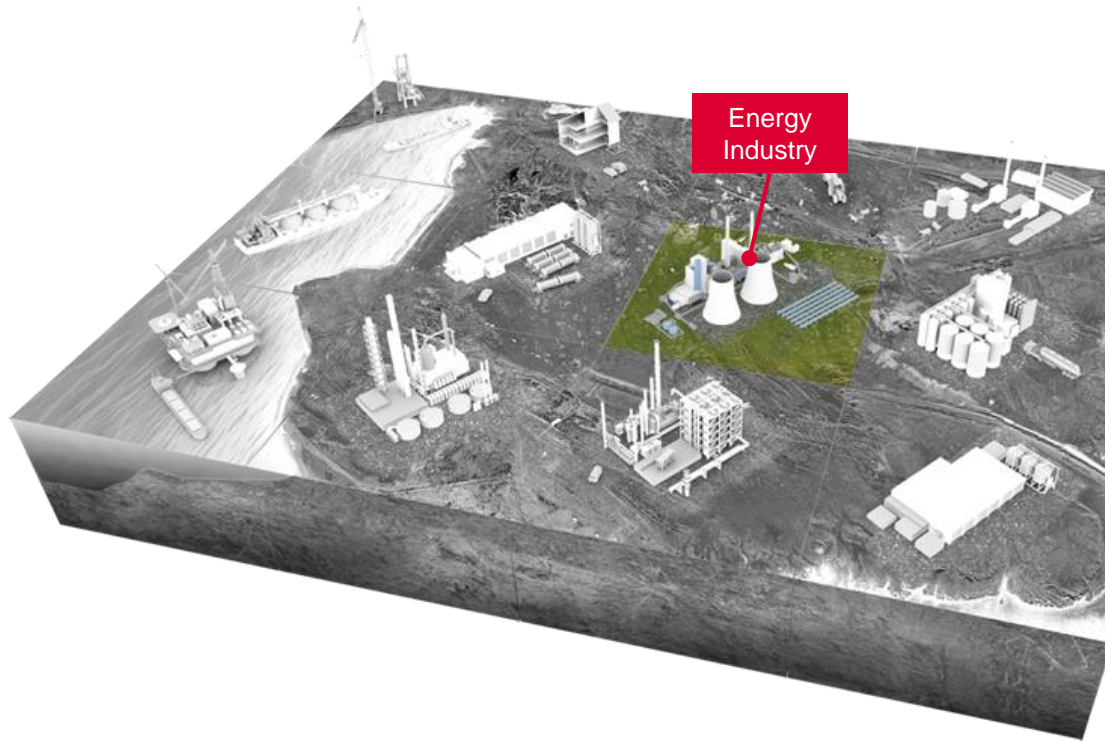


High Performance

- For high span of temperature
-270°C to 550°C
- High discharge capacity relative
to valve size

Energy Industry.

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Energy Industry.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. Pharmaceutical | 6. F & B | 7. **Energy** | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other



In the energy industry safety valves are used in conventional power plants and for renewable energies. In order to **use the plants at high pressures and high temperatures at possibly fullest capacity**, the plants are operated as close as possible to the set pressure. LESER supplies **safety valves for all applications within the power generation** and enables with its products a **positive utilization of the plant**.

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Boilers■ Superheaters■ Turbines■ Thermal expansion	<ul style="list-style-type: none">■ Siemens AG■ Vattenfall Europe AG■ EON■ RWE■ HESCH Industrietechnik■ VKK Standardkessel Köthen GmbH■ FISIA BABCOCK ENVIRONMENT GMBH■ ALSTOM Power Service GmbH

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Energy Industry.

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LESER understands the requirements of the Energy Industry and can therefore offer **optimal safety for all power plants.**

Requirements

- High pressures and backpressures
- Set pressure near to operating pressure
- Low lifecycle cost

LESER Product Solution



High Performance

- High blow-off capacity in comparison to valve size
- Universal valve for many applications



Compact Performance

- For high pressure up to 850 bar
- For small capacities e.g. in thermal expansion



High Efficiency

- Supplementary Loading System
- Operating pressure close to set pressure
- Opening process is independent of back pressure

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Energy Industry. Concentrated Solar Power Plants..

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Photo: Schott AG

LESER has **much experience in the field of solar power plants** and **offers specially developed standardized safety valves** even for the **application of heat carrier oils**. With the standardization of the safety valves **tried and tested solutions and short delivery times are guaranteed**.

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Solar field with thermo oil or water / saturated steam■ Heat exchangers■ Tanks■ Power plants	<ul style="list-style-type: none">■ Abengoa Solar■ Abener Energia, S.A.■ MAN Solar Millenium■ Helios 1 Hyperion Energy■ Foster Wheeler Energia■ Novatec Solar■ GDF SUEZ / Solar Power Group

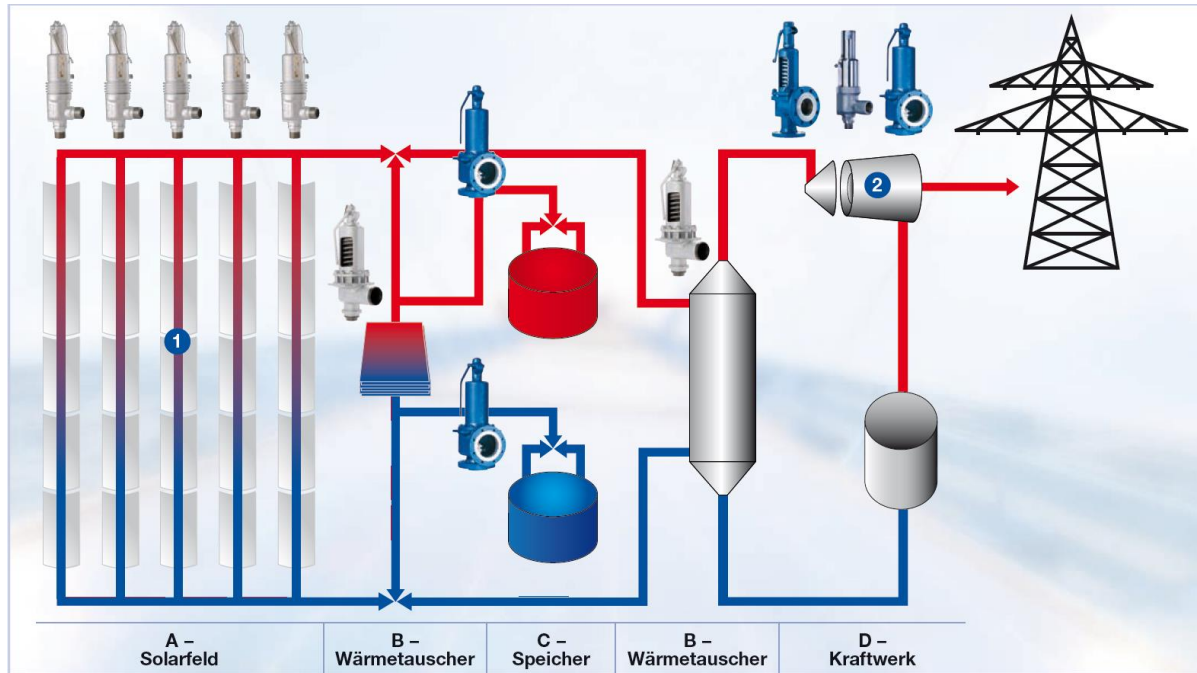
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Energy Industry. Concentrated Solar Power Plants.

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Setup of a solar thermal power plant:





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Energy Industry. Concentrated Solar Power Plants.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. Pharmaceutical | 6. F & B | 7. **Energy** | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

LESER understands the requirements of concentrated solar power plants and can therefore offer **optimal safety for this type of power generation.**

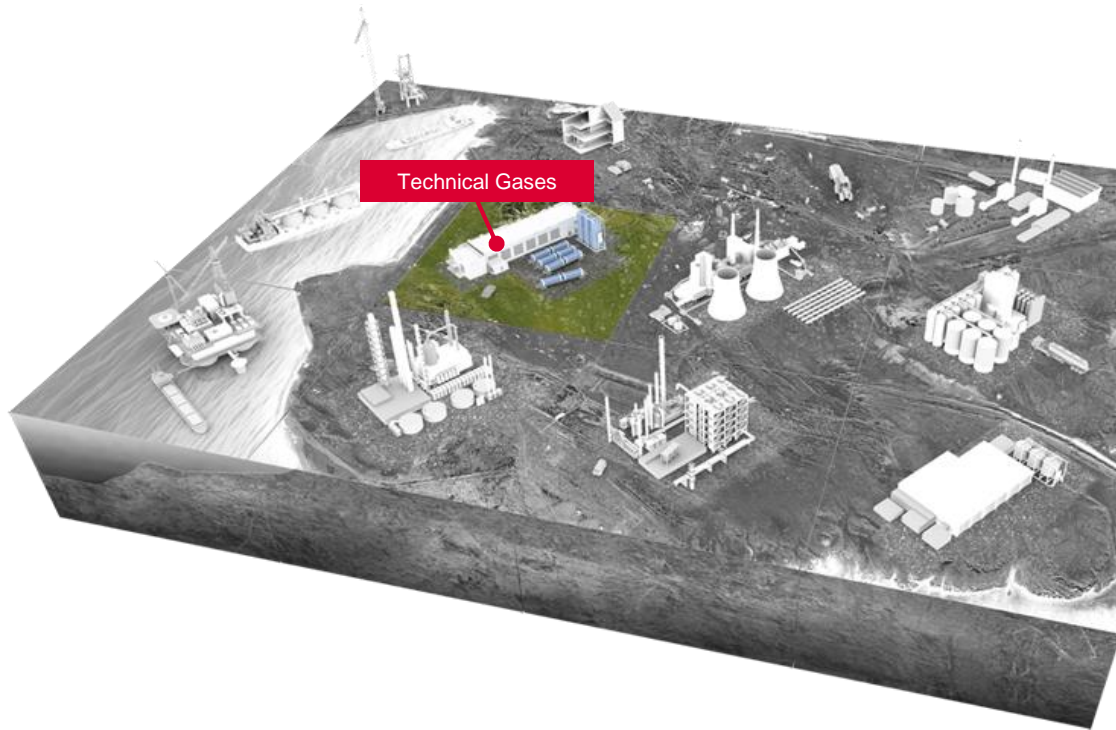
Requirements	LESER Product Solution
<ul style="list-style-type: none">■ Good heat resistance■ No external loss of creeping medium■ Compensation for high backpressure	 <p>Compact Performance in Solar configuration</p> <ul style="list-style-type: none">■ For set pressure up to 40 bar■ Temperatures up to 400 °C■ Special materials, sealings and connections
<ul style="list-style-type: none">■ Protection of small up to very high capacities■ Resistance to salt corrosion for heat storage	 <p>API in Solar configuration</p> <ul style="list-style-type: none">■ For medium and high capacities■ Special materials, sealings and connections

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Technical Gases.

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Technical Gases.

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LESER safety valves are used by leading companies in the technical gases industry for gas storage and processing.

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Thermal expansion in piping systems■ Pressure-increasing stations■ Vessels and other process equipment■ Air separation	<ul style="list-style-type: none">■ Air Liquide S.A.■ Air Products & Chemicals, Inc■ Cepsa S.A.■ Enagas S.A.■ Linde AG■ Messer Group GmbH■ Petronas■ Tyczka GmbH & Co KGaA■ Westfalen AG




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Technical Gases.

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LESER understands the requirements of the Technical Gases industry and can therefore **offer optimal safety for the plant and lower lifecycle costs.**

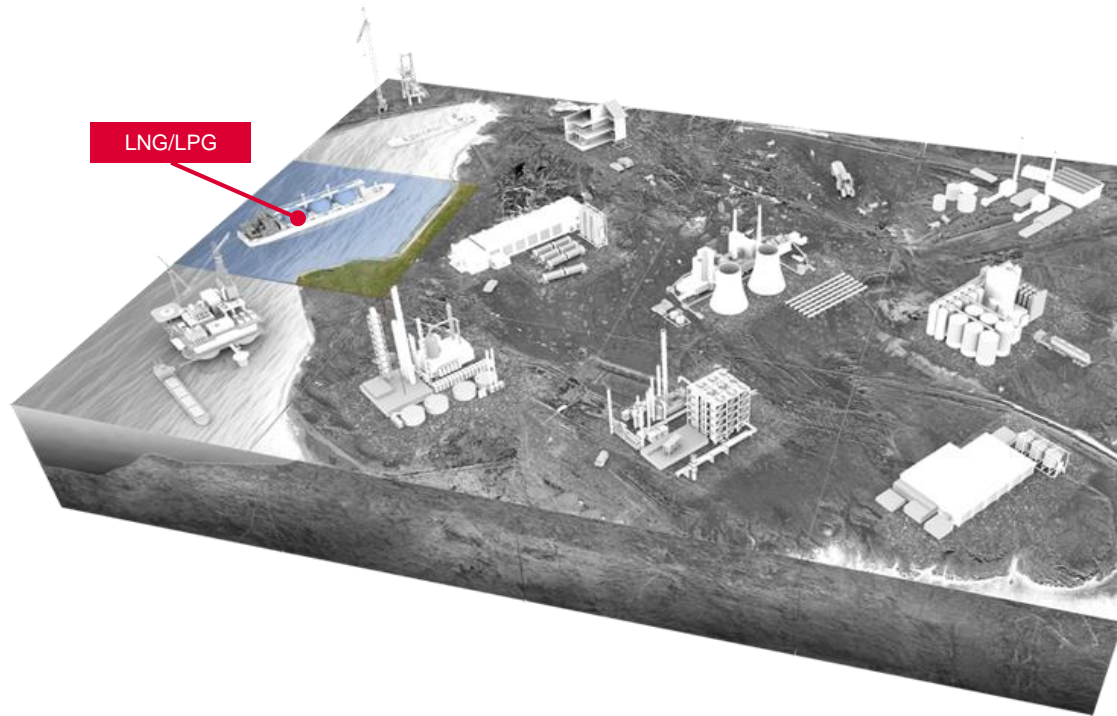
Requirements	LESER Product Solution
<ul style="list-style-type: none">■ High valve capacity at low weight and size■ High pressures and backpressures■ Comprehensive documentation and customer-specific inspections	 <p>High Performance</p> <ul style="list-style-type: none">■ For high span of temperature -270°C to 550°C■ Flange connection according to DIN EN, ASME BPE or other
	 <p>Compact Performance</p> <ul style="list-style-type: none">■ For high pressure up to 850 bar■ For small capacities e.g. in thermal expansion
	 <p>API</p> <ul style="list-style-type: none">■ Complies to delivery specification API 526■ Alloys (e.g. Duplex, Hastelloy) with short delivery times

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LNG/LPG.

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LNG/LPG.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. Pharmaceutical | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other



Photo: Shell International Ltd

The gases LNG and LPG liquefied for transport purposes make requirements on **safety valves concerning low temperatures and tightness**. The standard stainless steel designs of the LESER safety valves can be **applied for temperatures up to -270° C**.

LESER has the approvals for LNG and LPG.

Applications	LESER references (examples)
<ul style="list-style-type: none">■ LNG Carrier■ LNG Liquefaction■ LNG Regasification	<ul style="list-style-type: none">■ TGE■ Hamworthy■ Hartmann Schiffahrt■ P.I.A Pitow Industrieausrüstungen

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LESER understands the requirements of the LNG/LPG industry and can therefore offer **optimal safety for all applications as well as for utilities.**

Requirements

- Operation in cryogenic environments
- Sealing plates
- High and low pressures
- One-piece spindle for optimised setting accuracy

LESER Product Solution



High Performance

- High blow-off capacity in comparison to valve size
- Universal valve for many applications



Compact Performance

- For high pressure up to 850 bar
- For small capacities e.g. in thermal expansion

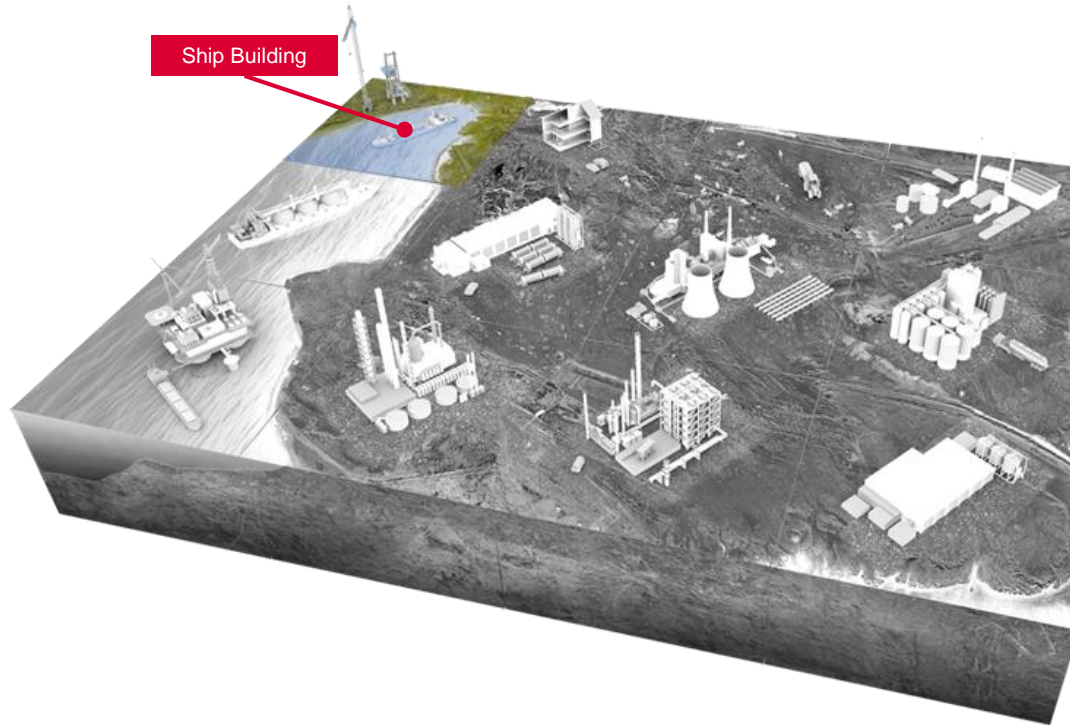


API

- Complies to delivery specification API 526
- Alloys (e.g. Duplex, Hastelloy) with short delivery times

Ship Building.

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Ship Building.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. Pharmaceutical | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

In the classic shipbuilding there are two application areas for safety valves: all **systems for the operation of a ship** and the **necessary systems for the transport of liquids or gases**.

LESER has **approvals of the worldwide leading classification societies**. Inspections are made daily for many societies which **guarantees accelerated deliveries and short delivery times**. By means of worldwide stocks **short delivery times can also be assured for spareparts**.



Photo: TGE Marine Gas Engineering GmbH

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Circulation of steam, water, fuels and lubricants■ Protection of chemicals, oil or gas	<ul style="list-style-type: none">■ Kröger Werft GmbH & Co.KG■ MEYER WERFT GmbH■ Lehnkering Reederei GmbH■ Bauer Kompressoren GmbH■ J. P. Sauer & Sohn■ MAN Diesel & Turbo SE■ Hamworthy Serck Como GmbH■ TGE

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Ship Building.

1. Overview | 2. Oil & Gas | 3. Petrochemical | 4. Chemical | 5. Pharmaceutical | 6. F & B | 7. Energy | 8. Technical Gases | 9. LNG/LPG | 10. Ship Building | 11. HVAC | 12. Other

LESER understands the requirements of the ship building industry and can therefore offer **optimal safety for all necessary applications as well as for utilities.**

Requirements

- Seawater resistance
- Short delivery times worldwide
- Extensive documentation and inspection program
- Approval of the relevant classification societies

LESER Product Solution



High Performance

- High blow-off capacity in comparison to valve size
- Universal valve for many applications



API

- Complies to delivery specification API 526
- Alloys (e.g. Duplex, Hastelloy) with short delivery times



Compact Performance

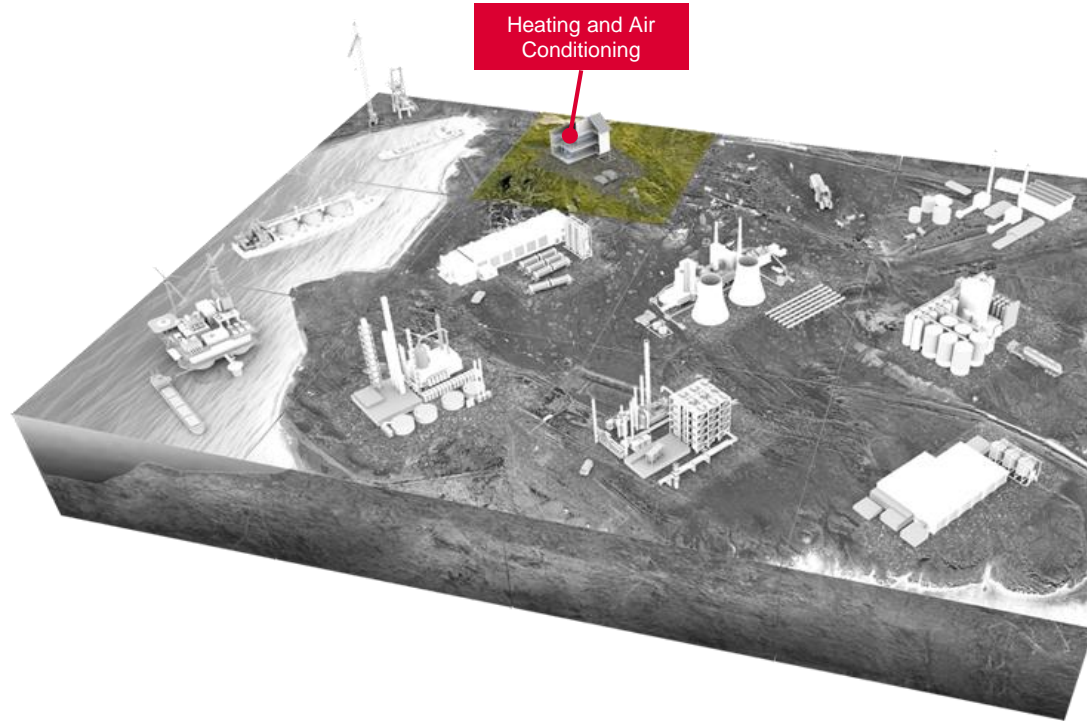
- For high pressure up to 850 bar
- For small capacities e.g. in thermal expansion

LESER

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Heating and Air Conditioning.

1. [Overview](#) | 2. [Oil & Gas](#) | 3. [Petrochemical](#) | 4. [Chemical](#) | 5. [Pharmaceutical](#) | 6. [F & B](#) | 7. [Energy](#) | 8. [Technical Gases](#) | 9. [LNG/LPG](#) | 10. [Ship Building](#) | 11. **HVAC** | 12. [Other](#)



Heating and Air Conditioning.

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In the Heating and Air Conditioning Industry the **TRD 721 is the central regulation**. Clause 5 and 6 define concrete requirements for the safety valve design.

LESER enables a **very easy order process** and **offers short delivery times by means of stock holding of all components**.



Applications	LESER references (examples)
<ul style="list-style-type: none">■ TRD-721 clause 6: Water heating systems up to 120° C with soft sealing disc and elastomer bellows■ TRD 721 clause 5: Steam generator up to 1 bar overpressure with metallic sealing disc and elastomer bellows	<ul style="list-style-type: none">■ Max Weishaupt GmbH■ Siegle & Epple GmbH & Co. KG■ Deinzer + Weyland GmbH■ Karl Lausser GmbH■ Cordes & Graefe KG■ Hermann Stitz & Co. KG■ HTI Gienger KG

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LESER understands the requirements of the Heating and Air Conditioning industry and can therefore **offer optimal safety for all applications.**

Requirements

- Easy ordering
- Short delivery times
- Simple and sturdy design

LESER Product Solution



S&R

- Optimised for heating and air conditioning requirements
- Flanged safety valves according to TRD 721
- In-line safety valves

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Other Industries.

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Every industrial plant has its specialties and must correspondingly be considered individually. Consequently, pressure, backpressure, temperatures and media are highly different. LESER supplies **safety valves for all applications**. Besides standard products LESER also realizes **customer-specific solutions**.

Applications	LESER references (examples)
<ul style="list-style-type: none">■ Individual requirements■ Standard products■ Delivery on time■ Paper mills■ Gas caverns■ Pipeline construction■ Fire extinguishing systems	<ul style="list-style-type: none">■ Aertzner GmbH & Co. KG■ Alstom S.A.■ Atlas Copco AB■ Enerflex Systems Ltd.■ Herrenknecht AG■ Pall Corporation■ Siemens AG■ Tetra Pak S.A.

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Other Industries.

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LESER understands the requirements of all industries and can therefore **offer optimal safety for all applications as well as for utilities.**

Requirements

- Individual requirements
- Standard products and individual solutions
- On time delivery
- Approvals for worldwide application

LESER Product Solution



API

- Complies to delivery specification API 526
- Alloys (e.g. Duplex, Hastelloy) with short delivery times



Compact Performance

- For high pressure up to 850 bar
- For small capacities e.g. in thermal expansion



High Efficiency (POSV)

- Pilot-operated safety valve
- Operating pressure close to set pressure
- Low weight and height

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Application Areas

Thank you for your attention

