



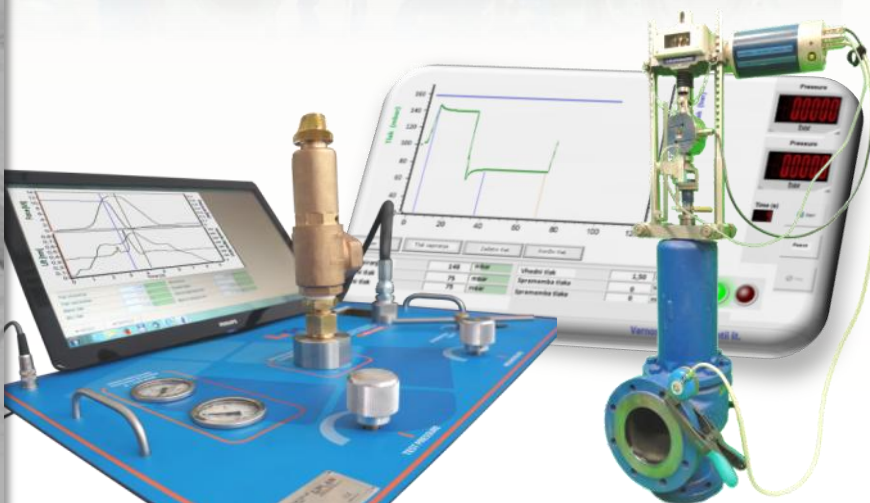
**CONFORMITY ASSESSMENT BODY -
INSPECTION / TESTING**



VALVE MAINTENANCE / TESTING / INSPECTION



INNOVATIONS / DEVICES DEVELOPMENT



**ACCREDITED
INSPECTION BODY
EN ISO/IEC 17020**

L'PLAN
As member of L-PLAN GROUP



"Inspection / Testing experiences are successfully implemented by our own innovative development!"



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Establisher of L-PLAN Company

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Dear Customers

L-PLAN is Accredited Conformity Assessment Body – Inspection Body in the field of Pressure Equipment. Our services are performed worldwide. Several Approvals for Inspection, Testing and Valve Repairing have made us more competitive.

Since 1991, Inspection, testing experiences are successfully included into the innovative development and production of Measurement, Test, Calibration and Inspection Devices as Methods and Procedures.

1992 L-PLAN was the first in the world with the Safety Valve Data Acquisition Testing System.

Concerning accuracy and usability, Legatest and Legaline devices today take the top world position.

Inspection, Measurement, Testing Services, Methods and Devices are carried out in accordance with the standards requirements (EN ISO /IEC 17020, 17025, API, ASME...), regulations and acts of Customers and Users.

By implementation of high technology and the introduction of innovative features and functions, we base on On Line – On Site, Under Operation Services providing.

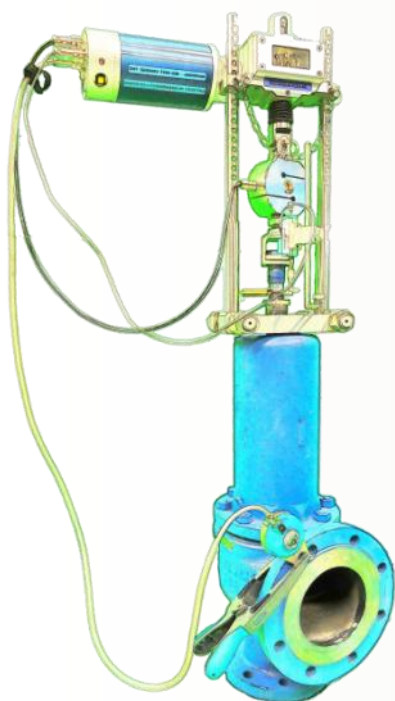
We have established a cluster of partner companies – market leaders in their respective fields. Their competence helps us to extend our limits.

**Thank you for
your attention.**

L'PLAN
Conformity Assessment – Inspection Body

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Type of Inspection / Testing

- Visual Inspection (CVI) and Remote Camera Inspection for Examination of Corrosion and Cracks mapping, Damages on: inner and outer metal surfaces, welded joints, supports and other main elements of pressure equipment.
- Coating Inspection
- Pressure strength and tightness tests / Inspection,
- Ultrasonic thickness examinations / Inspection
- Functional Tests / Inspection
- Seat Tightness Test / Inspection
- Calibration of pressure gauges, sensors
- Inspection of Metrological properties of Measuring Instruments (Pressure)

Inspection is carried out as:

- Periodical Inspections,
- Inspections during commissioning,
- Extraordinary Inspections,
- Initial Inspections.



Accredited Conformity Assessment - Inspection Body

L-PLAN is Approved and Accredited Inspection Body Nr: K072 for Pressure Equipment Conformity Assessment - Inspection / Testing.

- **Fired or otherwise heated pressure equipment** (Steam Generators, Process Reactors, Sterilizers)
- **Pressure vessels** (Air, N₂, LPG, LNG, CRYO, Heat Exchangers, Liquefied Gases, Hot Water, Steam)
- **Pipelines**
- **Safety Valves**
- **Pressure Gauges, Sensors**



Member of:



Approved Conformity Assessment - Inspection Body / Service Organization

L-PLAN is Approved and Certificated as Conformity Assessment Body - Inspection Body and Service Organization for Inspection, Testing, **Maintenance, Repair:**

- **Safety Equipment:** Safety Valves, Safety Systems, Bursting Discs, Pressure Limiters, Control Valves, Pilot Assisted Safety Valves
- **Pressure Accessories:** Industrial and other Valves, Pressure and Temperature Gauges and other Instruments

L-plan has a mandate for Safety Valves Certification and Sealing on behalf of Notify Body.



Conformity Assessment – Inspection and Certification of Pressure Measuring Instruments

Pressure accessories (Tire pressure gauges for motor vehicles)

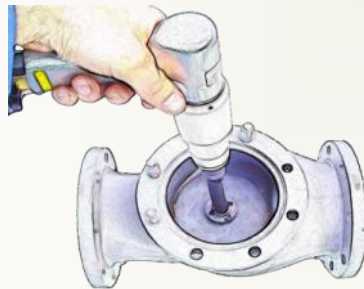




Valve Repairing

With use of transportable, special machines and equipment, the repairing of valves main parts can be done efficiently, qualitatively and "on-site".

Since 1993 L-PLAN staff provides maintenance services on all types of valves, sealing surfaces and flanges: globe valves, gate valves, safety valves, check valves, control valves, steam traps, venting valves...



Approved Conformity Assessment - Inspection Body / Service Organization

L-PLAN is Approved and Certificated as Conformity Assessment Body - Inspection Body and Service Organization for Inspection, Testing, Maintenance, Repair:

- **Safety Equipment:** Safety Valves, Safety Systems, Bursting Discs, Pressure Limiters, Control Valves, Pilot Assisted Safety Valves
- **Pressure Accessories:** Industrial and other Valves, Pressure and Temperature Gauges and other Instruments

L-plan has a mandate for Safety Valves Certification and Sealing on behalf of Notify Body.



Safety Valve Conformity Assessment - Inspection Body



Authorized by the Valve Manufacturers

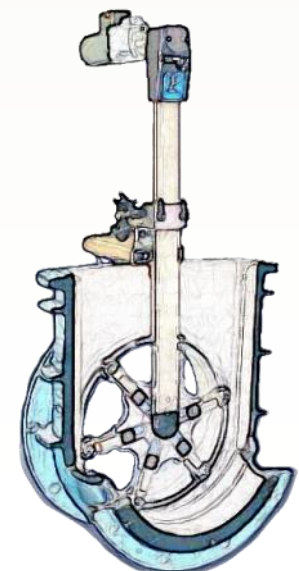
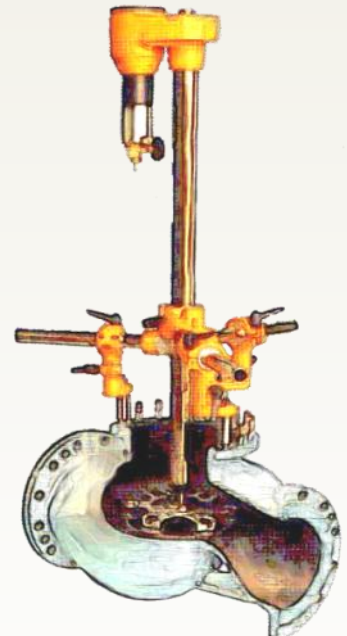
L-PLAN is authorized for **Repair, Replacement of parts and Testing** by the several valve manufacturers:



Valve and Spare Parts Mandate for Supply

C.H. Zikesch® Bopp & Reuther
Armaturentechnik GmbH

High Quality, Qualifications and Experiences since 1991



Methods and Devices Innovative Solutions for On Line Services and Laboratories, Inspection Bodies use



Valves seat Leakage I/T
Legaline Bubble Test (10)



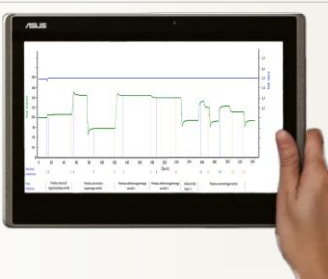
On Field Valves I/T
Legaline Valve Test-M (09)



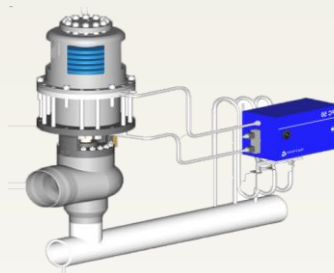
On Line Safety Relief Valves I/T
»Legatest» (07,08)



Safety / Industrial Valves I/T
Stabile Test units (11, 12)



On Line LNG Stations I/T,
Legaline "Gas Test" (13)



Pneumatic Control Units I/T
Legaline "CSPRS" (14)



Pressure gauges Calibration
Legaline "Mano Test" (15)



Strength & Tightness I/T
Legaline "Pressure test" (16)



Valves Production Tests
Legaline "Type Test" (17)



L-plan I/T References,
Approvals (19)



Pilot Assisted Safety Valves T.
Legatest (08)



Legaline Test Units
Railway Brake Systems T (18)

L-PLAN DEVELOPMENT PRODUCTS

The Devices of LEGALINE Series Program are designed for:

- Industry Process Measurements
- Testing in Industrial Environment
- Testing and Calibration laboratories
- Inspection Bodies

The LEGALINE products are specially designed for ON SITE / ON-LINE or UNDER PRODUCTION purpose.

Naturally LEGALINE devices can be also built in the complex stationary Process or Test systems.

Emphasis on High Accuracy?

The standard Accuracy of the Measurement Chain is high and stable under temp. range 0 °C up to 45 °C.

The Legaline System has already been used by the Inspection Bodies and Accredited Labors and based on EN ISO/IEC 17025, EN ISO/IEC 17020) with several advantages:

- Automatic calculation of measurement uncertainty.
- Correction or compensation of environment influences.
- System automatically calculated resultants acceptance criteria from Standards.
- Trend (history) function.
- Safety protection functions.

Environment influences are reported by Validation Test Report Nr. RA11;5.4.

The Reports could be printed immediately and stored in the database.

The data from several sensors are gathered during test and shown as graphs. Characteristic points in graphs are identified. Based on the recorded values the valve parameters are calculated.

Other System Performances

- Quality and accuracy coupled with simple operation leads to high efficiency.
- The equipment is user-friendly, positively affecting the quality of results. System contains relevant general and technical data, results and graphs of values obtained during the testing which increase applicability and accuracy.
- Software automatically selects the **acceptability limits** (based on criteria set in standard).
- Some sequences of measuring/testing process are automated so the errors caused by test human are avoided.
- The system comprises the data base for storing the results and the graphs obtained by testing – data base which allows report printing and backup. These can be analyzed as and when requested (**TREND FUNCTION**).
- Reports (based on EN ISO/IEC 17205/17020) which could be printed immediately, contain all required data and results, diagrams and data related to uncertainty of measurement and accuracy of measuring chain, identifications, procedures...



On Line Safety Relief Valve Inspection / Testing

By L-plan Legatest Inspection / Testing

**Motor Drive – quick response
& short testing time:**

- The technology enables closing the valve after activation.



Test Rig:
max. Pulling
Force 50 KN,
Weight 15 kg.

No pressure limit:

- Force sensor:
up to 5 T (50 KN)
- Pressure sensors
- Lift sensor
- Temperature
sensors

**High Accuracy
Measurement Chain:**

- in temperature range
- 15° C to + 65° C.
- Proven by Validation Test
Report Nr. RA11:5.4

**Power Autonomy –
Rechargeable Batteries:**

- Allow more than 200 tests.
- Device Legatest could be
used in explosive zones –
ATEX CERTIFICATE
II 2 G Ex d [ib] ib IIC T4 Gb
- Charging: universal 230 V, 50
Hz / 110 V, 60 Hz.

**Several Sensors and
Temperature Compensation:**

- Measurement Uncertainty
Determination.

Special Acoustic Sensor:

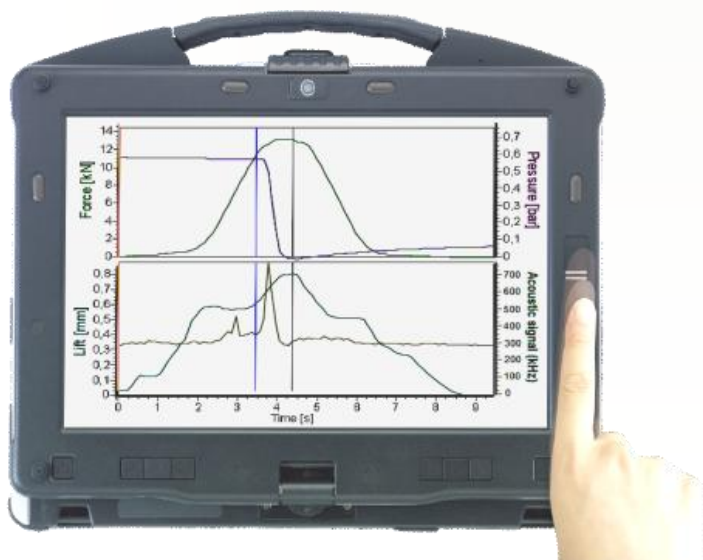
- Increased Valve Leak Detection
after activation.
- Exact determination of valve
functional points.

**Lightweight, less parts
- High Productivity**

Safety Protection Technology

Data Acquisition System:

- Testing Monitoring and Report Printing.
- Data base and History function.
- "Two measurement technology". Because of
high accuracy, valve Middle Seat Area is
determined in more cases and precisely.



Legatest opens the valve slightly by
pulling the spindle. Force, pressure, lift
and sound sensors are sending signals to
electronic data acquisition control unit and
PC. LCD is showing 4 curves:

- displacement of valve spindle versus
time
- system pressure versus time
- pulling force versus time
- sound – ultrasound recording

At the set pressure point the valve disc
and spring start to move. The valve opens
and the excess system pressure can
escape.

After the testing procedure we determine
the opening point. The system calculates
and displays the results.

$$P_{open} = P_{system} + \frac{F}{A_{seat}}$$

Any existing back pressure or other influences
are taken into results calculation:

- Set Pressure (bar)
- System Pressure (bar)
- Force (kN)
- Lift (mm)
- Closing point pressure (bar) (IA)
- Measurement Uncertainty (+/- bar)
- Allowed valve limits – upper, lower
- Other requested.

Because of high accuracy, some standard valve indication
could be examined:

- Effect of the nozzle and guide ring.
- Spring and internal parts condition.
- Increasing leakage after valve activation.

Emphasis on High Accuracy?

By Legatest Device Environment Influences Validation!

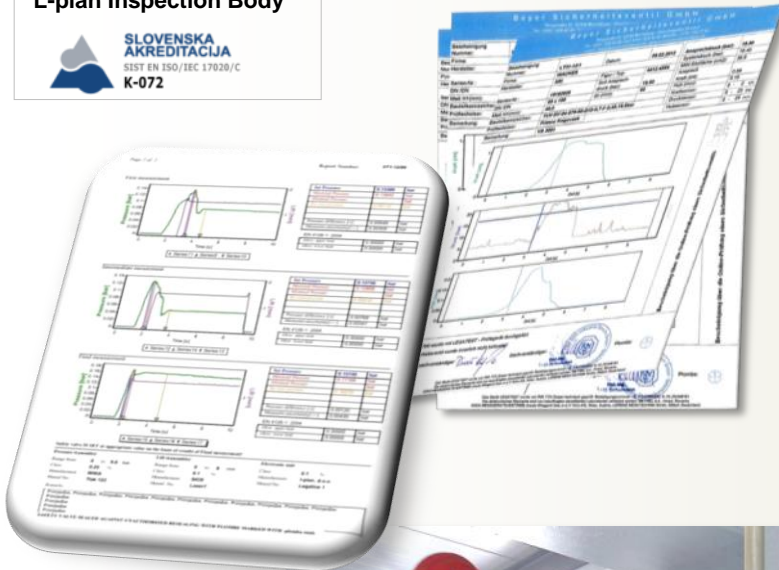
Since 1996 the Legatest is used by the Inspection Bodies and Accredited
Laboratories, according to EN ISO/IEC 17025, EN ISO/IEC 17020).

- Automatic calculation of measurement uncertainty.
- Correction or compensation of environment influences.
- System automatically calculated resultants acceptance
criteria from Valves Standards.
- Trend (history) function.

Several Safety Protections

- **sensor overload protection** - the maximum motor force is
limited by the force sensor measuring range
- **system overload protection** - the maximum motor pulling
force is mechanically limited so that the respective design
values of the components are not exceeded.
- **excessive temperature protection** – temperature is
monitored. If the temperature value exceeds the operating
limits the system is automatically shut off.
- **power monitoring** - an electronic system monitors if the
supplied current and tension meet the requirements of the
electronic components
- **valve overload protection** – the maximum force applied to
the valve is calculated from the valve data.
- **maximum lift limitation** – the maximum lift of the valve disk
can be limited through the valve parameters.

L-plan Inspection Body



On Line Pilot Assisted Safety Relief Valve Inspection / Testing

By **L-PLAN LEGATEST** device, **POSRV (Pilot Operated Safety Relief Valve)** can be also tested on site either on line, during regular operation with preconditions:

- The pilot S. valve spindle end shall be outside the valve body.
- Middle seat area shall be known.

Procedure:

Legatest device shall be mounted on the top of pilot s. valve. The testing procedure is equal to Safety relief valves on line testing.

Opening point of main valve is determined by sound sensor signal. By comparing all 4 curves (the main valve sound), (force, lift of the pilot valve), (system pressure), opening pressure and functionality of pilot and main valves conditions can be determined.



On Field Valves Inspection / Testing

Legaline "Valve Test - M" Mobile Unit

Legaline "Valve Test – M" Mobile Unit is designed for Inspection / Testing of Safety, Control and other Industrial Valves:

LCD and Printed resultants:

- Set pressure.
- Max. pressure (at max. lift).
- Closing pressure.
- Opening pressure difference (% , bar)
- Closing pressure difference (% , bar)
- Blowdown.
- Indication of valve tightness.
- Digital seat tightness – Bubble test.
- Valve Body pressure strength test.
- Auto Measurement Uncertainty Calculation

Autonomous System

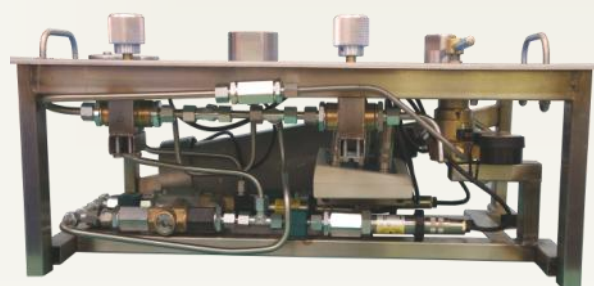
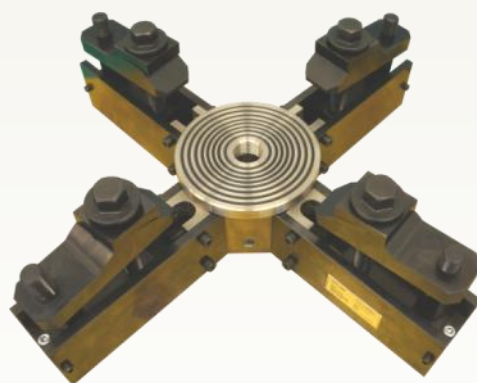
Mobile Legaline Operating Unit parts:

- Data Acquisition Legaline Valve Test System.
- LCD, PC, color printer.
- Pressure sensors (Lift, Sound – optional)
- 200 (300) bar N2 bottle, 2 l
- 200 (300) bar high pressure installation.
- Regulating valve, operating valves, manometers.

Legaline Bubble Test - Valve seat leakage set

20 T Half Proportional Clamping Unit with clamp parts, up to DN 150, flanged and threaded.

Legaline S. Valve Test Method is approved by:



Valve leak Inspection / Testing

Legaline "Bubble Test" Mobile unit

Mobile Electronic system for determination of valve seat leakage by Bubble Counting

The system provides digital measurement of the seat leakage by "bubble counting" as per API 527, EN 1593 standard or LESER-WERKNORM LWN 220.01.

The digital seat leakage measurement device is designed in such a way, that it can be easily connected to the existing LEGALINE system.

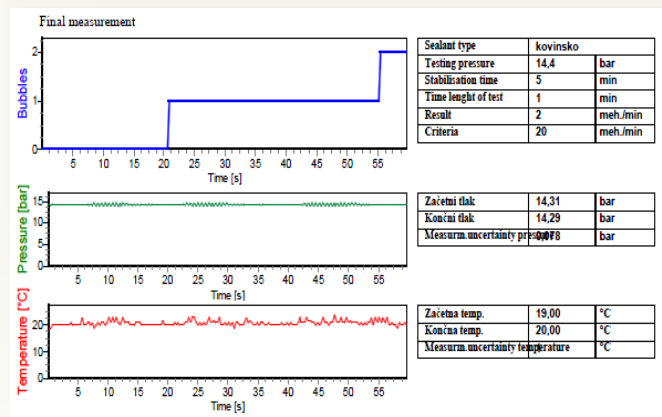
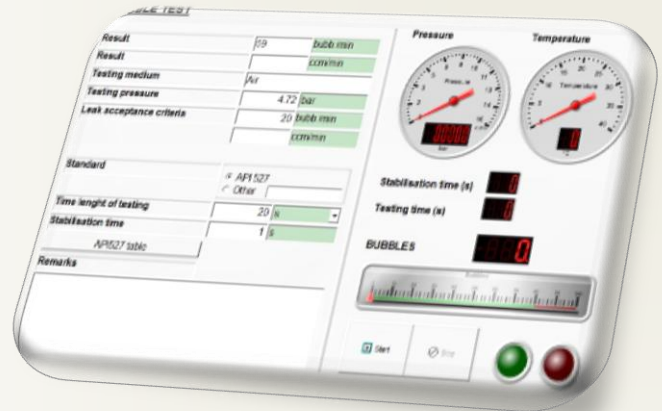
If the valve seat is leaking the overpressure builds up on the discharge side of the valve causing the buildup of the bubbles.

These travel through a transparent tube and are detected by electronic elements and are counted. The result in: bubbles per minute, or mbar liters/s is shown on a LC display. The result is compared with the limits defined by the standard.

The device can be connected to the suitable data acquisition system such as Legaline electronic unit and the PC (provided that the appropriate software is installed).

- Connection with suitable data acquisition systems.
- For on line and stationary applications.
- Elements for sealing of discharge side of the valve.

Legaline Bubble Test Method is approved by:



Legaline "Valve test" Data Acquisition System can be integrated in three ways:

1. Direct integration

Legaline Valve Test Data Acquisition System and pressure sensors can be mounted – Integrated into the existing test bench.

Integration should be done in the Customer workshop.

3. Integration by Industrial Cabinet System

The Legaline System is build into the Industrial Cabinet and connected to stabile Test Unit by high pressure flexible pipes:

- Air / water side high pressure installation with pressure sensors & overload protection.
- The LEGALINE electronic digital data acquisition device.
- Sensors: pressure sensors, lift laser sensor, sound sensor...
- Connectors for lift and sound measuring, outlet coupling for calibrating the sensor and system.
- PC, LCD, color printer...
- Software Valve Test with Database.
- Connection to BUBBLE TEST device.
- Other on request.

Benefit:

System is completely autonomous, so intervention into Customer existing Test unit is not required!

2. Integration by Industrial Case system

The Legaline System is build into the Industrial Case and connected to stabile Test Unit by high pressure flexible pipes:

- Air / water side high pressure installation with pressure sensors & overload protection.
- The LEGALINE electronic digital data acquisition device.
- Sensors: pressure sensors, lift laser sensor, sound sensor...
- Connectors for lift and sound measuring, outlet coupling for calibrating the sensor and system.
- PC, LCD, color printer...
- Software Valve Test with Database.
- Connection to BUBBLE TEST device.
- Other on request.

Legaline Valve and Bubble Test Methods are approved by:



Legaline Valve test Data Acquisition system includes also two IMPORTANT BENEFITS:

1. Proportional Auto Control of Clamping Force

Legaline ACF testing system can offer automation of clamping force rising during tests. Software and Legaline electronic proportionally control the pressure into hydraulic clamping system during the test sequences.

2. Automatic Testing procedure

Movements of the testing pressure are carried out by innovative driving system.

Legaline Data Acquisition System & Software, version for digital sensors:

- Set pressure.
- Max. pressure (at max. lift).
- Closing pressure.
- Opening pressure difference (% , bar)
- Closing pressure difference (% , bar)
- Blowdown.
- Indication of valve tightness.
- Digital seat tightness – Bubble test.
- Valve Body pressure strength test.
- Auto Measurement Uncertainty Calculation.
- Print Testing / Inspection Report Function
- Database of all stored Valves Tests

Other on request:

- Sound detection.
- Spindle lifts measuring.
- Other on request.

PC, LCD / industrial notebook, printer are included.

Proportional Auto Control of Clamping Force, Automatic testing procedure are available on request.

Mobile Electronic system for determination of valve seat leakage by Bubble Counting

The system provides for digital measurement of the seat leakage by "bubble counting" as per API 527, EN 1593 standard or LESER–WERKNORM LWN 220.01.

The digital seat leakage measurement device is designed in such a way, that it can be easily connected to the existing LEGALINE system.

The result is compared with the limits defined by the standard.

The device can be connected to the suitable data acquisition system such as Legaline electronic unit and the PC (provided that the appropriate software is installed).

- Connection with suitable data acquisition systems.
- For on line and stationary applications.
- Elements for sealing of discharge side of the valve.

Legaline Valve Test DAS-D System

Directly integrated into Customer existing Test unit



Legaline Valve Test DAS-C System

Integration by Industrial Case System



Legaline Valve Test DAS-I System

Integration by Industrial Cabinet System



Legaline Bubble test System

With all accessories



Legaline "GAS TEST" System is used for Inspection / Testing the whole Gas Line in LPG stations, including all valves (regulating valves, safety check and safety valves...) and pressure gauges.

During operation Testing Phase description

- Pressure gauge Inspection / Calibration (on DKD standards) – Legaline
- Tightness Inspection / Test of all pipe connections, flanges, welded joints... by visual Inspection method with leak detection liquid
- Tightness Inspection / Test of stop valves, safety valve and pressure gauge stop valves by visual Inspection method, with leak detection liquid, film Inspection method
- Mounting of LEGALINE testing system

Short shut down Testing Phase description

- Functional (operating) test, closing point, tightening test of safety check valve
- Functional (operating) test, operating pressure, tightness test of regulating valve
- Functional test, opening and closing pressure point, blow down and tightness test of safety valve
- Tightness test of electromagnetic valves
- Tightness test of stop valves on pipeline
- Tightness test of pipeline

Advantages of the Legaline "Gas Test" Equipment and Method:

Short shut down time, Small losses of gas, On Site Reports printing, Data base, Analyses Trend function, High Accuracy... The Inspection / Test Methods are approved by:

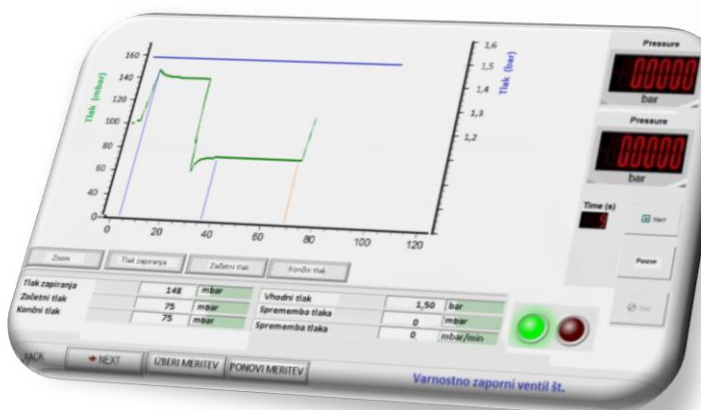


Pipeline and
S. Valve Inspection



Functional and tightness resultants – diagrams of: safety check valve, regulating valve, safety valve, electromagnetic and stop valves.

Diagram and resultants of Safety Check Valve Functional (operating) test, closing point and tightening.



The combination of pneumatic loading pistons coupled with the pneumatic control units is one of the ways to fulfill the increased performance requirements on the safety valves in critical applications.

Such CSPRS systems are offered by most of the major safety valve suppliers

Legaline unit "model CSPRS" is designed special for Testing of safety relief valves with additional assisted Pneumatic Control Units, according to EN ISO 4126-5:2013; CSPRS – Controlled Safety Pressure Relief Systems.

L-PLAN has the approval by Bureau Veritas.



LEGALINE CSPRS – software for testing of pneumatic control units of assisted safety valves with additional pneumatic piston

The software package was developed for testing of control units (cabinets) of assisted safety valves with additional pneumatic piston. On the beginning of the test three "pressure gauges" are displayed on the notebook screen showing:

- pressure in the nitrogen flask
- pressure after the HP regulating valve (system)
- pressure after the LP regulating valve (pneumatic)

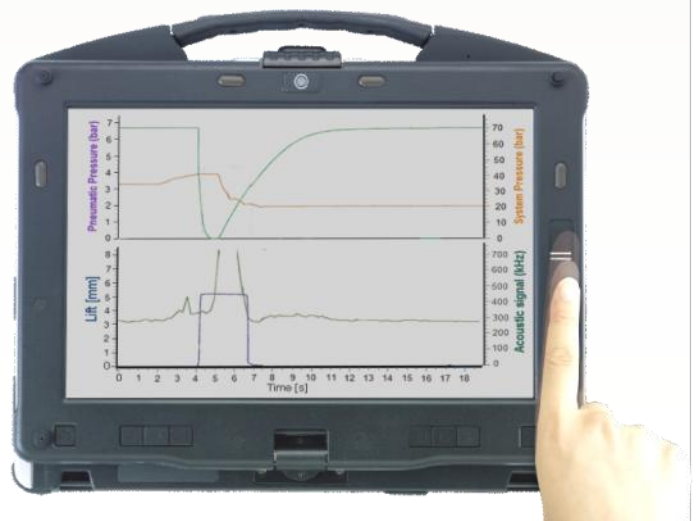
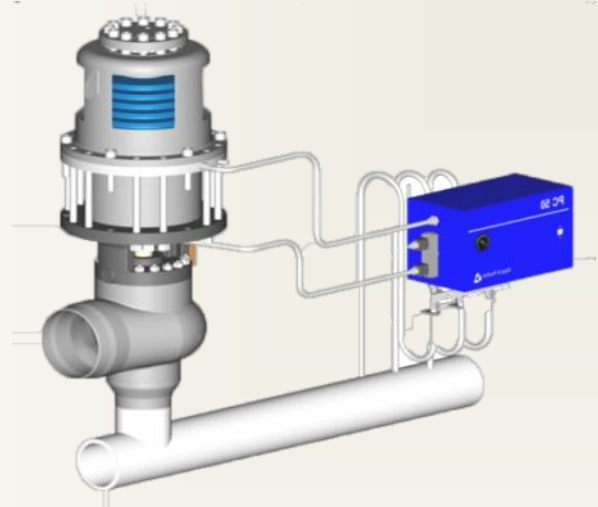
While the test is performed the following pressure versus time values (curves) are displayed simultaneously:

- system pressure
- pressure of compressed air fed in the control box
- air pressure in the upper chamber of pneum. piston
- air pressure in the lower chamber of pneum. piston
- spindle lift of the safety valve
- sound phenomena associated with the opening of the safety valve may be displayed

The data gathered during test are recorded and shown as graphs. Then the characteristic points in graphs are identified and based on the values recorded the valve parameters are calculated. The tests are stored in a database.

The already digitalized data supplied by several (analogue) sensors can be processed simultaneously. The PC software, depending on the application desired / test method chosen displays the results as curves or as alphanumeric data necessary to:

- perform the test
- print the test report
- record and establish the history of the object tested



On field Inspection / Calibration of Pressure gauges, sensors

Legaline unit, model Manotest

How the Legaline Manotest System operate?

The system enables to Calibrate Bourdon tube pressure gauges, analog and digital pressure sensors. Legaline Manotest System can be easily expanded to other types of measurement equipments like Temperature probes, PT sensors...

Software is divided into three modules, each specified according to appropriate standard requests.

As Reference are used a high accurate, temperature compensated digital pressure sensors.

Calculated measurement uncertainty mainly depends on choosing appropriate Reference.

Calibration range

Calibration range depends on accuracy of Reference. The accuracy of used digital pressure sensors start at 0.05% FS.

Pressure range is not limited by the software or by the Legaline system. According on Customer demand, we choose appropriate pressure generator.

Inspection / Calibration Report

Calibration / Inspection Reports are designed in accordance with requirements of EN ISO/IEC 17025 / 17020, EN ISO 1070 and OIML R23. Other standards can be easily implemented on requests.

The report contains relevant general and technical data, results and graph of pressure values, obtained during the calibration procedure, respectively the diagram of errors, so the re-calibration can be easier.

By the Legaline Manotest System the measurement uncertainty caused by human factor is reduced to minimum as same as the automatisisation of calibration sequences.

Whole system is built according to:

- EURAMET/cg-17/v.01, julij 2007
- EA-10/17 EA guidelines on the calibration of electromechanical manometers, July 2002
- DKD-R 6-1, Calibration of Pressure Gauges, 01/2003.
- ISO/IEC 17025:2005-General requirements for the competence of testing and Calibration laboratories
- Pressure gauges - Part 1: Bourdon tube pressure gauges - Dimensions, metrology, requirements and Testing
- Pressure gauges - Part 3: Diaphragm and capsule pressure gauges - Dimensions, metrology, requirements and testing
- OIML R 23, Edition 1975, Tyre pressure gauges for motor vehicles

The Legaline Manotest method is approved by:



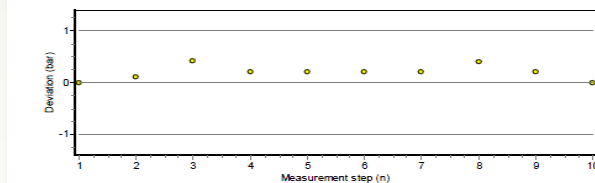
Manotest software: Calibration of pressure gauge.
Part of Calibration Report (Resultants)

Conditions and results

Testing media: Destilirana voda
Installation of the measurement device: vertikalno
The reference level was taken at pressure connection.
Visual control before measurement (condition on receipt): OK

Table of measured results

n	Standard (MPa)	Standard (bar)	Sensor (bar)	Deviation (bar)	Allowable deviation (bar)	Hysteresis (bar)	Acceptable
1	0.00	0.00	0.00	0.000	1.000	0.00	YES
2	1.00	10.00	10.10	0.101	1.000	0.10	YES
3	2.00	19.99	20.00	0.001	1.000	0.00	YES
4	3.00	29.99	30.00	0.001	1.000	0.00	YES
5	3.99	39.99	39.99	0.001	1.000	0.00	YES
6	3.99	39.99	39.99	0.001	1.000	0.00	YES
7	3.00	30.00	30.00	0.000	1.000	0.00	YES
8	2.00	20.00	20.00	0.000	1.000	0.00	YES
9	1.00	10.00	10.00	0.000	1.000	0.00	YES
10	0.00	0.00	0.00	0.000	1.000	0.00	YES



How the Legaline Pressure test operate?

Pressure strength and tightness test is performed on pressurized parts of valves, pressure vessels, pipelines, components of pressure equipment and all other devices, which shall be tested. Standard performance:

- Pressure strength and tightness test: constant load up to 700 bar, short duration load up to 824 bar. (
- Tightness test: pressure drop method.

Other performances are available and depend on pressure generators.

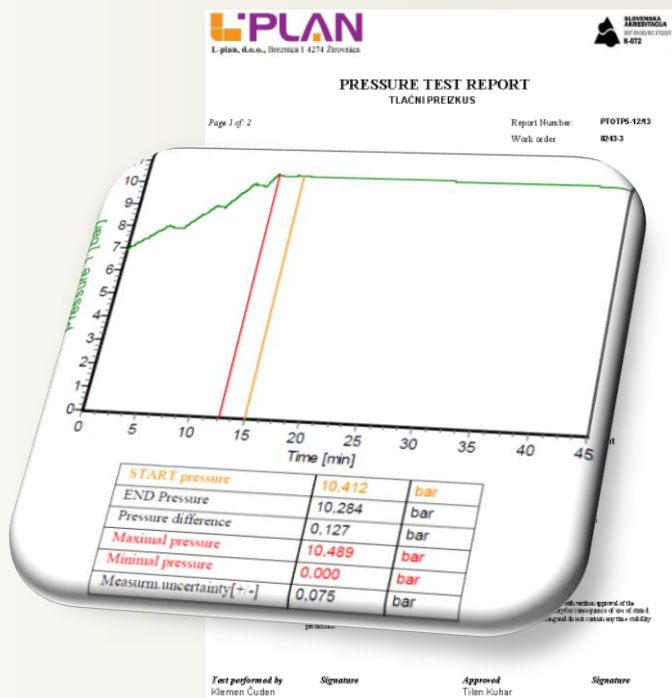
The test is performed "ON LINE" with **pressure and temperature** sensors, which are mounted on pressure system or upstream / downstream of valves.

The standard Accuracy of the Measurement Chain is high and stabile under temp. range 0 °C up to 45 °C.

The Legaline Pressure test system already used by the Inspection Bodies and Accredited Labors and based on standards EN ISO/IEC 17025, EN ISO/IEC 17020) with several advantages:

- Automatic calculation of measurement uncertainty.
- Correction or compensation of environment influences.
- System automatically calculated resultants acceptance criteria from Standards.
- Trend (history) function.
- Other...

The Legaline Pressure test method is approved by:



Steam Generator Pressure strength test report



L-plan Functional Tests under Valve Manufacturing Process Services

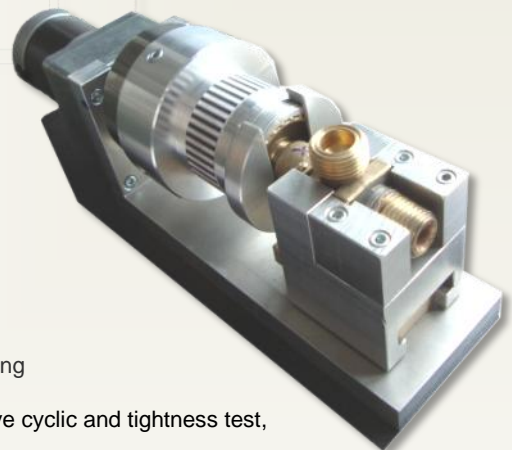
Legaline units, model Valve Type Test

CE

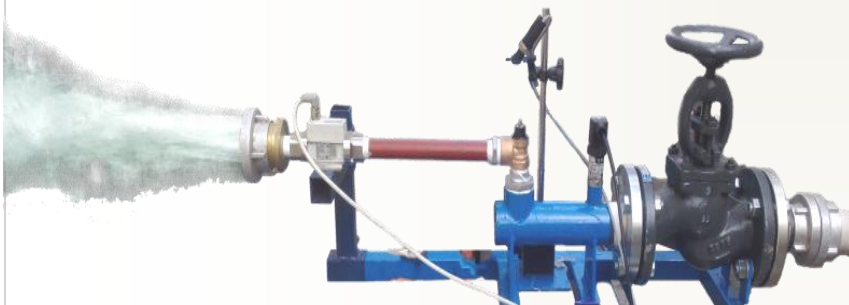
L-plan Development and production of several valve testing devices for Valves Conformity Assessment purpose in cooperation with Notify Bodies:



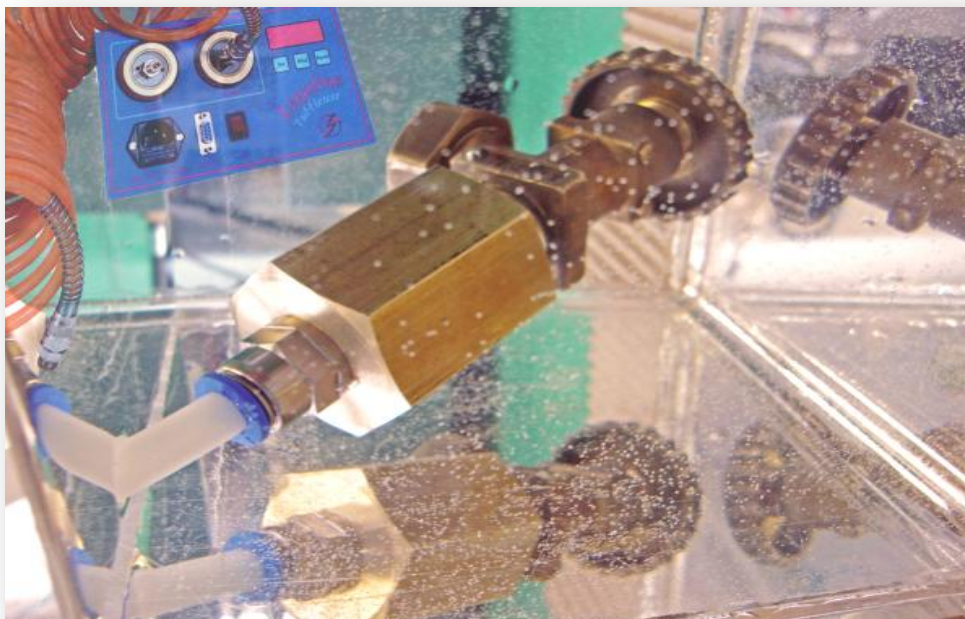
thermal aging and functionality testing



valve cyclic and tightness test,



Measurement of valve flow rate, spindle lift, closing difference, functional test, and other



Railway Vehicle Break Systems Testing

Legaline unit, model "RB"

Railways, a safe and reliable system for mass transport of persons and goods, with more than hundred years of history. Operating without interruption, day and night, regardless of the weather. A part of everyday life for millions of people, a backbone of the industry.

One of the prerequisites for its safe operation is a reliable functioning of train brake systems both on locomotives and wagons.

To ensure the high reliability in operation, the components of brake systems have to be regularly maintained in specialized workshops. Subsequently the functional testing on special rigs is performed to verify the proper functioning.

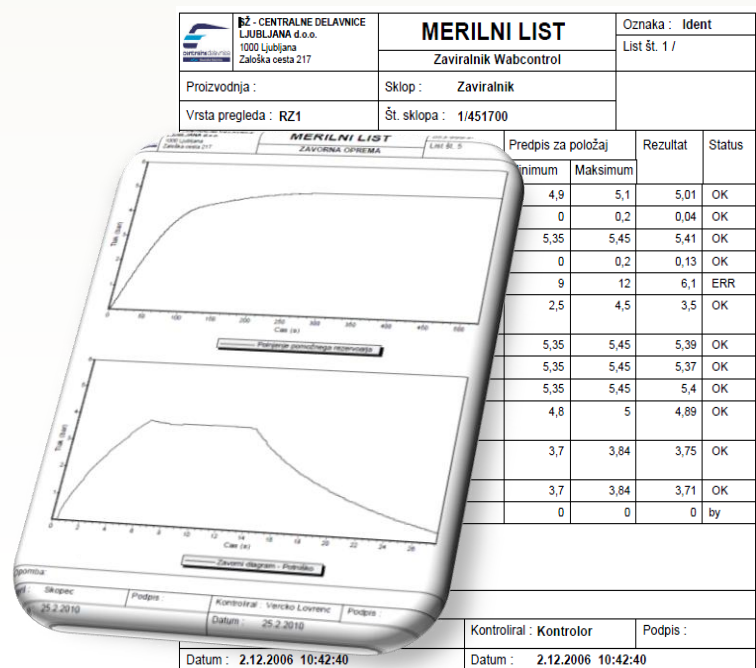
The test bench structure is a frame made of aluminum profiles carrying pressure vessels for compressed air of storage made of aluminum alloy as well as interconnecting piping and fittings. On the bottom side of the frame castor wheels are mounted. The test system comprises electronic device for data acquisition, sensors, LCD display, PC-based computer system, keyboard and several pushbuttons and signal lights. The design concept allows for testing of family of (nine) components.

It is operated by test engineer sorting out the „failed“ components, sending these to be adjusted /repaired whichever necessary. The test procedure is selected via PC, the test sequence itself is controlled via pushbuttons. This way the simple operation and high level of system flexibility are obtained. The system parameters and test reports can be modified easily.

The main advantage of the system is that a detailed protocol is recorded while testing is performed. The data are stored in the data bank containing all relevant general and technical data of the component tested as well as the data generated during the test run. The format of test report is adapted the particular requirements of the client.

The use of such test system completely eliminates the influence of human factor. High reliability, reproducibility and accuracy of the results, as well there was data consistency is achieved. The data collected are available for further analyses.

The final result is high reliability of brake systems in which the components tested are built in.



Users of LEGALINE - Inspection / Testing / Measuring / Calibration Devices

Cooperation: UNIGRIND Germany, EFCO Germany 1994-2004

LUKOIL Russia; STATOIL Norway; THK BP-BRITISH PETROL Russia; NUCLEAR POWER PLANT Slovenia; FURMANITE Germany; THYSSEN-KRUPP Germany; THYSSEN-XERVON Germany; GSOGPC Iran; NOPA Industriearmaturen GmbH Germany; KAZAN Russia, B.A.R. Testing technology UAE, UNIGRIND Germany; ENERGETIKA Ljubljana SI; SMAI CSI Italy; EVONIK INDUSTRIES Germany; VOEST ALPINE GmbH Austria; SMAI CSI Italy; SIA ROSTA Russia, SC TERMODINAMIC Srl Romania; INTRA TOOL Russia; CO.RE.M srl Italy; REMWILL Pollard, LOTOS Pollard, UKRSPECGAS Ukraine, Lenzing Technik GmbH Austria, VALVESERV Austria, WISAG Switzerland, SC Termodinamic Romania,

Reference list of L-plan "Legaline" Mobile / Stabile Test Benches Users

L-PLAN Slovenia, Faculty of Mechanical Engineering Slovenia; LEK Lendava SI; NAFTA Lendava SI; THERMAL POWER PLANT Trbovlje SI; LINDE PLIN Celje SI; ZVD Ljubljana SI; SLOVENIAN RAILWAY-Centr.delavnice SI; KOVA Celje SI; B.A.R. Testing technology UAE, SEPP SPECIALISTIČKI SERVISI Croatia; FRIGOMOTORS Croatia; INSPECT METROLAB Croatia; L-PLAN SERVICE Germany, MARUS Croatia, INTECH Libya, STS GAS Croatia, J.S. Oy Pietarsaari Finland, HERZ Slovenia, AMCM Macedonia

Users of LEGATEST - On Site Safety Valve Testing Device

L-PLAN d.o.o. Slovenia, VOEST ALPINE GmbH Austria; ARI Einstellendienst GmbH Germany; EFCO India; JS Oy Pietarsaari Finland; CHEMSERV GmbH Austria; A.F.M.R. France; IWTT Iran; STIRM COLMEC s.r.l. Italy; BAR Testing technology UAE; BMS GmbH Germany; VIMAB Sweden; LEAK STOP EXPERTS India, SPECIALISTIČKI SERVISI Croatia; VALVESERV GmbH Austria; SICHUAN YIBIN Power Plant CHINA; SAFETY PRO VALVE Romania; EFCO NAT BIH; ACTEMIUM Tavaux France; OULEIKA Ltd Hong Kong China, L-PLAN SERVICE GmbH&Co KG Germany, ARMATUREN M. SHUSTER GmbH Germany, SAH-KO Oy Finland, SURALCO / ALCOA Paranam Suriname; AL MASHRIG Group Kingdom of Saudi Arabia; GULF INDUSTRIES COMPANY Kingdom of Saudi Arabia; ICI Industry Engineering R. Serbia; GUANGXI SPECIAL EQUIPMENT SUPERVISION AND INSPECTION INSTITUTE China; BEYER & BEYER Gbr Germany; ZIKESCH Germany, FJARRTEK I NORR AB Sweden; MASTER PAC ASIA Thailand; VALVESERV Austria, SWB ERZEGUNG ARMATURTECHNIK Germany, IMC METROLOGIE Tunisia, L-PLAN SERVICES Germany, INTECH Libya, LENZING TECHNIK Austria, BARDENHAGEN MASCHINENBAU Germany, NOVA SWISS Switzerland, API Iran, INNOVISTECH – BD WORLDWIDE Italy, ARMATEK Oy Finland

L-plan Worldwide Services Performing

RELIANCE REFINERY, JAMNAGAR, INDIA; SABIC Kingdom of Saudi Arabia; EDISON SPA THERMO POWER PLANT, ITALY; WYETH PHARMA, IRELAND; BRISTOL-MYERS SQUIBB, IRELAND; ESI TECHNOLOGIES, IRELAND; KOC - KUWAIT OIL COMPANY, KUWAIT; EQUATE (PETROCHEMICALS), KUWAIT; MAIN THERMO POWER PLANT, KUWAIT; MINISTRY OF ELECTRICITY AND WATER, KUWAIT; KUWAIT INSTITUTE FOR SCIENTIFIC RESEARCH; P I C - PETRO CHEMICAL COMPANY, KUWAIT; K N P C (KUWAIT NATIONAL PETROLEUM COMPANY REFINERIES), KUWAIT; Oman Refinery Co, Ruwi; AES BARKA (power & desalination plant / gas turbine OMAN; Oman Gas Company; Daleel Petroleum L.L.C. / Daleel Oilfield OMAN; PDO Headquarters, Rudi OMAN; TONGOOYAN PETROCHEMICAL, IRAN; AMIR KAIBIR PETROCHEMICAL, IRAN; BOO - ALI PETROCHEMICAL, IRAN; KHOOZESTAN PETROCHEMICAL, IRAN; BANDAR-GMAM PETROCHEMICAL, IRAN; KAWIANI STELL FACTORY, IRAN; KARUN 3, OIL REFINERY & GAS CO, IRAN; POWER PLANT AHWAZ, IRAN; KARON OIL & GAS CO-MARON 3, IRAN; OIL REFINERY AHWAZ, IRAN; ESFAHAN DMT – CHEMICAL AND PETROCHEMICAL INDUSTRY, IRAN; ESFAHAN OIL REFINERY, IRAN; ESFAHAN THERMO POWER PLANT, IRAN; ARAK OIL RAFFINERY CO., IRAN; ARAK THERMO POWER PLANT, IRAN; ARI GERMANY; VOEST ALPINE AUSTRIA; FMCS PHILLIPINES, ROMPETROL PETROMIDIA Romania, SOLVAY Tavaux France, BAUSTEEL Shanghai China, Guangxi Special Equipment Supervision and Inspection Institute, China; ZIKESCH Germany, Furmanite Belgium, Furmanite Netherland, ROMPETROL Romania..., Refinery BOREALIS Austria, Hidratight Germany, Thermopowerplant Jenschwalde Germany, EVONIK Röhm GmbH Germany, TOTAL Raffinerie GmbH, Germany, Powerplant SESKARDIA Greek, STADTWERKE DUISBURG Germany...

L-plan Approvals

Accreditation Certificate for Conformity Assessment - Inspection Body (K-072)

Pressure Equipment Conformity Assessment - Inspection / Testing.



Approval Certificate According on the Valve Conformity and Examination Assessment as a Inspection Body / Service Organization / SV as a Notify Body

Certification of the Company as Laboratory and Service for Repair, Inspection and Testing of safety valves and other safety equipment, pressure limiters, pressure accessories, industrial and other valves, pressure and temperature gauges and other instruments. Sealing of safety valves on behalf of Notify Body.

Certificate of Compliance with quality requirements as workshop for repair, maintenance and testing



Decree of nomination: Professional Technical Services based on Conformity Assessment procedures and Authentication of Measuring Instruments in Service



- SECTOR CERT, Germany; Gesellschaft für Zertifizierung mbH; CERTIFICATE of **VISUAL TESTING**, Level II. (EN 473, ASNT-Richtlinie SNT-TC-1A, ANSI/ASNT CP-189 (ASME Sec.XI). Valves, pumps...Pressure devices, Tightness, Welded stick, Pressure equipment.
- SECTOR CERT Germany - CERTIFICATE of **ULTRASONIC TESTING**, Level I. (EN 473, SNT-TC-1A/CP-189) On basis of SECTOR CERT authorisation.
- SECTOR CERT Germany – Authorization - CERTIFICATE for personnel Engaged in Nondestructive Testing: **LEAK TESTING** LEVEL 2. according to DIN EN 473 .



Mandates & authorizations of valve producers - permissions for Testing, Resetting and Repair

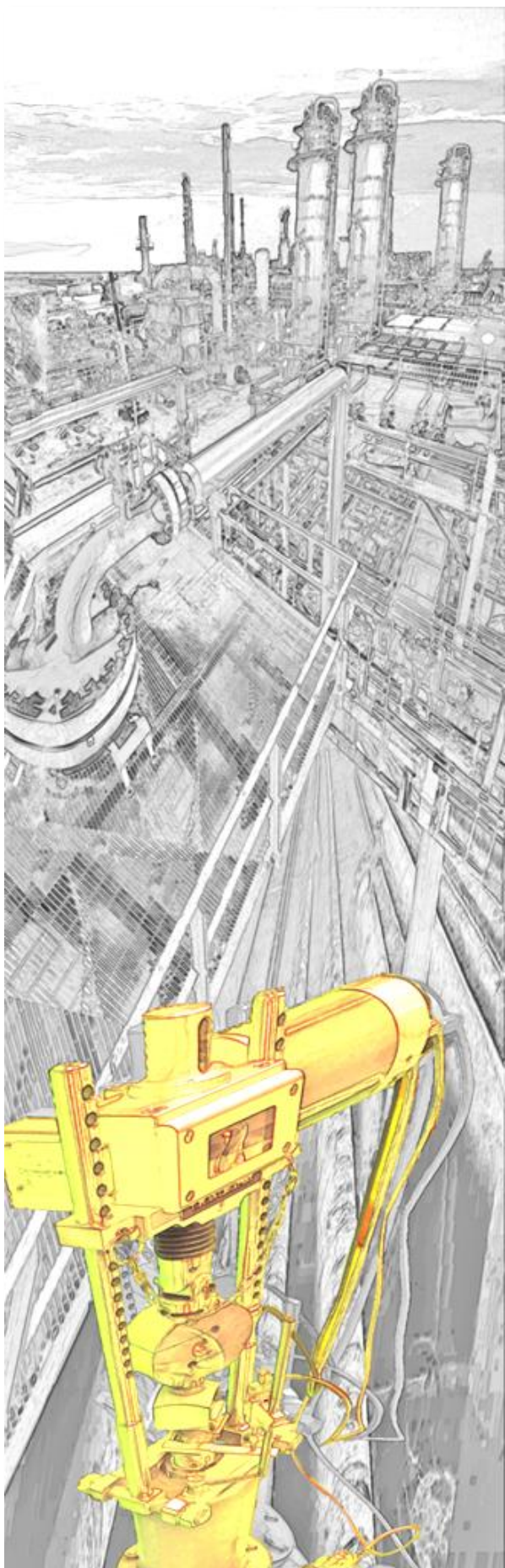
SPIRAX SARCO LTD England: CERTIFICATE - Setting and testing safety valves in accordance with BS 6759 including operation of the setting rig supplied.

ARI ARMATUREN, Germany: DECLARATION for setting ARI Safety Valves and servicing with using an original parts from ARI, acc. on ARI techn. doc. and EN 4126. **SEMPELL AG** Germany (a TYCO Int.Ltd.Comp.): CONFIRMATION for the service and maintenance of SEMPELL Safety valves (IPU International GmbH Austria: CERTIFICATE – Mandate for Testing, Servicing and selling of SEMPELL valves and IPU International in Slovenia market.

LESER - BRUNNBAUER-ARMATUREN m.b.H: AUTHORISATION – for testing, setting and servicing LESER safety valves base on standards and regulations. L-PLAN in official serviser and representative in Slovenia, Croatia and BIH areas. **GERHARD GOTZE & Co**

Germany: AGREEMENT for testing, Setting and Repairing of GERHARD GOTZE Safety Valves, based on contract L-PLAN – TUV Bayern Sava d.o.o.

(representation) **BOPP & REUTER and ZIKESCH Germany**; approval - the official dealer of industrial valves in Slovenia. Certificate of repair tests in the process of obtaining. (training) **ANDERSON GREENWOOD CROSBY**, CERTIFICATE of Achievement, Training Course in servicing, assembly and testing of ANDERSON GREENWOOD / CROSBY spring loaded pressure relief valves.)



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Head of Inspection Dep.

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Dear Customers

By periodical examination and testing we ensure safe and efficient operation of your pressure equipment.

In the **L-PLAN GROUP** we closely cooperated with our partners, which we complement each other:

- L-PLAN Technologies GmbH Germany
- L-PLAN Service GmbH&Co KG Germany
- FURMANITE Slovenia
- TÜV SÜD Sava Slovenia
- BUREAU VERITAS
- UNIGRIND GmbH & Co KG Germany

Together we can offer a large assortment of services for a successful and safe operation of your pressure equipment and production.

Thank you for your trust!



Sandi Jutriša
Head of Commercial Dep.
Inspection Body Coordination

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www.l-plan.si

We present to you our business by doing since 1991.

In our work we uppermost quality and accuracy of the work performed. Our goal is to be with you to achieve a high level of mutual cooperation and trust. The relationship should be turned into high-quality interaction.

This is our first step, and with it we'll inform you about all technical details. Contact us.

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