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**1 Purpose**

This LESER Global Standard (LGS) describes the way LESER understands and handles the repair and maintenance of valves in the field.

**2 Scope**

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

**3 References**

- [LGS\\_2813\\_Spare Parts Strategy](#)
- [LID\\_2812.01\\_EN\\_Testing procedures for valve repair shops](#)

**4 Introduction**

Over the last 200 years, LESER has sold millions of safety valves into various markets and industries worldwide. The maintenance and repair of these valves is essential for our customers to maintain their plant uptime.

**Maintenance** is the services required to ensure your valve’s longevity. These services include testing intervals, Spare Parts Kits, soft goods replacement, and more. LESER has maintenance recommendations that will tell you what needs to be done.

**Repair** is services that are needed when a valve or valve part is not working correctly. Either the part has malfunctioned or it has become worn to the point where the part needs to be replaced in order to maintain the performance of your valve.

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## 5 Use Cases for Maintenance and Repair

There are two use cases for plant operations where replacement safety valves and/or repair and maintenance are required.

**Planned Shutdown:** the whole plant is stopped for an extended period of time, usually measured in numbers of shifts and even numbers of days, to do equipment preventive maintenance and care; corrective repair; strip-down and overhaul; or component replacement work. Sometimes shutdowns of large sites can even go on for weeks.

























Synonyms: Turnaround

**Unplanned Shutdown (emergencies):** occasions where there is a forced plant shutdown, or a forced maintenance shutdown. These are stoppages which are unplanned events causing the operation or equipment to stop. They may be equipment breakdowns. They can also be disruption of services, like utility power supply loss or unavailability of raw materials.

Synonyms: Outage

## 6 Maintenance and Repair Personas

Different Personas are involved within the topic of maintenance and repair. These Personas have a different focus when it comes to the points described in this paper. The below table shows their interest in the form of pie diagrams. It serves two purposes. First, it helps the sales and marketing team to address the topics that are most important when talking to the customers represented by the Personas. Second, it shows who to keep in mind when developing new offerings within the different fields.

	Will Workshop 	Fritz Operation 	Thomas Purchase 	David Expert 
Maintenance and Repair Tools				
Service Providers LARC Network				
Spare Parts Supply				
Maintenance Intervals				
Maintenance & Repair Training				

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## 7 Maintenance and Repair Support and Tools

Keeping in mind that End users can select who does their maintenance and repair or even do it themselves, LESER offers many support tools to get the job done right.



A safety valve's set pressure is the pressure at which it audibly opens for the first time. If you want to change the set pressure of your valve, it may be necessary to replace the installed spring. With the [Pressure Change](#) web service you can find the right spring to change your valve to a new set pressure.



Original spare parts from LESER guarantee that your LESER safety valve reliably fulfils its task of protecting people, equipment and the environment. With the [Spare Part Finder](#) you can quickly and easily find the right parts for your individual LESER safety valve.



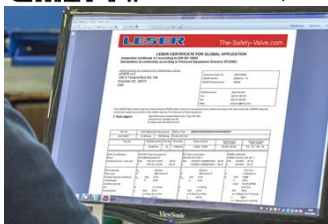
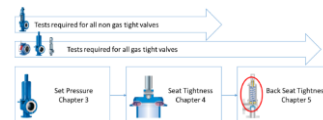
The [Maintenance Manual](#) offers you an extensive range of documents for the maintenance and repair of the LESER product groups. The documentation includes assembly / disassembly instructions, critical dimension charts and testing instructions for setting the valve after maintenance or repair.



For the pilot operated safety valves there are also assembly, disassembly and testing [Maintenance Videos](#) In addition to the maintenance manual. This makes the maintenance and repair of these valves as easy as for normal spring loaded safety valves.



The [LID 2812.01](#) specifies the setting and testing of LESER safety valves in different languages. It is currently available in English, German, Portuguese, Spanish and Chinese.




Certificates indicate the quality of the material used and the tests a safety valve has undergone during the production process at LESER. To review these certificates for maintenance and repair activities you can use the [Certificates](#) web service.



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## 8 Service Providers and LARC Network

### 8.1 Different kinds of maintenance and repair providers

There are different possibilities to choose from for maintenance and repair services on safety valves in general and LESER valves specifically. Generally, you're free to choose whatever 3<sup>rd</sup> party service provider you want or to do the work yourself as long as the technicians are trained. The above mentioned supporting tools are available for everybody. However, LESER has set up a network of service partners called LESER Authorized Repair Centers (LARC) to cater to your needs. As an operator of safety valves you want to be sure that the valves function the way they were intended to even after maintenance or repair. Furthermore, you want to have a competitive pricing for the services and a provider that can meet your requirements (e.g. oil & grease free valves or on-site repairs).

There are different service providers in the market that can be clustered in five main categories. The below table gives an overview about the training content and workshop requirements for the different kinds of maintenance and repair providers.

 The-Safety-Valve.com	LESER owned repair center	LESER Authorized Repair Center (LARC)	VR only certified Workshop	Unaffiliated workshop with LESER training	Unaffiliated workshop without LESER training
<b>Maintenance and Repair Training</b>					
Theoretical Knowledge					
Design and functionality of safety valves	X	X	-	X	-
Tightness and tightness requirements	X	X	-	X	-
Allowed and forbidden modifications and re-work	X	X	-	X	-
Practical training					
Assembly / Disassembly	X	X	-	X	-
Setting and testing of safety valves	X	X	-	X	-
<b>Maintenance and Repair Training POSV</b>					
Theoretical Knowledge					
Design and functionality of pilot operated safety valves	(X)	(X)	-	(X)	-
Differences between „Pop Action“ and „Modulate Action“	(X)	(X)	-	(X)	-
Tightness and tightness requirements	(X)	(X)	-	(X)	-
Practical training					
Assembly / Disassembly	(X)	(X)	-	(X)	-
Setting and testing of pilot operated safety valves	(X)	(X)	-	(X)	-
<b>Requirements</b>					
Local certification (e.g. VR in the US, TS in China).	X	X	X	-	-
Quality management system with process descriptions and calibration intervals	X	X	X	-	-
Setting and testing of LESER valves acc. to LID 2812.01 or LGS 0201 / 0202.	X	X	-	-	-
Kellogg test device designed acc. to API 527 and functional test bench	X	X	X	-	-
Workshop equipment suitable for valve repair	X	X	X	-	-
Pressure gauges with class 0,6 or better and marked working range	X	X	-	-	-
Valve repair traveler that allows traceability of valves and parts	X	X	X	-	-
Trained technicians with training records available	X	X	X	-	-
Practical assessment of valve repair capabilities	-	-	X	-	-
<b>Documentation</b>	LESER Original	Own	Own	Own	Own
<b>Interval of maintenance training</b>	Ongoing	≈ 3 years	-	-	No
<b>Interval of LARC audit</b>		3 years	No	No	No

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First, there are the LESER owned repair centers in Hohenwestedt, Rio de Janeiro, Aurangabad, Tianjin and Singapore. These are repair centers that are integrated in the LESER quality cluster and have access to the manufacturing resources of the different locations. The advantage for you as the operator is that original LESER documentation and repair tags are available for repairs.

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Then, there are the LARCs. These have to attend LESER maintenance training on a regular basis and are audited through the LESER organization to meet certain workshop requirements.

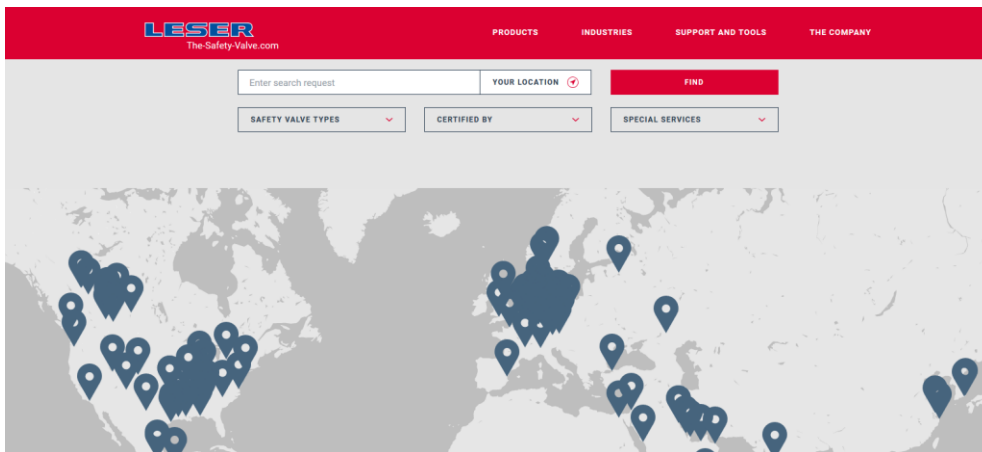
Third, the National Board of Boiler & Pressure Vessel Inspectors (NBIC) has a program set up, where a VR stamp is given to service providers who meet certain standards. The standards overlap with the LARC requirements when it comes to workshop equipment and a quality management system. However, a specific LESER maintenance training is not necessary for these workshops. A workshop can be VR certified and a LARC at the same time.

Fourth, there are unaffiliated workshops who have attended a LESER maintenance training. Thus the person who attended the training is trained on the functionality of safety valves and the setting and testing of LESER valves. However, the workshop itself hasn't been audited.

Last, there are workshops without a LESER training nor a workshop audit by LESER or the NBIC.

## 8.2 Finding Maintenance & Repair Providers

The LARC network is available via the LESER [Service Partner Finder](#). Here you can not only filter for a third party inspection certificate (VR or ISO 9001) but different product categories and services. Furthermore, the world map provides an overview of LARCs in the different areas of the world.



There are different ways to find the different types of maintenance and repair providers detailed above. The NBIC maintains a database of all VR certified workshops worldwide that can be accessed [online](#). One can either search by Country or specify a company name. It is important that the VR stamp is selected, as this stamp qualifies for valve repair.

**Manufacturer and Repair**

Company Name:

City:

State:

Country:

Stamps:

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Finally, the [LARC Database](#) gives LESER employees an in-detail overview of a LARCs capabilities, such as test bench pressure ranges and sizes. Therefore, you can get in touch with your nearest LESER subsidiary for special requests that can't be narrowed down using the standard filters on the LESER website.

## 9 Spare Parts Supply

The spare parts guideline and supply is described in the [LGS 2813 Spare Parts Strategy](#). In general, spare parts can be classified in maintenance spares (e.g. nozzle or disc) and uncommon spares (e.g. bonnet or body).

*“Maintenance spares are offered, whenever a customer requests a standard spare parts offer for valves that have been in service and without an indication what parts are needed. These parts can be shipped within three business days or 24h as a stretch goal.*

*Uncommon spares, on the other hand, are normally not needed during the lifetime of a LESER safety valve. However, they can be provided on request with delivery times that correspond to the valves delivery times.*

*The situation in project business is a little bit different than the situation in standard MRO business. Here commissioning spares, which are spare parts that are needed for start-up, are often part of the project tender and purchased by the EPC. Furthermore, a recommendation for an operational spares stock is often requested as part of the project documentation and purchased in an additional order, which LESER will actively follow up on as part of our Aftermarket initiative.”*

## 10 Maintenance Interval

The recommended maintenance interval is defined in the LESER operations manual as follows:

When and how often safety valves should be inspected cannot be answered in general but has to be regarded for each application individually. Due to the individual operating conditions and in consideration of the different mediums, LESER gives no general reference for an inspection time interval. However, in coordination between LESER, different operators, and the notified body, the following procedure has proven itself:

### 1. Determination of an initial inspection time interval:

In accordance with the operating conditions an initial interval of 24 month has proven itself. If the safety valve opens frequently or the medium is corrosive the inspection time interval should be 12 months.

### 2. Inspection of safety valves after this period of time:

After this initial time period the safety valve should be tested and three indicators should be checked at a minimum before disassembling the valve.

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Set pressure repeat accuracy (this requirement is fulfilled if the set pressure corresponds to the test pressure with a tolerance of  $\pm 3\%$ ).

Tightness test of the safety valve (this requirement is fulfilled if the tightness is tested according to API standard 527 or LGS 0201).

Testing of the mobility (this requirement is fulfilled if the safety valve can be opened with the lifting device at an operating pressure  $>75\%$  without the use of any additional tools).

### 3. Adapting the inspection time interval

The inspection time interval can be increased if the safety valve fulfills the requirements of the above mentioned tests. If not, the interval should be reduced to 12 months or less. In case the following inspection fulfills the requirements again the inspection interval can be lengthened by two month. If the safety valve is leaking before the scheduled inspection, the inspection has to be done immediately.

## 11 Maintenance and Repair Training

Although the maintenance and repair support tools offer a lot of help during planned and unplanned shutdown, every technician who works on a safety valve should be properly trained. Therefore, LESER offers different technical trainings to cater for your needs.

### 11.1 Seminar for spring loaded and pilot operated safety valves

The basis of the LESER training program is the standard maintenance seminar for [spring loaded](#) and [pilot operated](#) safety valves that is conducted at our headquarters and factory in Germany. The seminar provides know-how for the maintenance and repair of LESER safety valves to like-new condition. The program is designed so that at least 50% of the content is hands-on training.

The training is also offered at our subsidiaries, LESER US in Charlotte, LESER Br in Rio de Janeiro, LESER CN in Tianjin, LESER SG in Singapore and LESER IN in Aurangabad.

### 11.2 On-Site Maintenance and repair training

LESER offers on-site maintenance training for those of you that can't fit a trip to above mentioned LESER locations in their schedule or have specific requirements for the training. The basic training agenda is the same as for the normal seminar, but can be discussed individually. For an offer, planning and scheduling contact [aftermarket@leser.com](mailto:aftermarket@leser.com).

## 12 Glossary

LARC	LESER Authorized Repair Center
Maintenance Spares	Standard spare parts for a valve that has been in service.
NBIC	National Board of Boiler & Pressure Vessel Inspectors
Uncommon Spares	Spare parts that are normally not needed during the life cycle.
VR	A stamp similar to the UV stamp, but focused on valve repair.

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