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11.1 Introduction

The purpose of this chapter of the LESER Engineering Handbook is to explain

- How does LESER ensure the quality of its products?
- What makes the difference between LESER and most competitors?

Quality Management is a multi-faceted and multi-stage process. LESER therefore focuses its QM activities on several related areas, which are described in detail below:

- LESER's integrated Quality and Environmental Management System
- Requirements for the qualification of suppliers
- Requirements for components that are not manufactured in-house
- Requirements for the qualification of service partners
- Standard quality tests, procedures and certificates
- Quality tests performed on customer's request
- Explanation of LESER's Environmental Management activities

11.2 LESER's Integrated Quality and Environmental Management System

LESER is supplying safety valves to customers worldwide and makes sure that the products can be used in most countries without requiring any change.

LESER has summarized the requirements of international codes and standards and has transferred these into

- internal processes
- requirements for suppliers
- requirements for purchased materials

The result is a Quality and Environmental Management System which integrates the requirements of global quality and environmental standards.

This includes the certification according to various regional and international regulations such as:

- ISO 9001
- European Pressure Equipment Directive (PED 97/23/EC)
- ASME VIII Div 1
- ISO 14001
- Chinese Manufacture Licensing System
- EAC Russia, Belarus, Kazakhstan
- IACS
- and others

Thus, the worldwide suitability of LESER's safety valves is ensured without requiring additional regulatory compliance for most countries throughout the world. This system is applied by our worldwide subsidiaries as well.



Figure 11.2-1: Quality Management Certificates

11.2.1 Quality and Environmental Policy

With our safety valves we protect our clients' products and facilities and thereby prevent harm to people and the environment.

It is a matter of principle to LESER to provide each of our customers with products and services of the required quality which comply with the customers' specifications, the current norms and the rules and regulations.

The required quality is achieved as a result of standardized and controlled processes, processes that are shaped and carried out by our staff.

The achieved level of quality is therefore the collective result of the work done by each of our employees and only meets the requirements when every employee carries out the tasks in his/her field of activity self dependently and with quality awareness.

Only by ensuring the quality of our products and processes we can guarantee our objective to provide protection and our financial success.

To achieve the required quality, we work with the regulations and methods specified in our quality management system in accordance with (EN) ISO 9001-2000. This is perpetually being maintained and further developed in order to increase the effectiveness of the regulations and methods.

Environmental issues form a vital part of our planning and implementation activities across the processes of design, material management and production of LESER products.

A reasonable consideration of the environmental impact determines the type and scope of these activities.

LESER is committed to a careful use of resources and strives to continually improve the relevant processes in order to reduce the environmental impact.

11.2.2 Management System Overview

LESER Quality Management comprises both the levels of strategic planning and operative quality assurance.

On the strategic planning level, a large number of existing rules and regulations in the form of LESER work standards and working instructions for the operative quality assurance are in place in order to ensure compliance with rules and regulations within the controlled processes.

The operative quality assurance is the scheme which governs day to day operations. Quality coordinators located in the individual operative departments ensure the implementation of quality improving measures in all areas of activity of the order process.

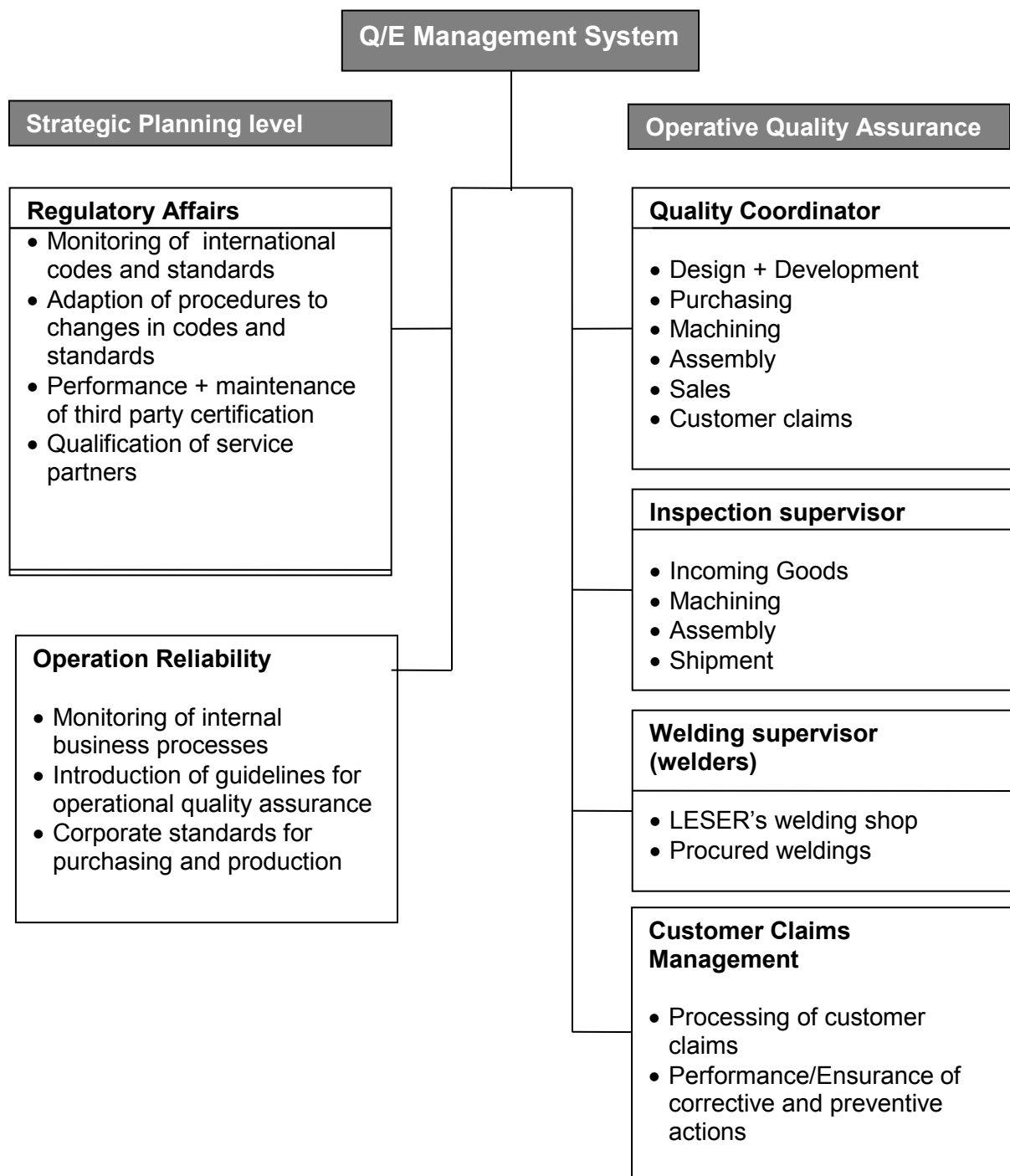


Figure 11.2.2-1: Management System Overview

11.3 Quality Assurance Activities

The high quality level of LESER safety valves is the result of coordinated processes, starting with product development, through the assurance of high quality purchased materials and high-grade qualified production, combined with coordinated quality assurance measures within each stage of production right up to the field application.

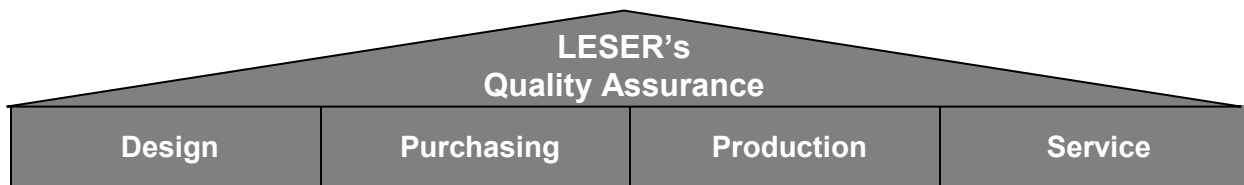


Figure 11.3-1 Quality Assurance at LESER

11.3.1 Quality Assurance in the Design Process

Quality assurance elements in all stages of product design are of key importance because this is where the greatest potential for cost reduction and quality improvement lies.

For this reason LESER has implemented elements like design reviews, process and design FMEAs (failure mode and effect analysis) into the design process.

Furthermore, product validation testing is conducted on our performance test lab, assuring the high quality of LESER safety valves already at the design stage.

In addition to the product validation testing required for the approval of a safety valve, regular product audits are performed by LESER.

A product audit is performed on production valves and consists of the following checks and verifications:

- capacity and function: performance tests on flow test lab
- set pressure: according to specification
- tightness: according to specification, API 527, LGS 0201
- documentation: order confirmation, LESER CGA, material certificates
- material certificates: compliance of materials with ASME VIII and ASME II, PED 97/23/EC
- marking: consistency between packing, tag and name plate
- valve external: no external damages
- dimensions: dimensional check of critical dimensions
- consistency of information: comparison of information in catalog and LESER order handling system (SAP configurator)

11.3.2 Quality Assurance in Purchasing

The requirements for purchased parts are laid down in LESER's corporate purchasing specifications. Examples for these specifications are:

- LDeS 3290.01_EN to LDeS 3290.16_EN: Terms of delivery for casting materials
- LDeS 3040.01: Delivery specification for bar materials
- LDeS 3265.01_EN: Delivery conditions for helical compression springs

These documents summarize the requirements of worldwide codes and standards (e.g. PED and ASME Code) and serve as contractual requirements for all tests and qualifications.

At the beginning of the purchasing process, the first step is the selection and qualification of suppliers.

LESER's requires a stringent qualification of new suppliers and continuous monitoring of established suppliers. LESER uses a comprehensive qualification system established in a supplier development process with the following topics:

- Check required certifications
- Requirements for supplier's quality system certifications, qualifications of staff and processes
- External audits of the supplier's quality management system and manufacturing equipment
- First sample examination process (6 sample lot per each new part)
- Continuous supplier assessment by incoming inspection
- Quality Assurance Agreements with suppliers which are then integrated into the LESER Quality Management System

The following example shows requirements and procedure for the qualification of a new supplier for casting materials:

Step	Process	Requirement
1	Preselection of supplier	ISO 9001, PED 97/23/EC, LR, GL, DNV, requirements are laid down in LDeS 0017.00 and LGS 0024
2	Supplier audit by QM and Purchasing	Verification of requirements above mentioned requirements regarding: certifications, equipment, personnel.
3	Implementation of LESER specified casting pattern by supplier	Conformity with drawings
4	Supply of first sample lot to LESER: 6 sample lot for each new part with first sample inspection performed by supplier	First sample inspection requirements are laid down in LGS 0215.
5	First sample inspection process at LESER <ul style="list-style-type: none"> - review of material certificate, spectral analysis - 100% incoming inspection of samples, dimensional check, ultrasonic or radiographic test - machining of all samples with tools used during serial production: shows possible internal defects - documentation of results in a specific first sample test report form - result: approved, approved with conditions, not approved... 	ISO 9001, PED 97/23/EC, ASME VIII App. 10. First sample inspection requirements are laid down in LGS 0215.
6	Approval of new part for supplier	

Table 11.3.2-1: Requirements for supplier qualification

Should quality deviations occur after the part has been approved, LESER uses a claim management process which secures that corrective and preventive measures are taken by the supplier. LESER's established supplier management system guarantees the LESER specific development of suppliers in order to attain a high quality level.

11.3.2.1 Castings Sourced in India or China

LESER is sourcing castings from suppliers in various countries in Europe, Brazil, UAE and a large portion coming from India and China.

Every supplier is going through the approval procedure described above and on every component supplied by the supplier the first sample examination process is performed. Quality control and all machining of castings is performed by LESER in Germany. Together with the quality assurance measures in production described in the following section, LESER ensures that every safety valve that leaves the factory satisfies the quality requirements of our customers and the applicable codes and standards.

11.3.3 Quality Assurance in Production

LESER has a high degree of vertical integration compared to other valve manufacturers. Instead of sourcing ready machined components or complete valves in low cost countries, machining, welding, pickling and assembly are integrated in the production process at the factory in Hohenwestedt (Germany). This deep vertical integration allows hands-on access to the processes and quick response times.

This process control is ensured by:

- Quality inspectors and workers in the machining department who are directly responsible for inspections according to specified inspection plans.
- Inspection supervisors trained according to
 - *EN 473 – Non-Destructive Testing – Qualification and Certification of NDT Personnel* and
 - *SNT-TC-1A - Non-Destructive Testing*who check the non-destructive inspections for cast and welded parts.
- Welding supervisors who qualify the welding procedures together with external inspectors.
- Quality coordinators who ensure the quality of the individual operational processes and who are especially trained as certified individuals according to ASME VIII UG 117.

11.3.4 After Sales Service

After the valves are delivered to the customer LESER the following quality related processes ensure the functionality of the products during the product life cycle:

- Service Partners like assemblers and repair shops receive extensive qualification by LESER and thus serve as contacts for our customers worldwide.
- LESER qualifies and certifies all Service Partners according to its own corporate quality standards.



Figure 11.3.4-1: Service Partner Certificate

- LESER's repair department at our Hohenwestedt production site ensures the repair even of old valves which have been in service for a long time.
 - In case of customer claims LESER's Claims Management immediately makes sure that effective corrective action is taken. Every incident is documented in a report and substantiated by photographs if applicable.
- In case of a claim you can contact LESER by:
Phone +49 4871 27-122
Fax +49 4871 27-298
E-mail: claims@leser.com

11.4 Environmental Management

LESER has established, documented and implemented an Environmental Management System according to ISO 14001. The Management System is improved continually.

The System ensures that LESER uses resources carefully and relevant processes are in place to reduce the environmental impact.

Environmental programs and objectives form the basis of the use of environmentally friendly technologies and serve as guidelines not only for ourselves but also for LESER's contractual partners.

Reduction of the environmental impact consists of a large number of small measures. Examples for these measures are:

- over 90 % of LESERs waste products are recycled as per the German environmental laws.
- LESER has also decreased the waste pickups by nearly 50%. The reduction of paper pickups from six to three per week alone saves over 600 travel kilometres per month.

11.5 Quality Tests and Test Certificates

LESER offers all relevant types of tests, including tests performed on customers' request and third party inspections. Testing is based on internationally applicable standards and on a large number of national codes and their requirements. There is extensive documentation of test procedures available. LESER issues a variety of certificates, including its own Certificate for Global Application (CGA) which integrates the various compliance certifications for LESER standard tests into one single certificate, certifying global suitability for LESER safety valves. For details about the Certificate for Global Application see section 11.5.5.

11.5.1 Types of Test

LESER performs the following types of tests or will arrange for them to be performed by a third party:

- LESER standard tests – required by international codes and standards (see section 11.5.2)
Tests are documented with a Certificate for Global Application - CGA, see section 11.5.5.
 - Body strength
 - Set pressure
 - Tightness Seat/Body, etc.
- Material Tests – performed by supplier or external laboratories
 - Strength tests
 - Chemical analysis,
 - NDE tests, etc.
- Additional Tests – performed by LESER on customer's request
- Third Party Inspections – performed by TÜV, classification societies, customer or others

11.5.2 Requirements for Standard Tests

The requirements for the LESER standard tests which are certified by the LESER Certificate for Global Application – CGA are based on the following directives:

Test Description	Directive	Option Code
LESER Certificate for Global Application - CGA (Inspection Certificate 3.1 according to DIN EN 10204)	ASME Code Sec VIII API 526 DIN EN ISO 4126 DIN EN 12266 1/2 PED 97/23/EG AD 2000-A2 VDTÜV SV 100	H03

Table 11.5.2-1: Requirements for standard tests

11.5.3 Procedures

LESER's test procedures are documented in LESER global standards - LGS. The standards contain detailed information about:

- * Applicability
- * Scope and definition
- * Test reference
- * Test equipment
- * Test procedure
- * Acceptance criteria
- * Personal qualification
- * Documentation
- * Standard references

The following are examples for procedures, as documented in LESER procedural standards:

Test	LESER Procedural Standard
Overview	LGS 0200
Body tightness	LGS 0201 and LGS 0209
Hydrostatic pressure test	LGS 0209
NDE-tests	LGS 0203 to LGS 0206
Material identification test	LGS 0207
Seat Tightness	LGS 0201

Table 11.5.3-1: Tests and Procedural Standards

The description of all test procedures can be downloaded from the LESER download portal on the LESER website: www.leser.com

11.5.4 Test Certificates According to EN 10204

According to the EN 10204 standard LESER offers three different types of certificates as follows:

Test report 2.2

Document in which the manufacturer declares that the products supplied are in compliance with the requirements of the order and in which he supplies test results based on non-specific inspection.

Inspection Certificate 3.1

Document issued by the manufacturer in which he declares that the product supplied are in compliance with the requirements of the order and in which he supplies test results.

The test unit and the tests to be carried out are defined by the product specification, the official regulation and corresponding rules and/or the order.

The document is validated by the manufacturer's authorized inspection representative, independent of the manufacturing department.

Inspection Certificate 3.2

Document prepared by both the manufacturer's authorized inspection representative, independent of the manufacturing department and either the purchaser's authorized inspection representative or the inspector designated by the official regulations and in which they declare that the products supplied are in compliance with the requirements of the order and in which test results are supplied.

The majority of the certificates issued by LESER are Inspection Certificates 3.1.

11.5.5 Standard Test – LESER Certificate for Global Application (CGA)

LESER offers a Certificate for Global Application (CGA) which confirms that LESER safety valves are manufactured and certified according to combined international regulatory standards. This ensures the worldwide suitability of LESER safety valves.

By issuing the CGA LESER certifies that the design, marking, production and approval of the pressure equipment correspond to the requirements of regulations which are listed under “directive”.

Further to the CGA, LESER offers to issue an inspection certificate 3.1 according to DIN EN 10204 for each test on request.

All named tests are applied for each individual safety valve which leaves the factory, regardless if the CGA is issued or not.

The shipment of certificates (LESER CGA or single inspection certificates) will be carried out together with the safety valves, if not specified otherwise.

On request, LESER will also dispatch the certificates by e-mail, fax or mail as well.

All certificates already ordered by the customer can be downloaded from the LESER Download Portal at “www.leser.com”.

To order additional inspection certificates please contact the LESER Certificate service via e-mail to: certificate@leser.com.

Customers can order the LESER CGA by specifying option code “H03”.

LESER		The Safety Valve	
LESER CERTIFICATE FOR GLOBAL APPLICATION			
Inspection certificate 3.1 according to DIN EN 10204			
Declaration of conformity according to Pressure Equipment Directive 97/23/EC			
LESER GmbH & Co. KG Postfach 26 16 51, 20506 Hamburg, Germany			
Customers Order-No.:		LESER – Job – No.:	
LESER – Customers-No.:		LESER – Contact:	
For:		Fax:	
eMail:			
This LESER CGA confirms that the undimensioned LESER-safety valves are manufactured and certified according to the rules world-wide. LESER makes the world-wide employment possible of the safety valves by the reference on these regulations.			
1 Test object			
High Performance Safety valve, type 441 DIN, closed bonnet, gastight cap H2 for steam, gases and liquids.			
Art.-No.:	Cold differential test pressure	Option Code:	
	bar	Further SV-info:	
Tag – No.:	LESER – Job – No.:	Pos. – No.:	Serial – No.:
			Body material
			Nominal size
			Pressure rating
			Inlet
			Outlet
Kind of certification	VDTUEV-Type test approval	EC type-examination	ASME certification
Rules	AD 2000-Merkblatt A2	DIN EN ISO 4126-1	ASME-Code Sec. VIII, Div. 1
Certification No., valid until	D/G: TOV-SV 04-576 • 31.05.09	G/S: 072020111200059/006 • 01.07.10	G/S: M37044 • 17.02.07
	F: TOV-SV 04-576 • 31.05.09	L: 072020111200059/006 • 01.07.10	L: M37055 • 30.01.07
Flow diameter	q _v [mm]	A [mm]	K [in.]
Flow area	A [mm²]	G/S [mm²]	K G/S [sq. in.]
Certified derated coefficient of Discharge	D/G:	K _v G/S:	K G/S:
Certified capacity	F:	L:	L:
Lift	H [mm]	h [mm]	i [in.]
Overpressure	c D/G: [%]	c G/S: [%]	c G/S: [%]
Cold differential test pressure	p [bar g]	p _v L: [bar g]	cold [bar g]
Temperature correction	[bar g]	[bar g]	[bar g]
Backpressure correction	[bar g]	[bar g]	[bar g]
Set pressure	- [bar g]	p [bar g]	p [bar g]
2 Declaration of conformity and LESER Management Systems			
Conformity assessment procedure: Category IV acc. to PED 97/23/EC			
Notified body: TÜV NORD Systems GmbH & Co. KG, Große Bahnstraße 31, D-22525 Hamburg			
Certification No.: 0045			
LESER-Management systems	Quality Management System	DIN EN ISO 9001:2000	Certification No.: 07 100 0066
	Environmental Management Sys.	DIN EN ISO 14001:2005	Certification No.: 07 104 0066
	Production Quality Assurance	ASME Certificate of Authorization	Certification No.: 07 20201112 2008/001
		ASME Code Sec VIII Div. 1	27.856
3 Regulations			
LESER certifies with this CGA that design, marking, production and approval of this pressure equipment correspond to the requirements of the following regulations (directives, codes, rules and standards).			
Harmonized standards:	Other regulations:		
DIN EN ISO 4126-1	AD 2000-Merkblatt A2	TRD 221	ASME-Code Sec. II
DIN EN ISO 4126-2	AD 2000-Merkblatt A4	TRD 421	ASME-Code Sec. VIII, Div. 1
DIN EN 12266-1	AD 2000-Merkblatt HPS	TRD 221	ASME PTC 25
DIN EN 12266-2		TRD 221	ASME PTC 28
			API RP 520
LESER GmbH & Co. KG Hamburg HRA 82424			
GP: 800 Joachim Klaus, Martin Leser			
20537 Hamburg, Wendenslo: 133 – 135			
20506 Hamburg, P.O. Box 26 16 51 (J)			
Fon +49 (40) 251 65-100			
Fax +49 (40) 251 65-500			
eMail sales@leser.com			
Web www.leser.com			
LESER – The Safety Valve			

LESER		The Safety Valve	
LESER CERTIFICATE FOR GLOBAL APPLICATION			
Inspection certificate 3.1 according to DIN EN 10204			
Declaration of conformity according to Pressure Equipment Directive 97/23/EC			
LESER GmbH & Co. KG Postfach 26 16 51, 20506 Hamburg, Germany			
Customers Order-No.:		LESER – Job – No.:	
LESER – Customers-No.:		LESER – Contact:	
For:		Fax:	
eMail:			
This LESER CGA confirms that the undimensioned LESER-safety valves are manufactured and certified according to the rules world-wide. LESER makes the world-wide employment possible of the safety valves by the reference on these regulations.			
4 Material suitability and marking			
4.1 LESER certifies that the suitability of the used materials corresponds to the regulations quoted in chapter 3.			
4.2 The marking of the materials as well as their transmission took place as follows:			
Pos.	Description	Material	Manufacturer
1	Body	1.4408 / CF8M	Alfona
2	Seat	1.4404 / 316L	Ulgine
3	Disc	1.4404 / 316L	Ulgine
9	Bonnet	1.4404 / 316L	Ulgine
15	Stem	1.4401 / A4-70	Ulgine
55	Max. nut	1.4401 / A4-70	Ulgine
The realization of the tests took place through: LESER GmbH & Co. KG			
5 Tests			
The tests specified in the following one were realized on basis of the stated LESER works standard (LWN) without any objection:			
5.1 Shell test:			
Design review in respect of stresses and technical safety: LWN 300-00-E			
Shell tightness test: LWN 331-14-E			
Hydrostatic testing: LWN 331-05-E, 331-18-E			
Nondestructive testing: LWN 331-03-E III, 331-06-E			
Material identification check for alloyed materials: LWN 331-07-E			
The realization of the tests took place through: LESER GmbH & Co. KG			
5.2 Valve setting and testing:			
Seat tightness: LWN 331-13-E, 331-16-E			
Back seat tightness: LWN 331-15-E			
Operability: LWN 221-17-E			
Cold differential test pressure: LWN 331-12-E			
Setting at with <input type="checkbox"/> air <input type="checkbox"/> water <input type="checkbox"/> saturated steam <input type="checkbox"/> psig			
at <input type="checkbox"/> ambient temperature <input type="checkbox"/> saturated steam temperature <input type="checkbox"/> °C <input type="checkbox"/> °F			
The safety valve is protected by a seal, marked with: GL			
Setting and testing were done by: LESER GmbH & Co. KG			
6 CERTIFICATE OF SHOP COMPLIANCE			
By the signature of the Certified Individual (CI) noted below, we certify that the statements made in this report are correct and that all details for design, material, construction, and workmanship of the pressure relief devices conform with the requirements of Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code			
UV Certificate of Authorization No. 27.856 Expires June 16, 2009			
Martin Leser LESER GmbH & Co. KG		Date: Manfred Orłowski Inspection Representative Works Hohenwestedt Certified Individual (CI)	
LESER GmbH & Co. KG Hamburg HRA 82424			
GP: 800 Joachim Klaus, Martin Leser			
20537 Hamburg, Wendenslo: 133 – 135			
20506 Hamburg, P.O. Box 26 16 51 (J)			
Fon +49 (40) 251 65-100			
Fax +49 (40) 251 65-500			
eMail sales@leser.com			
Web www.leser.com			
LESER – The Safety Valve			

Table 11.5.5-1: Certificate for Global Application

The following table lists all tests whose certification is included in the LESER CGA.

Standard Tests - LESER Certificate for Global Application (CGA)			
Test	Directive	Procedure	Option code ¹⁾
Test pressure			
Inspection certificate 3.1 acc. to DIN EN 10204: Testing of cold differential test pressure with air	DIN EN ISO 4126-4 DIN EN ISO 4126-1, chapter 7.2 ASME Code Section I, PG-72 ASME Code Section VIII, Div. 1 UG 134;Ad 2000-Merkblatt A2, chapter 11	LGS 0202	N05
Component strength test			
Inspection certificate 3.1 acc. to DIN EN 10204: Hydrostatic testing 1,5 x PN	DIN EN ISO 4126-1; ASME Code Sec. VII Div. 1, UG 136(d)(2)	LGS 0209	M68
Surface crack test			
Surface crack testing in accordance with AD 2000-Merkblatt A4, chapter 6 and ASME code section VIII, Div. 1, UG 136 is usually conducted as random testing and can be certified with LESER CGA. Surface crack testing can be conducted using varying methods (magnetic particle testing, red-white colour dye penetrant testing, or fluorescent penetrant testing). LESER determines the corresponding test method for the component and substance. Inspection certificate 3.1 acc. to DIN EN 10204: Surface crack test	AD 2000-Merkblatt A4, chapter 6 ASME Code, Section VIII Div.1, UG 136	LGS 0203 LGS 0204	N52 N53 N54
Tightness			
Overview of different tightness test		LGS 0201	
Seat tightness test			
Inspection certificate 3.1 acc. to DIN EN 10204: Seat tightness test with air, bubble test - Standard tightness requirements	DIN EN ISO 4126-1 DIN EN 12266-1, ASME Code Section VIII Div. 1, UG 136(d)(5); API 527	LGS 0201	M66
Inspection certificate 3.1 acc. to DIN 10204: Seat tightness with air, test fluid		LGS 0201	M22
Pressure retaining body			
Inspection certificate 3.1 acc. to DIN EN 10204: Shell tightness test	DIN EN 12266-1, 4.2	LGS 0201	M18
Back seat tightness test (tightness outwards)			
Flanged Safety valves Inspection certificate 3.1 acc. to DIN EN 10204: Back seat tightness test with test fluid	DIN EN 12266-2, test P21 ASME Code Section VIII, Part UG-136(d)	LGS 0201	M28
Compact Performance Safety valves Inspection certificate 3.1 acc. to DIN EN 10204: Back seat tightness test, dipping procedure		LGS 0201	M78
Design review of safety valve			
Design review in respect of stresses and technical safety Inspection certificate 3.1 acc. to DIN EN 10204: Design review	AD 2000-Merkblatt A4, chapter 6 par. 6.1 TRD 110, chapter 4.2	WI 3300.00	M85

Standard Tests - LESER Certificate for Global Application (CGA)			
Test	Directive	Procedure	Option code ¹⁾
Material identification check (PMI)			
<p>Material identification check in accordance with AD 2000-Merkblatt A4, chapter 6, par. 6.1 (6) is usually conducted as random testing and can be certified with LESER CGA. LESER determines the corresponding test method for the component and material.</p> <p>Inspection certificate 3.1 acc. to DIN EN 10204: Material identification check (PMI)</p>	AD 2000-Merkblatt A4, chapter 6, par. 6.1(6)	LGS 0207	N55 N56 N57 N1A N1B N1C N1D N1E N1F N1G N1H N1J
Body volume check			
Inspection certificate 3.1 acc. to DIN EN 10204: Ultrasonic test	AD 2000-Merkblatt A4,chapter 6 ASME Code, Section VIII Div. 1, UG-136	LGS 0205	M56

Table 11.5.5-2: Standard tests

1): Option code to order a 3.1 test certificate for the individual test

11.5.6 Specific Tests at LESER

For specific tests at LESER which are not performed as a standard and which can be ordered individually, see column "Option Code" in the following table.

Specific Tests at LESER			
Test	Directive	Procedure	Option Code
Body strength test			
Hydrostatic testing according to customer specification Inspection certificate 3.1 acc. to DIN EN 10204 included	Customer specification (Please note: Test pressure and test duration must be specified.)	LGS 0209	M01
Tightness			
Overview of different tightness test		LGS 0201	
Seat tightness test with air, bubble test - Increased tightness requirements Inspection certificate 3.1 acc. to DIN EN 10204 included	DIN EN ISO 4126-1; DIN EN 12266-1, ASME Code Section VIII Div. 1, UG 136(d)(5); API 527	LGS 0201	J86
Tightness: Helium leakage test			
Back seat tightness test with helium Inspection certificate 3.1 acc. to DIN EN 10204 included	DIN EN 12266-2, Test P21 ASME Code Section VIII, Part UG-136(d)	LGS 0201	N64
Seat tightness test with helium, overpressure procedure - Inspection certificate 3.1 acc. to DIN EN 10204 included	DIN EN ISO 4126-1 DIN EN 12266-1, Test P12 ASME Code Section VIII, Part UG-136(d) API 527	LGS 0201	N62
Seat tightness test with helium, leakage detection in vacuum - Inspection certificate 3.1 acc. to DIN EN 10204 included		LGS 0201	M86
Testing of substances			
Testing that all parts are free of oil and grease - Inspection certificate 3.1 acc. to DIN EN 10204 included	LGS 0210	LGS 0210	J85
Surface crack test			
Clean Service Safety valves			
The surface qualities for LESER Clean Service Safety valves are defined in LWN 325-14 as LESER Surface Grades (LSG), and assigned to the individual valves by the Clean finish, HyClean finish, and Sterile finish surface packages.			
LESER surface packages - Clean finish - HyClean finish - Sterile finish			
Inspection certificate 3.1 acc. to DIN EN 10204: Surface roughness	DIN EN ISO 11866 ASME BPE 2002 Part SD	LGS 0214	N04

Surface roughness for components according to customer specification			
Testing of surface roughness Inspection certificate 3.1 acc. to DIN EN 10204, included – components to be specified by customer	Customer specification	LGS 0214	N04
Testing of components			
Spring loaded safety valves			
Specification acc. to NACE MR0175 - 2003 Inspection certificate 3.1 acc. to DIN EN 10204, included components: body, seat / nozzle and disc	NACE Standard MR0175-2003	LDeS 3001.91	N78
Specification acc. to NACE MR0103 - 2012 Inspection certificate 3.1 acc. to DIN EN 10204, included components: body, seat / nozzle and disc	NACE Standard MR0103-2012	LDeS 3001.91	N77
Pilot operated safety valves			
Specification acc. to NACE MR0175 – 2003 Inspection certificate 3.1 acc. to DIN EN 10204 included components: body, seat, disc, pilot body and manifold block	NACE Standard MR0175-2003	LDeS 3001.91	R70
Specification acc. to NACE MR0103 – 2012 Inspection certificate 3.1 acc. to DIN EN 10204 included components: body, seat, disc, pilot body and manifold block	NACE Standard MR0103-2012	LDeS 3001.91	R93
Body volume check			
Inspection certificate 3.1 acc. to DIN EN 10204: Radiographic test	AD 2000-Merkblatt A4,chapter 6 ASME Code, Section VIII Div. 1, UG-136	LGS 0206	M80

Table 11.5.6-1: Specific Tests

11.5.7 TÜV Inspection Certificate for Setting of Safety Valves

In accordance to AD 2000-Merkblatt A2 chapter 11.4 the set pressure of each safety valve shall be determined.

This may be achieved using neutral media. A certificate specifying the set pressure, the test medium, the test temperature and the marking shall be issued with respect to this. In the case of safety valves as safety accessories for pressure vessels, this is done by the relevant third party.

The inspection certificate for setting of safety valves is issued by an independent inspector from the notified body TÜV-Nord, Registration-No. CE 0045.

This TÜV certificate is an inspection certificate 3.2 according to DIN EN 10204 for setting of safety valves. It provides confirmation that an inspector from the TÜV-Nord has examined the set pressure.

The inspection certificate can be ordered using option code M33.

TÜV-Certificate valve setting		
Test	Directive	Option code
Test Pressure		
Inspection certificate 3.2 according to DIN EN 10204 for setting of safety valves	AD 2000-Merkblatt A2 chapter 11.4 AD 2000-Merkblatt HP 512R chapter 5 HP 512 chapter 7 DRG 97/23/EG, annex I chapter 3.2.3	M33

Table 11.5.7-1: TÜV-Certificate

11.5.8 Material Test Certificates

For the quality traceability of materials test certificates according to EN 10204 2.2, 3.1 or 3.2 can be provided. The certificates are issued by the material manufacturer.

Material Test Certificates		
Component	Certificate type	Option code
Compact Performance Safety Valves		
Inlet body	DIN EN 10204-3.1	H01
Outlet body	DIN EN 10204-3.1	L34
Inlet flange	DIN EN 10204-3.1	L22
Outlet flange	DN EN 10204-3.1	N3B
Outlet adaptor	DN EN 10204-3.1	N3A
Flanged safety valves		
Body	DIN EN 10204-3.1	H01
Type 5267 body (WC6/1.7357)	DIN EN 10204-3.2	H09
Type 4587 body (WC6/1.7357)	DIN EN 10204-3.2	H09
Type 447 Outlet body	DIN EN 10204-3.1	L34
Change-over valves		
Body / flange elbow	DIN EN 10204-3.1	Y41
Stud bolt	DIN EN 10204-3.1	N07
Nuts	DIN EN 10204-3.1	N08
POSV		
Main valve		
O-Ring (Pos. 60+67)	DIN EN 10204-2.2	H2H
Piston	DIN EN 10204-3.1	R75
Top plate	DIN EN 10204-3.1	R76
Piston guide	DIN EN 10204-3.1	R77
Spring Pos. 59	DIN EN 10204-3.1	H2K
Pilot		
Body	DIN EN 10204-3.1	R78
Bonnet	DIN EN 10204-3.1	R79
Manifold block	DIN EN 10204-3.1	R84
Options		
Field test connector	DIN EN 10204-3.1	R88
Supply filter	DIN EN 10204-3.1	R89
Other components		
Stellring	DIN EN 10204-2.2	H2D
Federteller	DIN EN 10204-2.2	H2F
Druckschraube	DIN EN 10204	H2G
Dichtring	DIN EN 10204	H2H
Arretierschraube	DIN EN 10204	H2J
Bonnet	DIN EN 10204-3.1	L30
Cap / lifting device	DIN EN 10204-3.1	L31
Seat / nozzle	DIN EN 10204-3.1	L59
Disc	DIN EN 10204-3.1	L23
Guide	DIN EN 10204	N95
Bonnet spacer	DIN EN 10204	H2E
Spindle	DIN EN 10204	N94
Bellows (metal)	DIN EN 10204	N96
Bellows (elastomer)	DIN EN 10204	N96
Stud	DIN EN 10204-3.1	N07
Nuts	DIN EN 10204-3.1	N08
Spring	DIN EN 10204-3.1	L60

Table 11.5.8-1: Material test certificates

11.5.9 Third Party Inspections

LESER offers the following inspections:

- Inspection by TÜV
- Inspection by customer's representative
- Inspection by Classification Societies

Examples for normal Classification Society Inspection of set pressure test are as follows:

Third Party Inspections		
Inspections, tests	Option code	Delivery time of certificates
Det Norske Veritas (DNV)	M45	with safety valves
Germanischer Lloyd (GL)	M47	2 weeks after shipment
Lloyd's Register EMEA (LREMEA)	M48	3 weeks after shipment
American Bureau of Shipping (ABS)	M38	7 weeks after shipment
Bureau Veritas (BV)	M43	7 weeks after shipment
Registro Italiano Navale (RINA)	M50	2 weeks after shipment
others		7 weeks after shipment

Table 11.5.9-1: Third Party Inspections

Delivery time of certificates: LESER provides the relevant certificates immediately after receiving them from the inspection organisation.

11.5.10 Download of Certificates

Certificates are usually shipped together with the product. In the real world, however, documents may get lost or simply do not arrive where they are needed.

Therefore LESER offers a convenient online download of every inspection certificate or material test certificate which was ordered with the safety valve under www.leser.com, menu item "Certificates".

On our website two different logins are provided for the download of certificates for an individual valve or for a complete order.

Certificates for an individual valve

Required login data:

- Serial No.: serial number of the individual valve, see nameplate or LESER shipping documentation
- Article No: 8-digit LESER article number, see nameplate or LESER order confirmation / shipping documentation

Certificates for a complete order

Required login data:

- Customer No: Your LESER customer number, see LESER order confirmation or shipping documents
- LESER Job No: see LESER order confirmation or shipping documents

If your certificate was not ordered with the valve it will not be listed. In this case please order the required certificate with the certificate request form LESER on the website and contact LESER by

Fax +49 (4871) 27 - 296

E-mail certificate@leser.com