

LESER – The Safety Valve.

A globally leading company.

LESER GmbH & Co. KG



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The-Safety-Valve.com

The Safety Valve. Agenda.

The aim of the presentation is
acquire knowledge about LESER.

1. Facts and figures
2. Customer requirements
3. Customer advantages
 - a. Long-term global references
 - b. Application-based solutions
 - c. Reliable valve function
 - d. Services around the safety valve
 - e. Low lifecycle costs
 - f. Passion for technology



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The Safety Valve. Facts & figures.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Product range

9 product groups and more than 2 million configurations for all industrial applications

Company development

With more than 100 Mio EUR net sales and 800 employees, LESER is one of the leading companies in its industry

LESER worldwide

8 subsidiaries and more than 80 sales partners ensure worldwide availability and service














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Facts & Figures. 9 Product Groups up to DN 400 and 850 bar.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

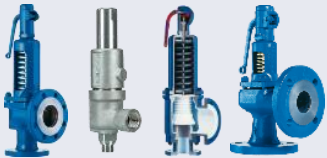





General industrial applications (chemical, petrochemical, oil & gas, technical gases, LNG / LPG, marine)						
Product Group	High Performance	API	Compact Performance	High Efficiency Pilot-operated safety valve	Modulate Action	
						
Short description	Flanged safety valves with especially high capacity for their size	Flanged safety valves that meet all the requirements of API 526	Threaded and flanged safety valves with compact dimensions	Pilot-operated safety valves for optimal tightness right up to set pressure.	Flanged valves with a standard or proportional opening characteristic	
Nominal Diameter at Inlet	DN 20 - DN 400 3/4" - 16"	DN 25 - DN 200 1" - 8"	DN 15 - DN 40 3/8" - 2"	DN 25 - DN 200 1" - 8"	DN 15 - DN 150 1/2" - 6"	
Pressure	0,1 - 300 bar 1,5 - 4.350 psig	0,12 - 413,8 bar 2 - 6.000 psig	0,1 - 850 bar 1,5 - 12.328 psig	2,5 - 426 bar 36 - 6.170 psig	0,2 - 160 bar 2,9 - 2.320 psig	
Special industrial applications						
Product Group	Clean Service	Critical Service	High Efficiency Suppl. loading	Best Availability Change-over v.	Best Availability Bursting discs	S&R
						

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Facts & Figures. All Industrial Applications. DGRL and ASME VIII.

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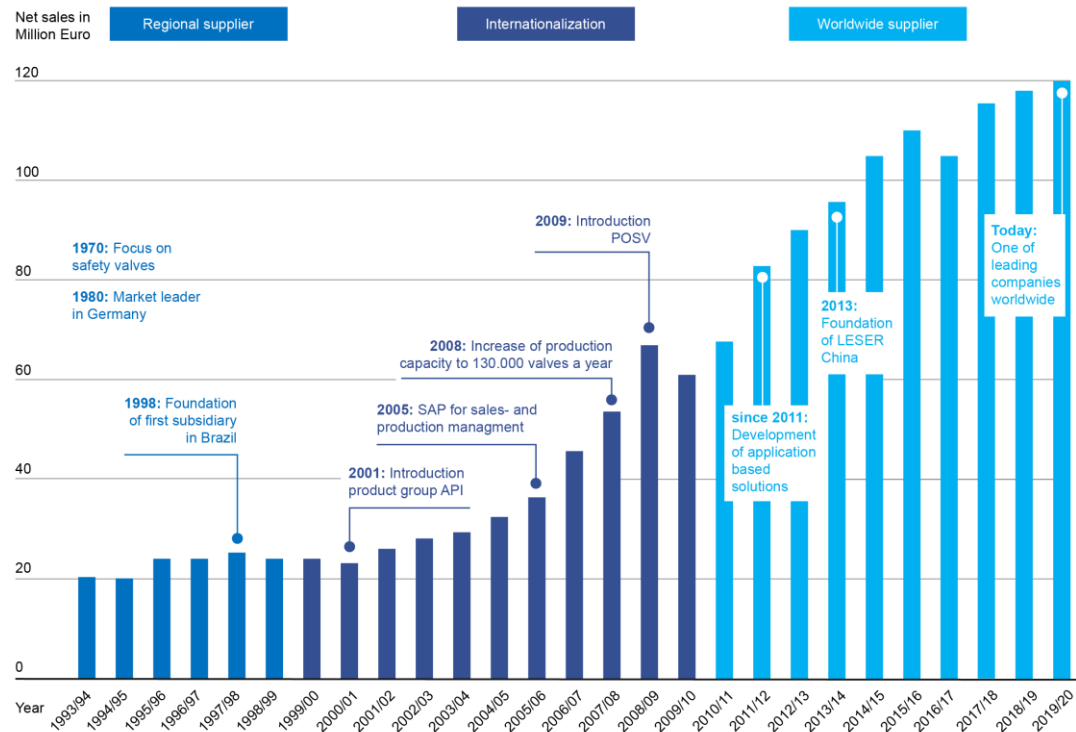
Typical product groups for applications			
Industry	Chemical industry	Petrochemical / Oil & Gas industry	Applications with special requirements (e.g. pharmaceutical, urea, refrigeration)
PED			
Typical product groups for PED markets	High Performance, Compact Performance, Critical Service, Modulate Action	High Performance, Compact Performance, High Efficiency POSV and SLS	Clean Service, S&R, application-based product solutions
ASME			
Typical product groups for ASME markets	API, Compact Performance	API, Compact Performance, High Efficiency POSV	Clean Service, application-based product solutions

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Facts & Figures. Net Sales quintupled.

1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages



Net sales quintupled since 1990 as LESER became a full-range international supplier.

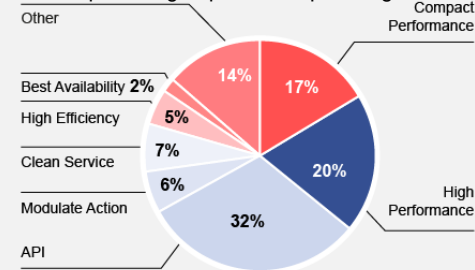
Facts & Figures. LESER – A Leading Company in the Safety Valve Market.

1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages

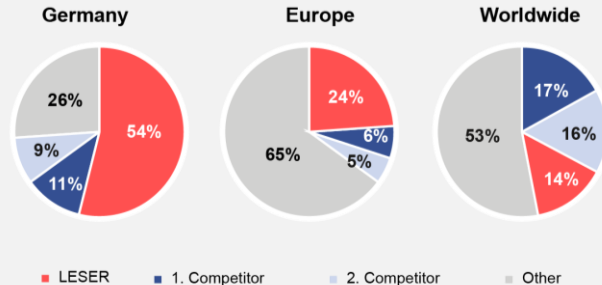
- Founded 1818
- Number of employees: more than 1,050
- Production capacity: more than 150.000 SV / a
- Installed based: > 2.000.000 SV
- More than 30 Mio EUR investments in the last 5 years
- Inventory in raw material and components:
> 20 Mio EUR in the factory and subsidiaries
- 1.700 t castings used per year
- 1.100 t bar material used per year

Net sales per product group

PED and ASME-oriented product groups have equal weight

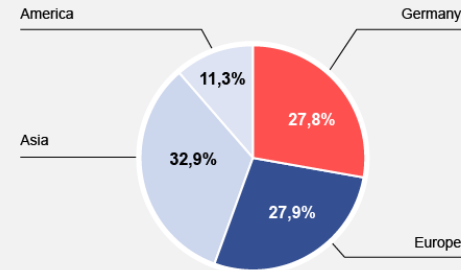


Market shares – Number one in Europa and Germany



Net sales per region

Strong presence in all regions



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Facts & Figures. LESER Worldwide.

1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages



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Customer Requirements. Small Component, big Impact on Safety & Efficiency.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Regulations and approvals

Safety valves must fulfill many specifications and regulations.

Reliability

Once installed the safety valve must work trouble-free for a long time.

Time

Ordering, delivery and documentation should take as little time as possible.

Costs

Regular maintenance has a high impact on cost and should be efficient.

Application

Safety valve functionality depend on the flow conditions before and after the valve.



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Customer Advantages. The LESER Valve-Star.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)



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Customer Advantages. Long-term Global References.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Recognition in the market

More than 2.000.000 installed safety valves

Qualified by customers

LESER is on the approved vendor list of more than 200 customers

Global approvals

LESER safety valves are approved according to PED, ASME VIII and more than 10 more codes and standards

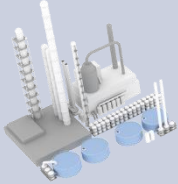
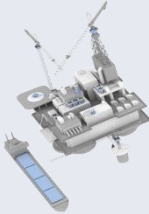
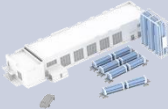


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References. Solutions for Leading Companies.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)



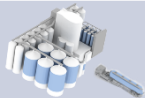

Industry	Customer	Since	Additional information
Petrochemical industry 	Shell Deutschland	1981	Continuous supply of large number of safety valves, especially Modulate Action
	Brunei Shell Petroleum	2011	Fulfillment of Shell specification, delivery of pilot-operated safety valves in special materials with short delivery times
	ExxonMobile	2006	Worldwide prequalification by ExxonMobile
	Petrobras	1998	Supply to large projects like Comperj or FPSOs, consistent fulfillment of high ITP requirements, local content manufacturing in Brazil
	GS E&C	2012	Frame contract with LESER shows the trust of one of Korea's biggest EPCs
Oil & Gas 	Saudi Aramco	2013	Together with a partner a local production facility was established in KSA, LESER can supply as "local approved company" both directly and to OEM
	LEWA	2004	High pressure safety valves for offshore application. High requirements regarding corrosion protection and variety of connections.
	PDO	2012	Valves in Dupelx and high alloy materials and short delivery times for the corrosive sections of advanced oil production plants
Technical gases 	Linde	1990	High technical requirements e.g. oil & grease free for oxygen applications in air separation, proven multiple times by customer audits
	Air Liquide	2004	High technical requirements, proven by OEVT certification for LESER safety valves

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References. LESER fulfills the Requirements of Leading Companies.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Industry	Customer	Since	Additional information
Chemical industry 	BASF	1975	There is a long-term customer relationship with e.g. Germany, USA or China. Here, the technical requirements such as increased tightness are met reliably. LESER uses a consignment warehouse in order to keep short delivery times.
	Bayer	1980	Main supplier for Germany with long-term global framework contract. Delivery of standard products as well as technical highly sophisticated solutions.
	DOW Chemical	1992	With a worldwide framework contract LESER delivers valves to North America and Europe; special solutions with pneumatic supplementary loading systems are developed in order to ensure the main transfer line of a plant.
	Wacker Chemie	1976	Long-term collaboration; main supplier for Germany and USA
Power 	Siemens	2001	Collaboration with diverse locations in the powerhouse-area as well as in the pump-division.
	Abengoa Solar	2003	Development of the configuration of solar fields for this customer.
	Shanghai Turbine	2007	LESER is main supplier with long-term customer relations.
	SPX Heat Transfer	2012	Delivery of Compact Performance valves with special connections and Inconel-inlet body.
Food / Pharma 	Krones	1995	High requirements for hygiene and cleanability. Wide range of products with approximate 290 different configurations.
	Hetero Labs	2005	Delivery of over 2000 valves in only 10 weeks
Shipbuilding 	TGE	1978	Valves for cryogenic application on LNG / LPG-carriers as well as for gas fuel applications such as cruise ships.

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References. Quality, Reliability and attractive Price for big Projects.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Projects > 500 T€	End User	EPC / OEM	Year
Raffinerie Lukoil Volgograd	Lukoil	Tecnicas Reunidas	2013/14
Yanbu Phase 3 Power plant	Saudi Aramco	Empresarios Agrupados / Al Toukhi	2014/15
Raffinerie Ryazan	Rosneft	---	2012/13
Raffinerie Jazan	Saudi Aramco	Petrofac, HHI, Hitachi, Technicas Reunidas	2014/15
Petro Rabigh II	Saudi Aramco	SK Engineering, Saipem, Petrofac	2014/15
Booster Station	KOC	Saipem	2013/14
Ras Al Kahir	SWCC Saline Water Conversion	ThyssenKrupp	2012-14
POLY 11	WACKER	---	2013-15
CNCC	PETROBRAS	TECHNIP	2012
UHV	PTT	GS E&C	2013
Rabigh CP 1 & CP 2	Saudi Aramco	Daelim	2013
Raffinerie Atyrau	Raffinerie Atyrau	Luoyang (Sinopec), KSS	2014/15
Hangbang PTA	China Prosperity (Jiangyin) Petrochemical Co., Ltd.	JDEC	2015

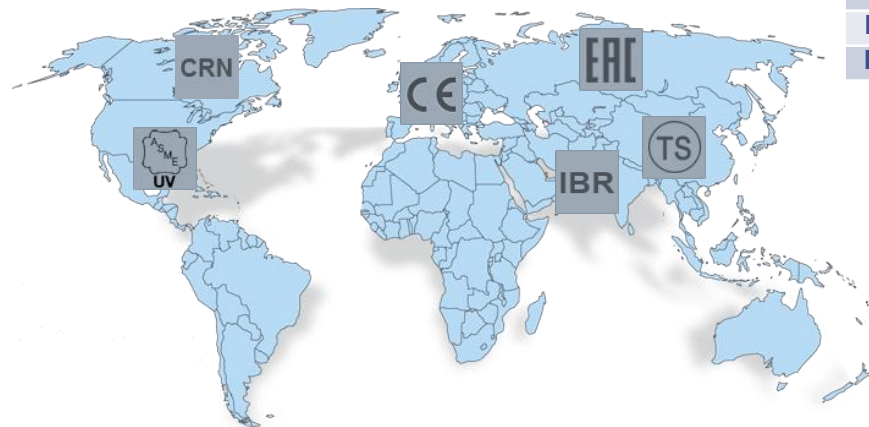
More than 15 projects > 500 T€ in two years

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References. Approvals and Certifications for every Continent/Country.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)



Country	Approval	Since
Europe	DGRL / DIN EN ISO 4126-1	1991
Germany	DGRL / AD 2000-Merkblatt A2	1985
USA	ASME Sec. VIII Div. 1	1990
Canada	CRN	1990
China	AQSIQ	1998
Eurasian Customs Union	EAC	2015
Korea	KOSHA	1999
Korea	KGS Approval	2012
India	IBR 1950	2008

Classification society	Since
DNVGL	1983
Bureau Veritas	1997
Lloyd's Register of Shipping	1991
RINA	1999
US Coast Guard	2009
ClassNK NIPPON Kaiji Kyokai	2010
American Bureau of Shipping	2002

Additional classification societies on request

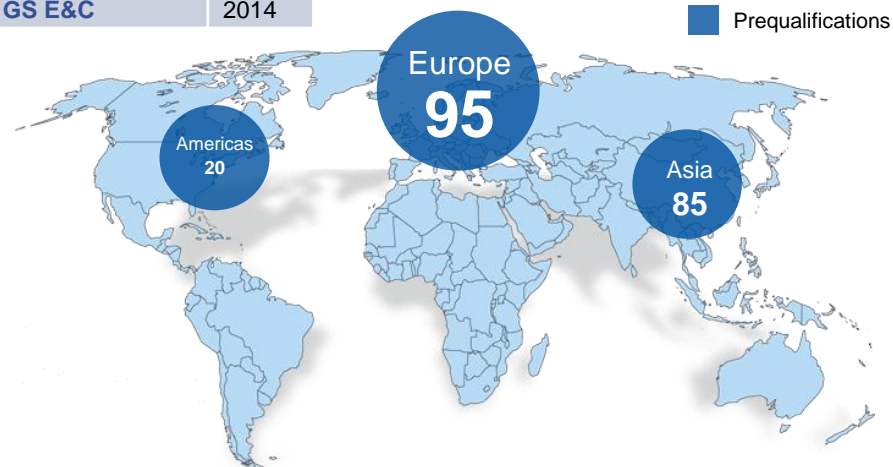
References. More than 200 Approvals by Top Leading EPCs & End Users.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Prequalified at	Since
Bayer	1998
BASF	1999
Novartis Pharma	1999
Toyo Engineering	2001
Petronas	2002
Shell Global Solutions	2002
Bechtel	2011
Petrobras	2011
Exxon Mobile	2014
EIL	2015

Customer audits	Year
Voith	2010
Saudi Aramco	2011
Total	2012
Cameron	2013
Petrobras	2013
Stamicarbon	2014
Linde	2015
Cryostar	2015
BASF	2015

Frame contracts	Since
BASF	2004
DOW Chemical	2005
TetraPak	2005
Bayer	2007
Lurgi	2007
Linde	2009
GS E&C	2014



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Customer Advantages. Application-based Solutions.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Safety valves for all industrial applications

Complete range up to 850 bar and 16x20"

Standardized industry solutions

90% back pressure, -196 °C medium temperature, zero dead space – LESER has the answer to application requirements



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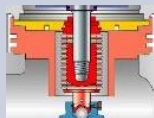
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Application-based Solutions. Configurations enlarge Operation Range.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)



Options for adaption to operating conditions



Backpressure compensation



Non-upright installation



Tightness up to set pressure



Corrosive media



High temperature applications



Sour gas applications

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Application-based Solutions. Product Solutions make Applications efficient.

1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages



Configuration for refrigeration

High tightness, medium resistance, easy interchangeability



Configuration for solar power

High temperatures, high backpressures, creeping medium



Configuration for FPSO / offshore

Corrosive media and environment, ship classifications



Configuration for urea synthesis

Crystallizing and corrosive medium



Configuration for Toxic Service

100x tighter than TA Luft



Configuration for cryogenic service

Safe function and tightness at low temperatures



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Customer Advantages. Reliable Valve Function.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Durable Design

Eight critical components strengthened for longer life

Tight Finish

50% less medium loss

Straight alignment

Two guiding points for less galling

Definitive setting

First audible discharge setting for higher operating pressures

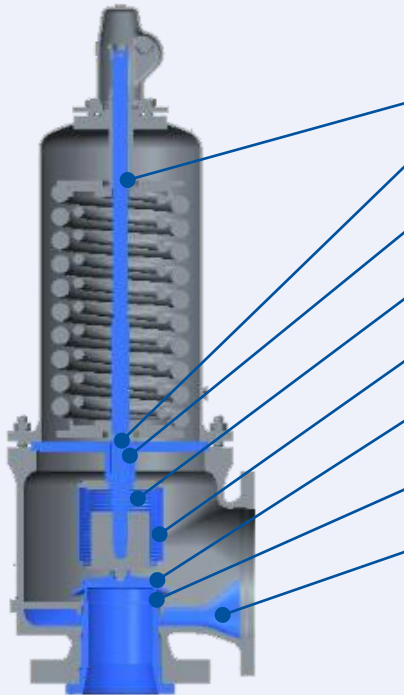


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Reliable Valve Function. Durable Design for longer Life.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)



Critical Components	Advantage
Needle bearings	Safe pressure setting
Roller-burnished spindle	Less wear and tear
Nitrocarburated guides	Less wear and tear
Long-life bellows material	Longer life
Shielded bellows	Protection of bellows
Stellited or hardened disc	No leakage after opening
Stellited nozzle according to operating conditions	No leakage after opening
Self-draining body	Less corrosion

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Reliable Valve Function. Outstanding Tightness increases Plant Efficiency.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)



Seal type	Feature and benefit
Metal-to-Metal sealing with LESER Nano Tightness	Smoothness and flatness of the sealing surfaces in the nanometer region ensure a tightness level with 50% less bubbles than API 527
O-ring disc	Optional: 10 different O-ring materials for zero bubbles in a sturdy disc design
Sealing plate	For temperature- and pressure ranges beyond possibilities of O-ring discs

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Customer Advantages. Services around the Safety Valve.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Easy ordering

More than 100 sales engineers, EDI and online shop for easy quotations and ordering

Best fit supply chains

7 supply chains for different customer needs

Time saving documentation

35 standard tests and inspections with standardized documentation

Web services

Certificates, spare parts lists and order status available online



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360° Services. Customer specific Consultancy and Supply Chains.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

LESER offers different supply chains for customer requirements concerning consulting and delivery times.

Your business requirement	LESER product range	Quotation time	Delivery times
OEM and MRO with repeating and defined configurations	> agreed between customer and LESER ¹⁾	> 1 working day or immediately through webshop	> 5 working days ex works in Germany
OEM, MRO and small project business	> full product range in price book ²⁾	> usually within 1–3 working days	> 2-4 weeks ex works in Germany
	> products on stock from local stocks		> 5 working days or faster ex local stock
Project business with detailed engineering and project specific handling of production	> full product range in price book and customer-specific configurations	> within bid due date	> agreed between customer and LESER, ex works in Germany (normally within 12 weeks)
Emergency	> products marked red in price book	> immediately	> 24-48 hours ex works in Germany

1) ordering via EDI and webshop possible. 2) Except options starting with S.



1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages

LESER offers standardized and efficient documentation packages to pool:

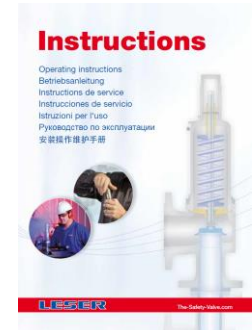
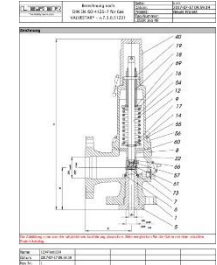
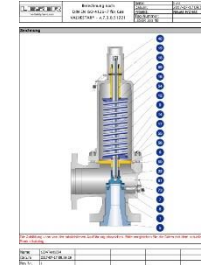
the correct sizing according to the norms and approvals

the right dimensioning and choice of materials

non-destructive tests during the production

approvals in different markets

necessary information for installation, usage and maintenance

[illegible]

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360° Services. Really 360°.

1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages

- VALVESTAR Web
- ENGINEERING
- Catalogs

SELECTION



- Order status

ORDER

- MAINTENANCE
- Pressure change
- Spare part finder

MAINTENANCE



- CERTIFICATES

DOCUMENTATION

Customer Advantages. Low Lifecycle Costs.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

Attractive pricing

For safety valves and spare parts

Single Trim

Same trim parts for steam, gas and liquid service

Spare parts availability

LESER Original Spare Parts Kits and
LESER Authorized Repair Centers
make maintenance quick and easy



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Low Life-Cycle Costs. Cost Optimization already included in Design.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

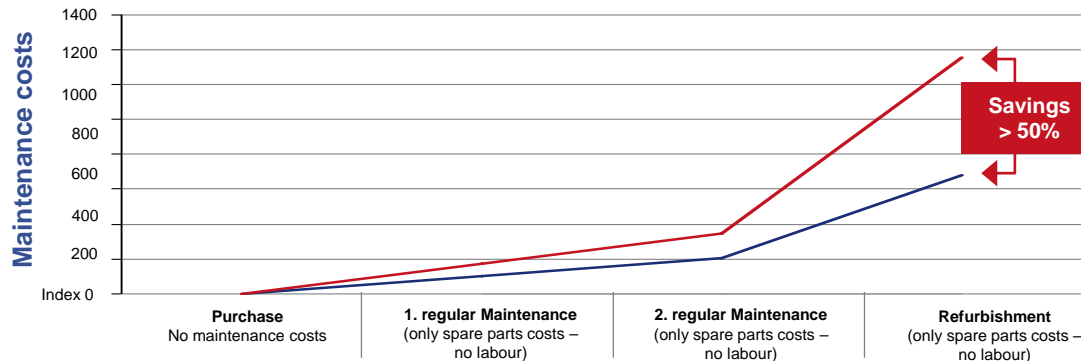
Example based on typical maintenance cycles

Typical maintenance	Typical parts	LESER advantage
Regular maintenance (disassembly, inspection, cleaning, re-lapping, assembly)	Gaskets, securing ring (disc), split ring, ball, securing ring, ball, screw, gasket (lock screw)	LESER Original Spare Parts Kits are 25 – 45% cheaper than individual parts and save ordering and logistics costs
Refurbishment (after two regular maintenance cycles)	All of the above plus disc subassembly	Due to the optimized design LESER spare parts are lower costs

Further LESER advantages not considered in this example include **longer service intervals due to Durable Design** and customer-friendly **spare parts** pricing (less than 5% of LESER net sales come from spare parts)

Example: API Orifice K

■ LESER ■ other valve

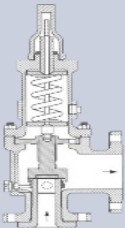
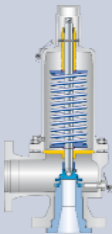


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Low Life-Cycle Costs. For all Media. With low Storage Costs.

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Competitor	LESER Single Trim	LESER Advantage
Multiplicity of springs	Low number of springs for a fixed set pressure range	<ul style="list-style-type: none">■ LESER needs only 13 springs for 15 psig to 1,500 psig (Orifice D) vs. 39 springs■ Reduced spring stock for a better spring availability
Different parts and springs for different options and services	<ul style="list-style-type: none">■ Single trim and design for all services (steam/gas and liquid) and options (e.g. bellows, O-ring disc)■ Same setting for all services (steam/gas and liquid)	<ul style="list-style-type: none">■ Same parts for all services for easier maintenance■ No changes for ASME, PED or Chinese AQSIQ approval■ Less parts reduce spare part stock
		

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Low Life-Cycle Costs. The right parts in one kit.

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Advantages of LESER Original Spare Parts Kits

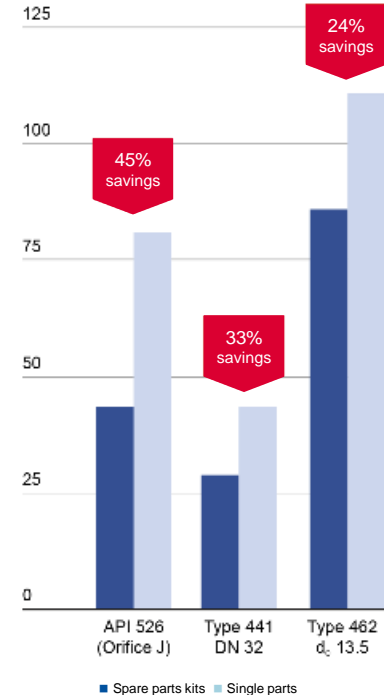
- Easy to order – only one part number for all spares
- Less storage effort
- Lower price than individual spares
- Quick delivery
- Worldwide availability

Example:

LESER Original Spare Parts Kits content for API:
securing ring (disc), split ring, ball, securing ring,
gasket, ball, screw, gasket (lock screw)



Examples of savings



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Low Life-Cycle Costs. Worldwide Maintenance Support.

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The LARC network (LESER Authorized Repair Centers) consists of audited repair centers worldwide who support the maintenance capacities of the customers.

Benefits:

- Over 100 repair centers in the network
- Special qualified for LESER safety valves through
- Certification and regular re-certification
- Training
- Access to manufacturer-documents



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Customer Advantages. Passion for Technology.

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Quality in series

5 Mio EUR investments in modern serial production every year

Constant flow of innovation

More than 50 R&D engineers, CFD simulation and the most advanced test lab in the world of safety valves



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Passion for Technology. Highly automated Serial Production.

1. Facts & Figures | 2. Customer Requirements | 3. Customer Advantages

Precise machining in one clamping



Machining



Traceability of components through coding in the machine

IT-based commissioning



Stock

SAP-controlled assembly with full transparency



Assembly



Strong packaging for safe transport

- Automated manufacturing of all critical components ensures high repeatability
- All manufacturing technologies in-house, including all machining, welding and heat treatment
- 75% of orders can be assembled from 10 Mio. EUR raw material and component stock
- More than 5 Mio. EUR investment in new technologies and processes every year

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Passion for Technology. 35 Quality Checks for each and every Valve.

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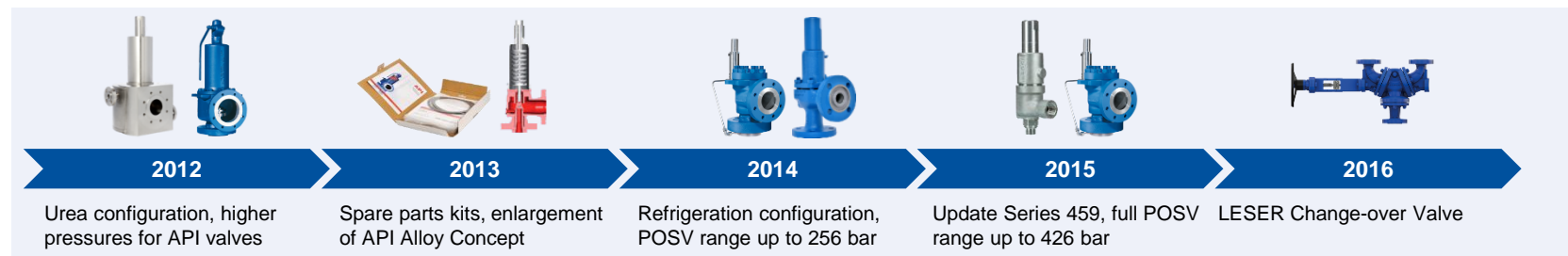


- Worldwide cluster certification of each subsidiary with identical qualified and certified processes
- Comprehensive supplier development with own team
- 35 inspections for every safety valve as standard
- All inspection data is entered in SAP in real time and can be retrieved and analyzed

Passion for Technology. Never stand still but constant Flow of Innovations.

1. [Facts & Figures](#) | 2. [Customer Requirements](#) | 3. [Customer Advantages](#)

- With more than 50 R&D engineers, CFD simulation capabilities and performance testing in our own test labs, LESER every year
- widens the operating limits of the product groups
- launches new products and options
- develops application-based Product Solutions



- The LESER test labs for steam, gas and water are an integral part of product development and are certified by TUV and ASME



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Thank you for your Attention.

