Kosan Crisplant®

ENGLISH

GENERAL PRODUCT CATALOGUE

Systems, equipment & services for the LPG industry

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The Kosan Crisplant Group

Kosan Crisplant®

FLEX SPEED®

The *only* high-speed filling system for LPG cylinders in the world

www.flexspeed.info

Kosan Crisplant®

CONTENTS

PALLETIZING SYSTEMS

Kosan Crisplant's palletizing systems are designed for safe and efficient handling of all kinds of pallets as well as for automatic loading and unloading of LPG cylinders.

- High safety and optimal logistics at the filling plant
- Minimum time consumption for loading and unloading of trucks
- Fully automatic plant
- Minimum need of manpower
- High capacity – up to 2,400 cylinders per hour
- Careful transportation of cylinders between filling plant, storage and customer
- Flexible design for handling of many pallet types

Easy and safe handling of gas cylinders in pallets

Linear palletizer

Bottom left: Pallet stacker/destacker on linear palletizer

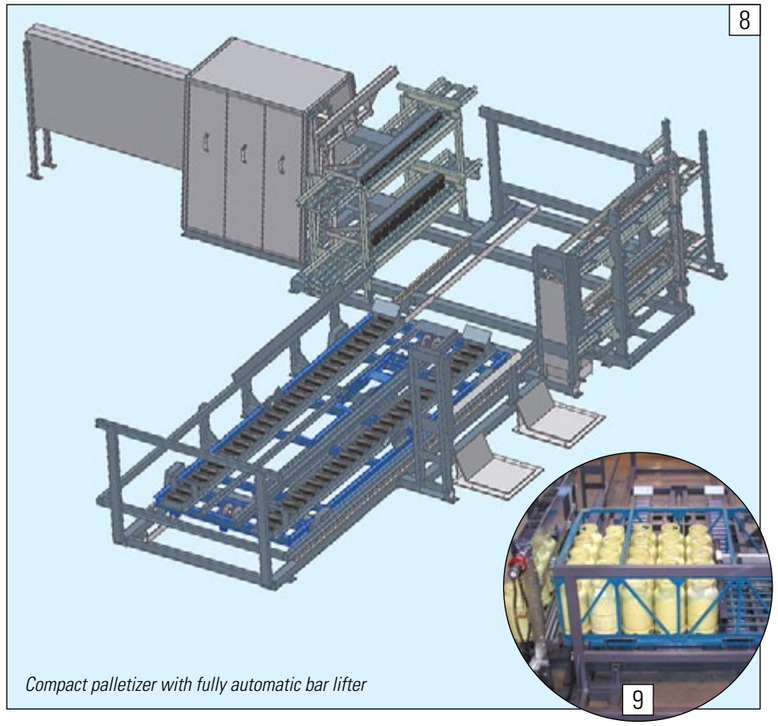
Bottom right: Fully automatic bar lifter on linear palletizer

Your benefits

- High safety as only internal vehicles operate near by the filling plant, and only few external people has access to the plant
- Optimal logistics as, to a large extent, external and internal vehicles operate in separate areas
- Possibility of expansion thanks to flexible and modular design
- Just few cylinder repairs necessary as cylinders are protected in pallets during transport
- Just few industrial injuries as there are no manual cylinder lifts

Your possibilities

- Two basic palletizers: Compact Palletizer and Linear Palletizer
- Both plant types can be connected to all types of chain conveyors
- Both plant types can be supplied with fully automatic bar lifter
- The Compact Palletizer is available in one or two storeys and with a capacity of up to 2,400 cylinders per hour
- The Linear Palletizer is available in one storey and with a capacity of up to 1,800 cylinders per hour
- The Linear Palletizer has modular design so that the internal buffer storage can be varied
- The Linear Palletizer can be supplied with a pallet stacker/destacker in order to minimize the fork-lift truck operations and/or to reduce the number of fork-lift trucks
- Manual or semi-automatic palletizers for low capacity filling plants



Compact palletizer with fully automatic bar lifter

Your safety

- All palletizing systems are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All palletizing systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

Easy and safe transport of gas cylinders in pallets

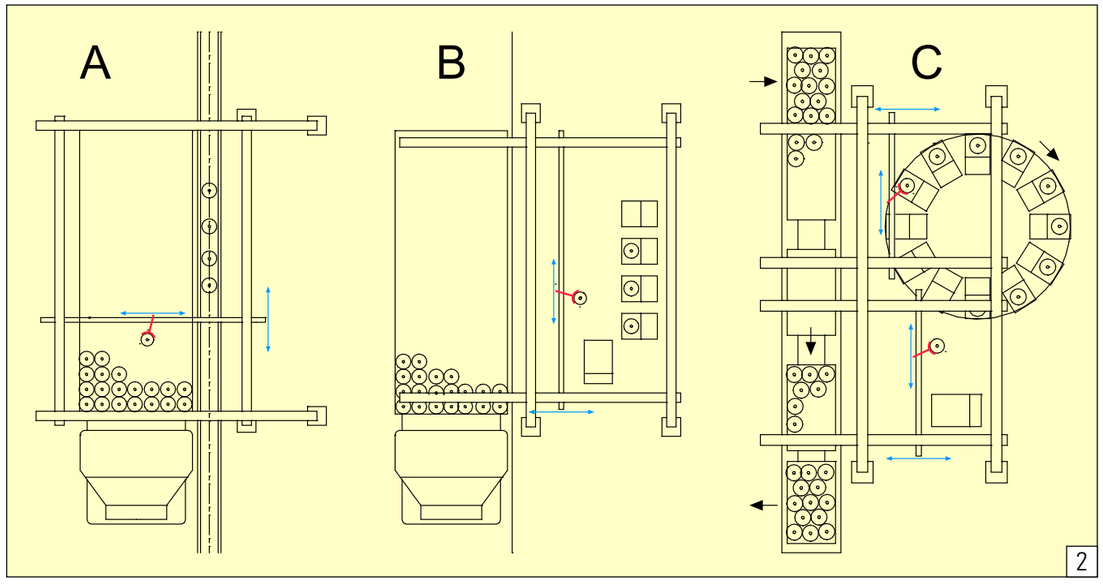
CYLINDER HANDLING SOLUTIONS

Kosan Crisplant's cylinder handling solutions are designed for optimisation of manual handling processes when unloading and loading cylinders from trucks, and other lifting and removal processes in the filling hall.

- Heavy lifts and removals are performed by handling equipment
- Flexible systems, available as overhead systems and telescopic conveyor systems
- Minimum need for manpower
- Ergonomic solutions
- Small investment
- Handling of both industrial and domestic cylinders

1

Kosan Crisplant's telescopic conveyor has been designed to facilitate the heavy manual handling in connection with loading/unloading of LPG cylinders onto/from trailers or lorries. The conveyor is mounted as a direct extension of the chain conveyor on the platform or the ramp. It consists of a stationary section as well as a movable section in the form of a built-in telescopic extension.



2

Examples of principle solutions for handling of single cylinders by means of an overhead rail system – A: Handling between lorry and chain conveyor B: Handling between lorry and stationary filling machines – C: Handling between pallets and filling carousel

Your benefits

- Minimized strain on operators
- Transport of cylinders directly from the conveyor or the filling machine to the truck platform
- Increased capacity when loading and unloading trucks
- Efficient handling at peak periods
- Reduction of typical handling damages on cylinders

Your possibilities

- The overhead system can be supplied either with electrical lifting motor and lifting hooks, or with vacuum principle (incl. suction disc and equipment for balancing of cylinder weight)
- The overhead system can also be applied for manual loading and unloading of pallets, together with the pallet transporting system
- Telescopic conveyor systems include telescopic chain conveyors which cover the length of the truck platform for easy loading and unloading
- Both the overhead and the telescopic conveyor systems can be combined with other handling systems, such as palletizers

Your safety

- All cylinder handling solutions are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All cylinder handling solutions are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

3

Example of suspension device for an overhead handling system based on the vacuum principle

4

Safe handling of heavy cylinders

5

Handling system, based on the vacuum principle, for two cylinders

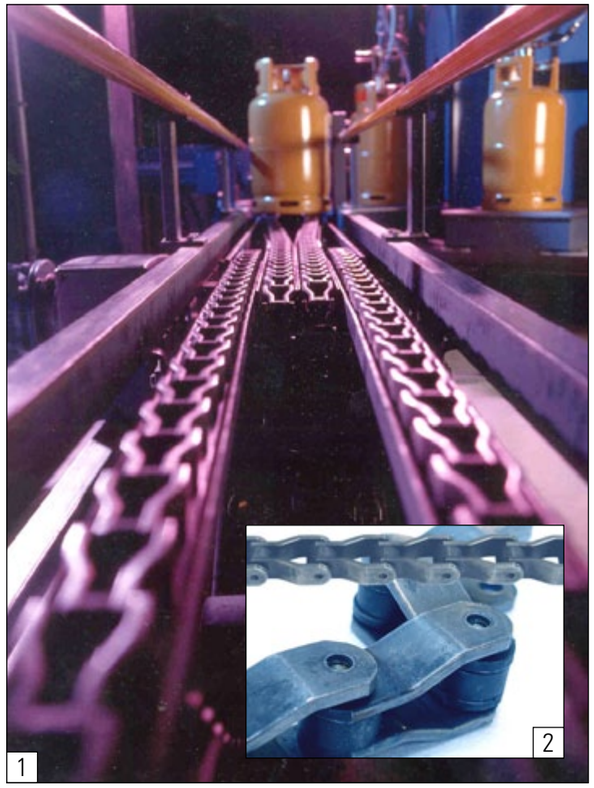
6

Handling system, based on the vacuum principle, for one cylinder

CONVEYOR SYSTEMS

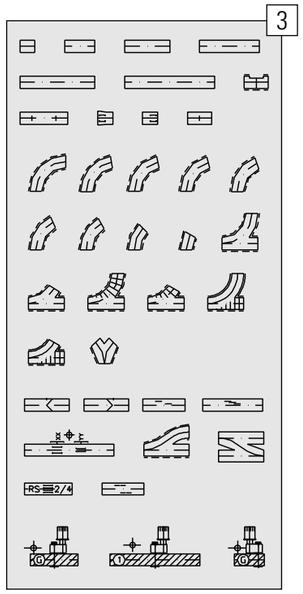
The conveyor systems are designed for efficient and rational transport of LPG cylinders from the unloading point to the loading point, passing various processing points.

- High quality and solid systems developed on the basis of 50 years' experience
- Rational transport of LPG cylinders
- Modular and flexible systems
- Layout according to requirements
- Systems for all cylinder types
- Manual or fully automatic control of cylinder flow
- Integration with machines and processes
- Fully galvanized

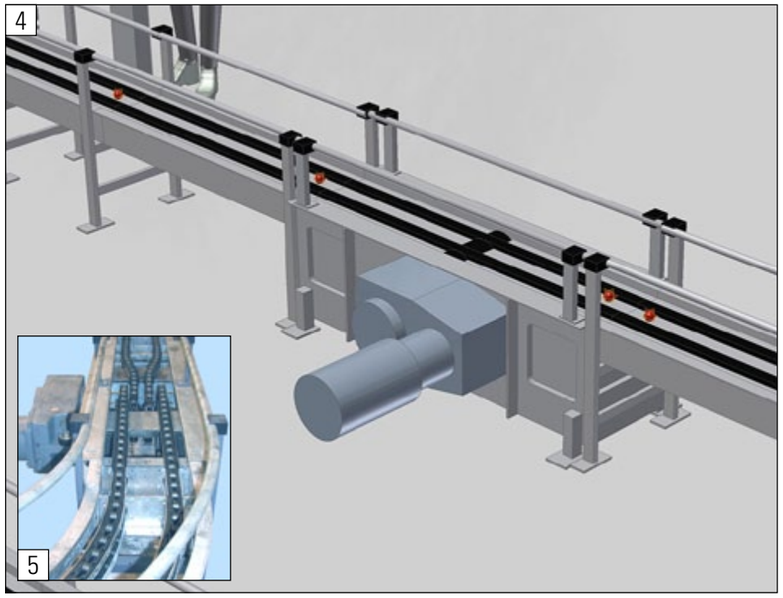


Chain conveyor for LPG cylinders

Kosan Crisplant's original chain type 20000



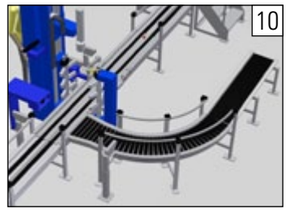
Examples of chain conveyor sections



Driving unit for chain conveyor

Your benefits

- Minimized strain on operators
- Capacity increase thanks to optimisation of manual processes
- Minimum need for manpower
- Lasting quality
- High safety thanks to controlled cylinder logistics
- Reduction of typical handling damages on cylinders
- Minimum wear, low power consumption and noise level when using soap water lubricated chain conveyor



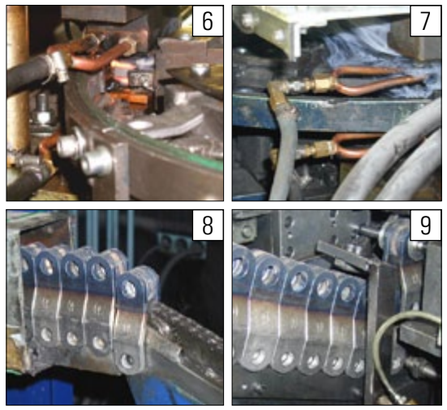
Curve section of roller conveyor

Your possibilities

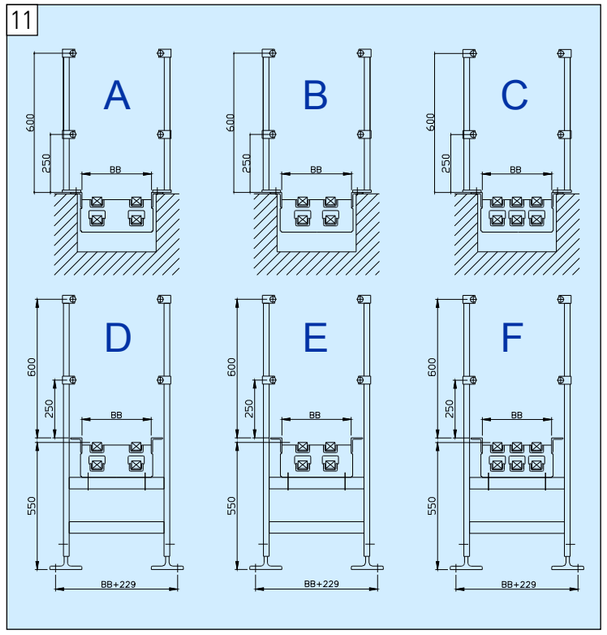
- Dry or soap water lubricated chain conveyor
- Ascending and descending chain conveyors
- The modular principle allows infinite combinations
- Driving units with ex-proof motor and gear for variation in chain conveyor speed
- Chain conveyor systems with two or three chains and different widths
- Convergence and divergence units for chain conveyors
- Reversion sections for variation in chain conveyor speed
- Installation at floor level or on supports at a given level
- Pusher for discharge conveyor
- Manual, semiautomatic or fully automatic control of cylinder flow
- Central system for distribution of soapy water

Your safety

- All conveyor systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All conveyor systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals



All processes in the chain component production are monitored which guarantees that each component is 100% perfect before assembly and welding. Defective components are rejected and scrapped. In addition, random samples of the ready-made chain sections (with a standard length of 5 m) are taken to make absolutely sure that the chain meets Kosan Crisplant's strict quality standard.



Chain conveyor systems

A System I with 2 chains for installation at floor level

B System II with 2 chains for installation at floor level

C System I with 3 chains for installation at floor level

D System I with 2 chains for installation on supports

E System II with 2 chains for installation on supports

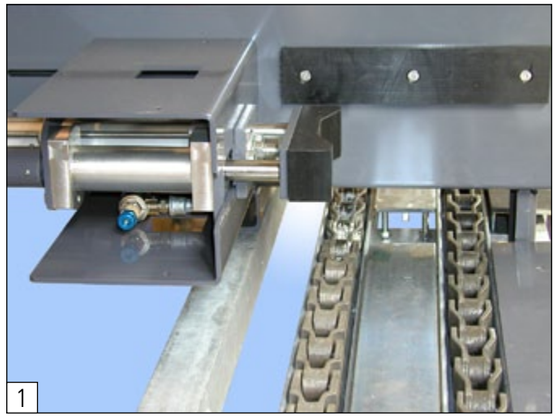
F System I with 3 chains for installation on supports

All systems are available with or without rails (high or low).

CARROUSEL INTRODUCTION AND EJECTION SYSTEMS

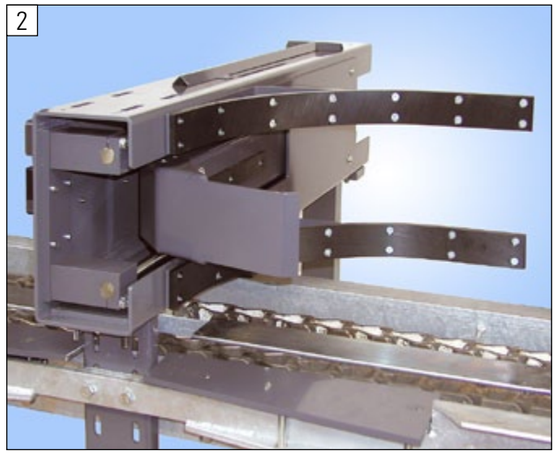
Kosan Crisplant's carrousel introduction and ejection systems are designed for safe and fast introduction and ejection of LPG cylinders to and from carrousels.

- Maximum use of carrousel capacity
- Safe operation of carrousels
- Fully automatic cylinder flow to and from carrousels
- Systems for all cylinder types
- High capacity
- Can be integrated in carrousel filling system
- Can be integrated in chain conveyor system
- Easy installation in existing plants



1

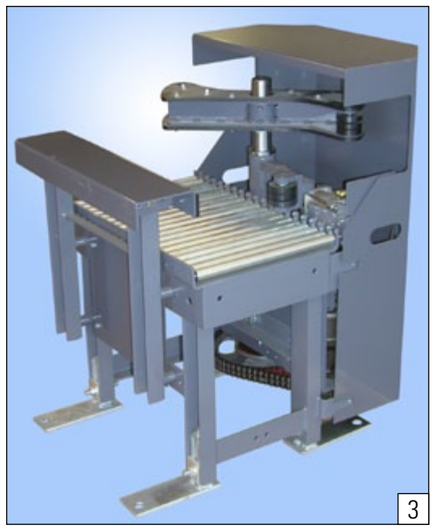
TIE introduction unit for tangential introduction of cylinders to filling carrousel



2

TIE ejection unit for tangential ejection of cylinders from filling carrousel

HRS introduction unit for radial introduction of cylinders to filling carrousel



3

4

PER ejection unit for radial ejection of cylinders from filling carrousel

Your benefits

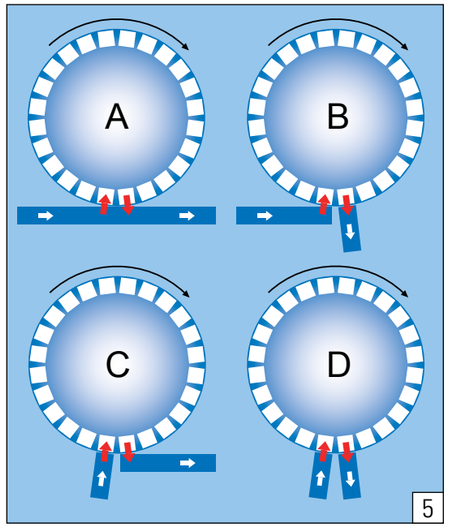
- No manual handling before or after carrousel
- No introduction if filling machine on carrousel is occupied
- No ejection if cylinders are accumulated on chain conveyor after carrousel
- In case of CUC controlled system:
  - Non touch control
  - Automatic data transfer to filling machine and check scale

Your possibilities

- Tangential design,
  - with introduction and ejection
  - with introduction and arrangement for activation of pusher on each filling machine
- Tangential design can be combined with valve orientation
- Radial design,
  - with introduction and ejection
  - with introduction and arrangement for activation of pusher on each filling machine
- Pneumatic system or electronic CUC controlled system
- Adjustment of system speed to carrousel speed

8

Radial introduction unit combined with tangential ejection unit with a cylinder pusher on each filling machine



5

Introduction and ejection systems

A Tangential introduction and ejection
B Tangential introduction and radial ejection
C Radial introduction and tangential ejection
D Radial introduction and radial ejection

The illustrated introduction and ejection systems are designed for filling carrousels with clockwise rotating direction. All systems are available for filling carrousels with anticlockwise rotating direction.

6 7

Carrousel filling systems with radial introduction and ejection units

9 10

Top: TIE tangential introduction unit
Bottom: TIE tangential ejection unit

Your safety

- All carrousel introduction and ejection systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All carrousel introduction and ejection systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

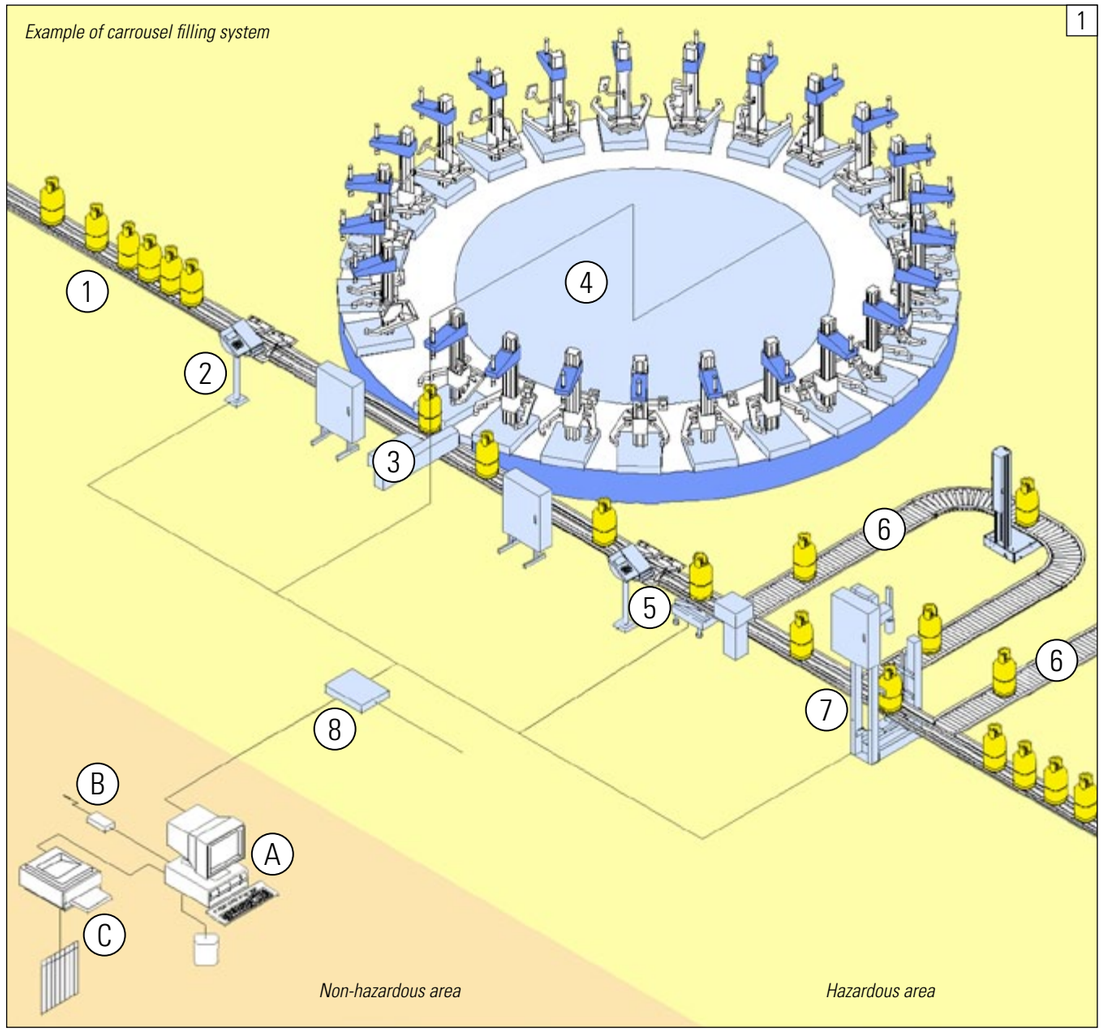
CARROUSEL FILLING SYSTEMS

Kosan Crisplant's carrousel filling system is designed for safe and effective filling of all kinds of LPG cylinders.

- The most effective way of filling LPG cylinders
- High capacity filling, up to 1,800 cylinders per hour
- Fully automatic cylinder flow
- High safety level thanks to intrinsically safe network
- Decentralized control units independent of PC's
- Rapid encoding or automatic reading of cylinder tare
- Control system uptime: 99% – the best on the market
- Total overview of the filling production thanks to PC data collection

Equipment in hazardous area:
1 Chain conveyor
2 Encoding station
3 Introduction and ejection units
4 Filling carrousel and filling machines
5 Check scale
6 Sort-out conveyor
7 Leak detector
8 Power and data interface

Equipment in non-hazardous area:
A PC incl. software and database for filling data
B Modem for connection to KC on-line service
C Printer for printing reports



Carrousel filling system with UFM universal filling machines

Introduction and ejection units

Electronic check scale

Your benefits

- Low installation costs and high safety thanks to intrinsically safe network
- Focus on ergonomics at central tare encoding station
- Few operators and minimized risk of human errors
- No mechanical wear on electrical control equipment, non-touch sensors and swivel connectors
- Optimal logistics and high output (e.g. sorting of cylinders for maintenance before filling)
- Optimal PC data collection tool for effective filling and maintenance
- Capacity increase is possible
- Same user interface (HMI/CUC controller) on all machines

Your possibilities

- Semi-automatic or fully automatic system according to valve type
- Automation level can be upgraded according to actual and future needs
- From 8 to 42 filling machines on the carrousel platform – capacity can be adapted to actual and future needs
- Filling machines and filling heads adapted to cylinders and cylinder valves
- PC placed in non-hazardous area can be connected to the system
- Quick and professional service back-up by remote control available

Your safety

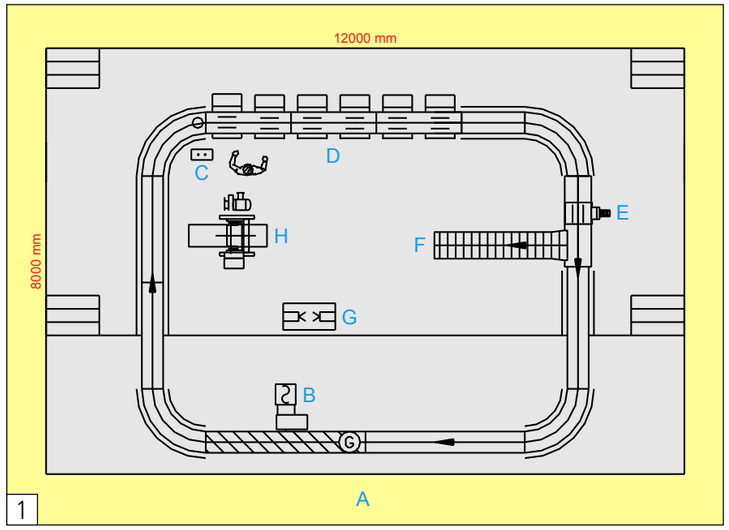
- All equipment and machines in the filling system are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All equipment and machines in the filling system are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- Filling machines and check scales have weighing Accuracy Classification C3 according to OIML R 76/ EN45501
- National/local approvals

ATEX approval certificate

IN-LINE FILLING SYSTEMS

Kosan Crisplant's in-line filling systems are designed for safe and efficient filling and checking of all kinds of LPG cylinders.

- Suitable system for low capacity filling of industrial cylinders
- Capacity between 50 and 250 cylinders per hour
- Semi-automatic handling of cylinders
- Flexible to different cylinder diameters, heights and cylinder valves
- Filling machines can perform both filling and check weighing
- Flexible solutions – with possibilities of expansion
- Small investment



1

Example of in-line filling system with filling machines in-line in chain conveyor

A Unloading/loading area
B Driving unit for chain conveyor
C Control desk for control of cylinder flow
D Filling machines
E Check scale and manual leak detector
F Roller conveyor for rejected cylinders
G Cylinder clamp
H Tiltable evacuation rack

2

UFM universal filling machines in-line in roller conveyor

Your benefits

- Low installation costs
- High safety thanks to intrinsically safe network
- Focus on ergonomics
- Minimum manual cylinder handling
- Includes automatics for regulation of cylinder flow
- Controlled cylinder logistics
- Ready for communication with PC for data collection
- Capacity increase is possible

Your possibilities

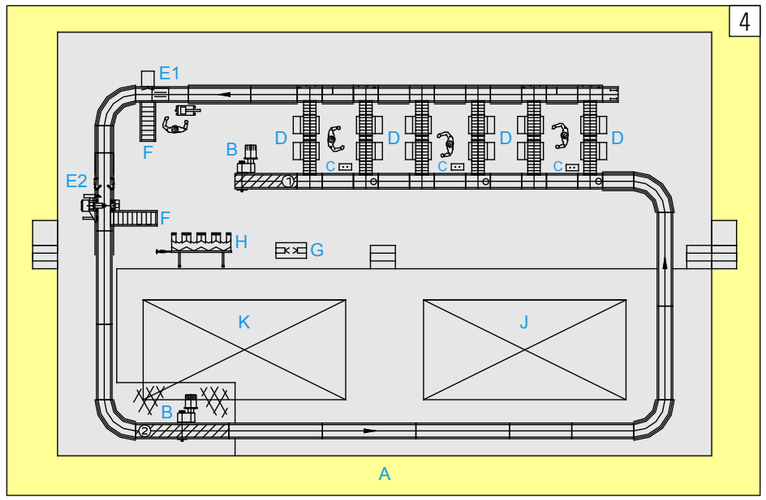
- Manual or semi-automatic filling head according to valve type
- Parallel filling lines for increased capacity
- 1 to 8 filling machines per filling line
- Weighing principle or mass flow principle
- Can be integrated in chain conveyor or roller conveyor
- Manual or semi-automatic handling of cylinders
- Filling of both domestic and industrial cylinders
- Automation level can be upgraded according to actual and future needs

Your safety

- All in-line filling systems are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All in-line filling systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- All in-line filling systems have weighing Accuracy Classification C3 according to OIML R 76/EN45501
- National/local approvals

3

In-line filling system with roller conveyor



4

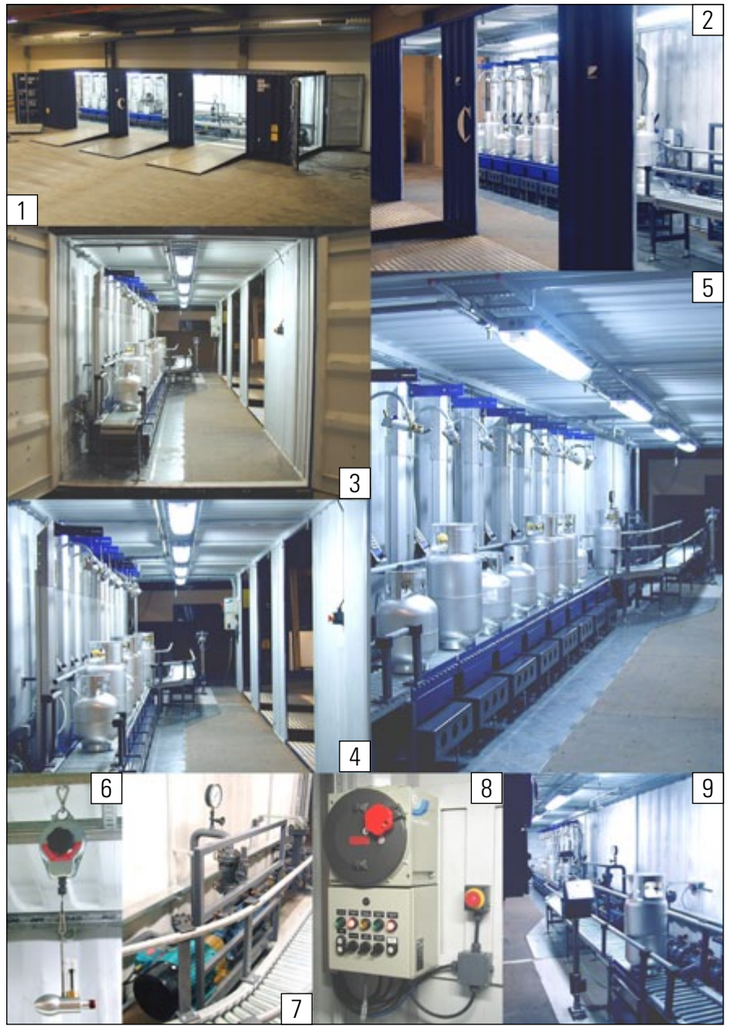
Example of in-line filling system with filling machines in-line in roller conveyor

A Unloading/loading area
B Driving unit for chain conveyor
C Control desk for control of cylinder flow
D Filling machines
E1 Check scale
E2 Electronic leak detector
F Roller conveyor for rejected cylinders
G Cylinder clamp
H Evacuation rack
J Storage area for empty cylinders
K Storage area for filled cylinders

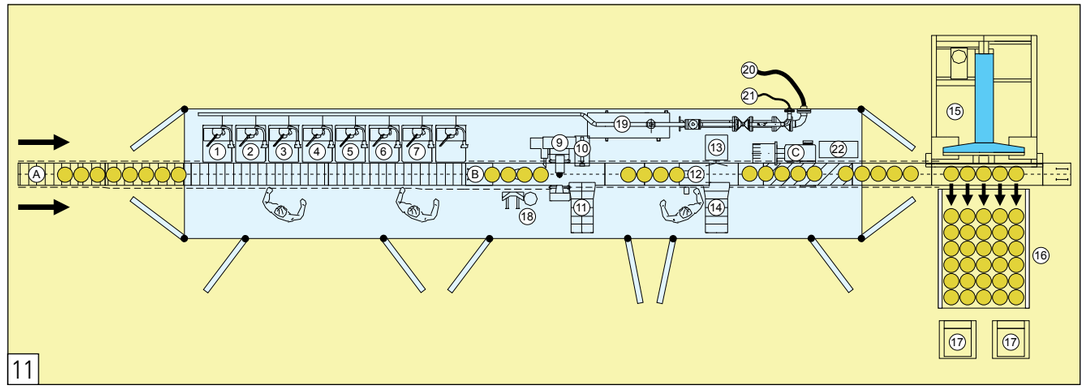
CONTAINER FILLING PLANTS

Kosan Crisplant's mobile container filling plants are designed for safe and efficient filling, checking and maintenance of all kinds of LPG cylinders.

- Small flexible mobile and prefabricated plants – plug & play
- Ideal solution when entering and testing new markets
- Ideal filling solution when rebuilding/renovating existing plants
- Flexible solution and arrangement according to customer needs
- 20' and 40' containers, according to actual need for equipment
- Comprise Kosan Crisplant's thoroughly tested standard filling equipment
- Filling capacity up to 400 cylinders per hour per container
- Complete filling plant (can also contain storage room, gatehouse and LPG tanks)



Complete container filling plant with storage tank



11

Container filling plant with eight filling machines, check equipment and pallet loader

A Roller conveyor
B Chain conveyor
C Driving unit for chain conveyor
1-8 Filling machines
9 Electronic leak detector
10 Cylinder pusher
11 Sort-out conveyor for leaky cylinders
12 Electronic check scale
13 Cylinder pusher
14 Sort-out conveyor for incorrectly filled cylinders
15 Pallet loader
16 Pallet with cylinders
17 Fork lift stops
18 Evacuation equipment
19 LPG pump unit
20 LPG supply hose
21 LPG return hose
22 Electrical panel

Your benefits

- Easy installation on site
- Simple layout and maximum safety
- Minimum civil work and engineering
- The plant can be made independent of external power supply (e.g. in rural areas)
- Low power consumption
- Easy and safe to operate
- Ready for integration in filling system network
- Ready for communication with PC for data collection
- Comprise all necessary equipment for safe and reliable filling of gas cylinders
- Capacity increase is possible

Your possibilities

- 1-8 filling machines
- Supply of standard filling plant equipment
- Supply of roller or chain conveyor
- Can be delivered as Turn Key projects including all equipment "within the fence"

Your safety

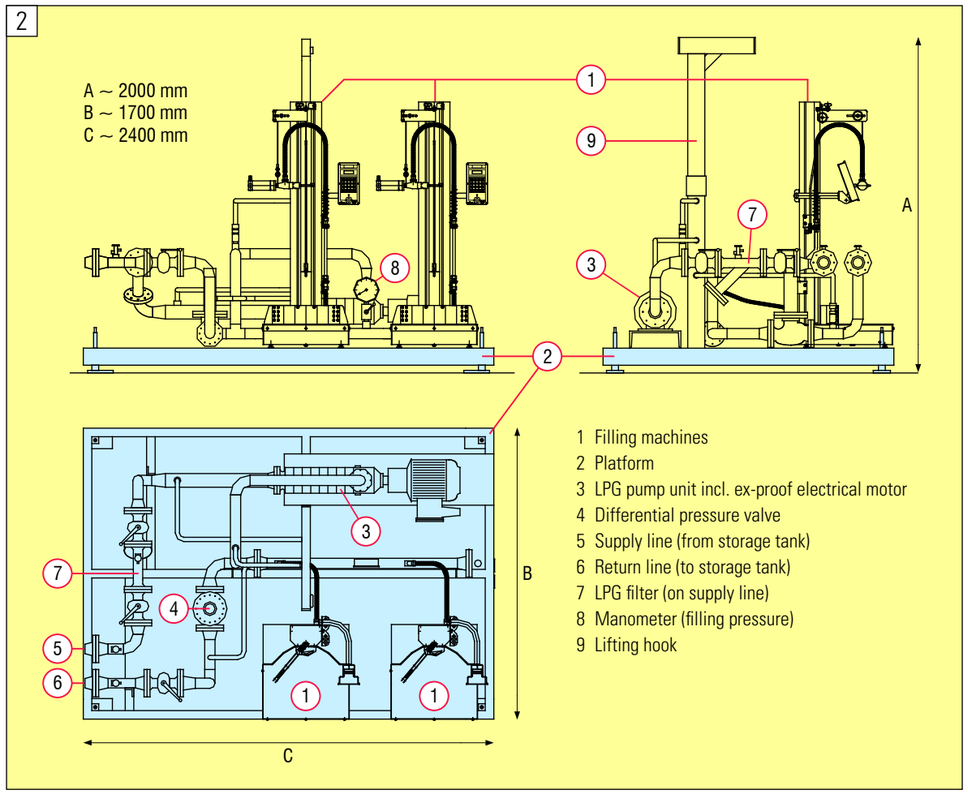
- All equipment and machines are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All equipment and machines are designed for use in hazardous areas classified as one 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- Filling machines and check scales have weighing Accuracy Classification C3 according to OIML R 76/ EN45501
- National/local approvals

COMPACT FILLING SYSTEMS

Kosan Crisplant's mobile compact filling systems are designed for safe and efficient filling and checking of all kinds of LPG cylinders.

- Small flexible mobile and prefabricated platforms – plug and play
- Ideal solution for quick installation
- Suitable when rebuilding and renovating existing filling plants
- Flexible system - arrangement according to customer needs
- Platform size according to actual need for equipment
- Comprise Kosan Crisplant's thoroughly tested standard filling equipment

One-man LPG filling unit with four UFM universal filling machines and complete platform with LPG pump unit, ex-proof power panel and piping arrangement (incl. filter, differential pressure valve and LPG liquid level sensor)

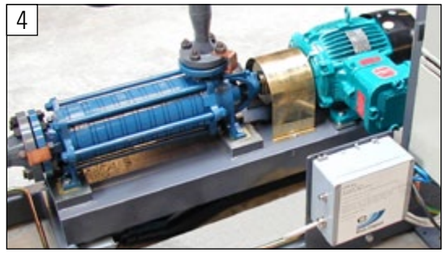


Example of one-man LPG filling unit with two UFM universal filling machines

Your benefits

- Easy installation on site
- Simple layout and maximum safety
- Minimum civil work and engineering
- The plant can be made independent of external power supply (e.g. in rural areas)
- Low power consumption
- Easy and safe to operate
- Ready for integration in filling system network
- Ready for communication with PC for data collection
- Comprise all necessary equipment for safe and reliable filling of gas cylinders
- Capacity increase is possible
- Minimum space requirements

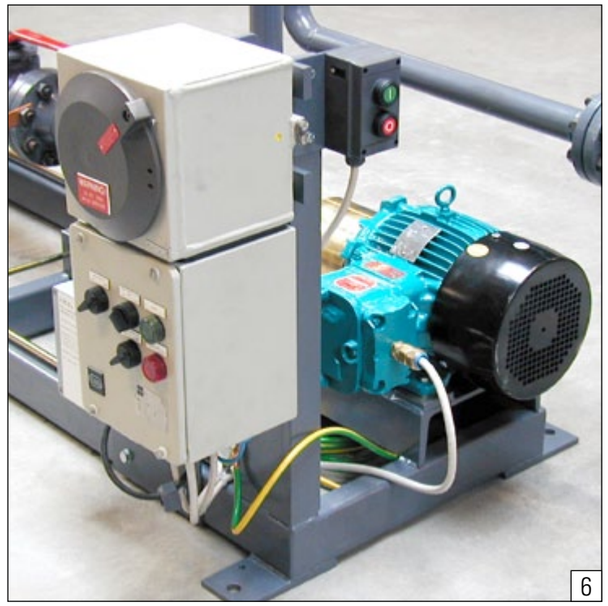
UFM universal filling machine



LPG pump unit, ex-proof electrical motor and Kosan Crisplant's CPI power supply for intrinsically safe network

Detail of piping arrangement: shut-off valve, safety valve and earthing connections

Ex-proof power panel, start/stop switch and electrical motor for LPG pump unit



Your possibilities

- 1-8 filling machines
- Supply of standard filling plant equipment
- Supply of roller or chain conveyor
- Different platform sizes

Your safety

- All equipment and machines are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All equipment and machines are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- Filling machines and check scales have weighing Accuracy Classification C3 according to OIML R 76/EN45501
- National/local approvals

UFM UNIVERSAL FILLING MACHINE

Kosan Crisplant's UFM universal filling machine is designed for safe and accurate filling of all types of LPG cylinders and valves.

- Most used filling machine in the world
- Weighing principle (load cell) or mass flow principle
- Operation; fully automatic, semi-automatic or manual
- Installation: on carrousel, in-line in roller or chain conveyor, or as stand-alone unit
- Flexible to different cylinder diameters, heights and cylinder valves
- Modular design with thoroughly tested components
- Competitive price

Your benefits

- Satisfied end-users due to accurately filled cylinders
- Savings on LPG because of high filling accuracy and intelligent filling software

1 Semi-automatic filling of industrial cylinders with screw valves including fully automatic opening and closing of valve hand wheel
2 Fully automatic filling of domestic cylinders with centre valves
3 Manual filling of camping cylinders with screw valves
4 Semi-automatic filling of industrial cylinders with centre valves
5 Manual filling of industrial cylinders with screw valves
6 Fully automatic filling of camping cylinders with centre valves

- Low installation costs due to intrinsically safe system
- Minimum maintenance and service requirements
- Low power consumption
- Easy and safe to operate
- High safety due to intrinsically safe system
- Easy adjustment and maintenance (error messages in display)
- Ready for integration in filling system network
- Ready for communication with PC for data collection

Your possibilities

- Carrousel models for high capacity batch filling (from approx. 300 cylinders per hour) and/or for automated filling. Operation can be manual, semi-automatic or fully automatic
- In-line in chain conveyor models for low capacity filling (up to approx. 300 cylinders per hour) or/and for automated handling of cylinders (especially big and/or heavy cylinders)
- In-line in roller conveyor for low capacity filling
- Stationary on floor models for low capacity random or batch filling and/or for filling of cylinders in different sizes /with different valves

Your safety

- All equipment and machines in the filling system are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)

UFM universal filling machine with double centring device for automatic filling of industrial cylinders with centre valves

- All equipment and machines in the filling system are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- Filling machines and check scales have weighing Accuracy Classification C3 according to OIML R 76/ EN45501
- National/local approvals

1 UFM universal filling machines mounted on filling carrousel
2 UFM universal filling machine with three filling heads for fully automatic filling of domestic cylinders with three different types of centre valves
3 Adjustable HMI/CUC controller – easy to use and program
4 UFM universal filling machine with mass flow meter

FILLING HEADS

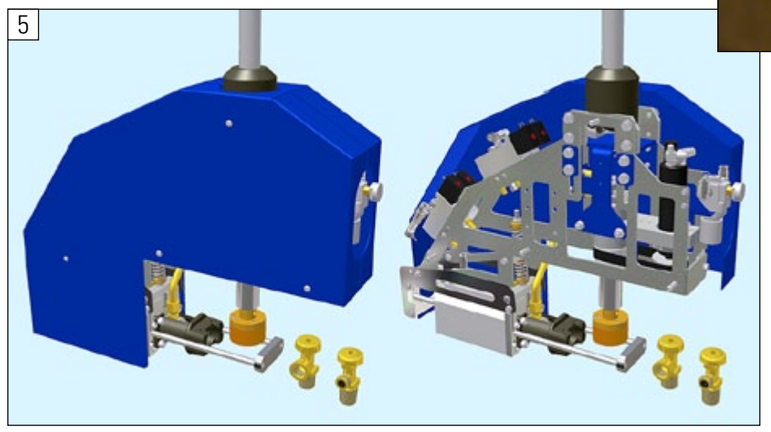
Kosan Crisplant's filling heads are designed for safe and easy filling and evacuation of all types of LPG cylinders.

- High quality and solid systems developed on the basis of 50 years' experience
- Operation: fully automatic, semi-automatic or manual
- Optimised flow and filling speed
- High safety level
- Can be used for both filling and evacuation

Your benefits

- Lasting quality
- Easy and fast coupling and decoupling
- Minimum gas discharge at coupling and decoupling
- No gas discharge at sudden interruptions in compressed air supply
- Manual and semi-automatic filling heads are operated by single hand
- Flexible suspension for coupling of valves which are not in central position for filling
- Ergonomic operation of manual and semi-automatic filling heads thanks to balanced suspension
- Minimum maintenance

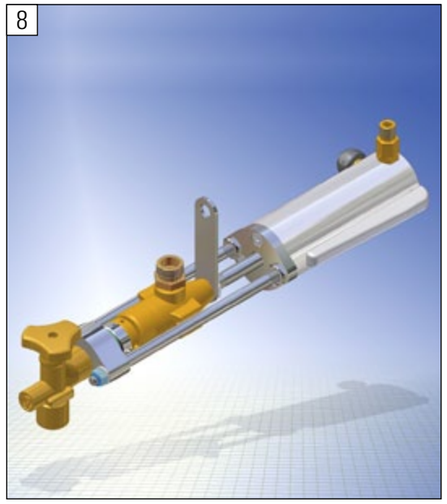
Fully automatic AFH filling head for centre valves



Fully automatic filling head for screw valves

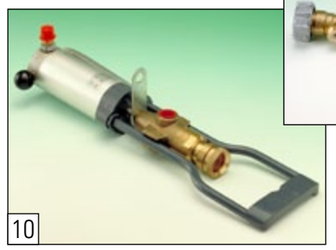
Semi-automatic (self-decoupling) SAC filling head for centre valves

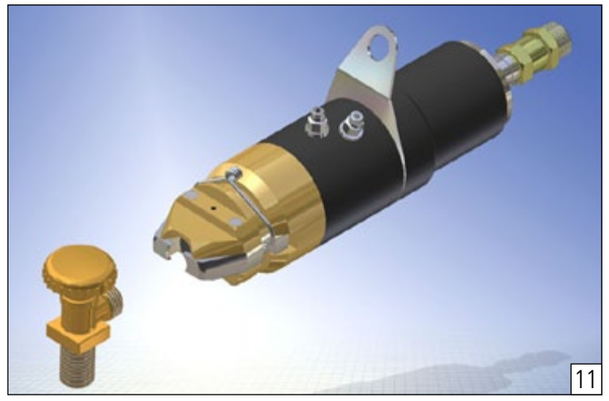
Manual mechanical MFC filling head for centre valves



Manual pneumatic PI filling head for OPD valves and check valves

Manual pneumatic PUI filling head for screw valves





Semi-automatic (self-decoupling) SAS filling head for screw valves

Your possibilities

- Filling heads for all types of centre valves and screw valves
- Customer specific filling heads for special valves
- Coupling and decoupling can be manual, semi-automatic or fully automatic
- Usage in combination with a large variety of filling machines

Your safety

- All filling heads are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All filling heads are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

KCFiLL1

Kosan Crisplant's patented KCFiLL1 filling machine is designed for easy, safe and accurate filling of all types of LPG cylinders and valves, and offers the best value for money on the market for low-capacity filling machines.

- Weighing principle with load cell
- Easy and safe manual operation
- Unlimited installation possibilities
- Flexible to different cylinder diameters, heights and cylinder valves
- Simple design with thoroughly tested components
- Competitive price: best value for money on the market

Your benefits

- Easy and quick installation
- Satisfied end-users due to accurately filled cylinders
- Savings on LPG because of high filling accuracy and intelligent filling software
- Plug'n'play solution: minimum installation costs
- Minimum maintenance and service requirements
- Low power consumption
- Easy and safe to operate
- Minimum manual handling of heavy cylinders when using a semi-mobile KCFiLL1 solution
- High safety due to intrinsically safe system

1

- Easy adjustment and maintenance (error messages in display)
- Can be integrated in existing filling system network
- No need for separate check weighing equipment: filling and check weighing processes performed by the same unit

Your possibilities

- Unlimited installation possibilities:
  – Fixed installation (e.g. on a suspension frame with a minimum load-carrying capacity of 500 kg per installed unit)
  – Semi-mobile installation (e.g. on a swing crane or on a frame with wheels)
  – Mobile installation (e.g. in a container, as a skid-mounted installation or on a truck – either fixed or on a swing crane)
- The cylinder flow to and from fixed KCFiLL1 units is carried out manually or by using chain or roller conveyors
- Configuration possibilities:
  – Manual or automatic connection of filling head
  – With or without lifting device for filling head
  – Including external lifting table or weighing plate
- Data collection pack, including complete PC system or connection to existing Kosan Crisplant PC system, is available as an option
- Developed specifically for low capacity random or batch filling and/or for filling of cylinders in different sizes with different valves

2

3

An upgrade to KCFiLL1 filling machines not only improved customer satisfaction, but also plant and consumer safety for Koshi Gas Udyog in Nepal

Your safety

- The KCFiLL1 unit is designed in accordance with current EU directives incl. the ATEX Directive 94/9/EC with the Ex-marking II 2G Ex ib IIB T4 Gb
- The KCFiLL1 unit is designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- The weighing accuracy of the load cell is according to OIML R60, NTEP 3000d, accuracy class C3
- National/local approvals

4

5

KCFiLL1 with manual pneumatic filling head for screw valves

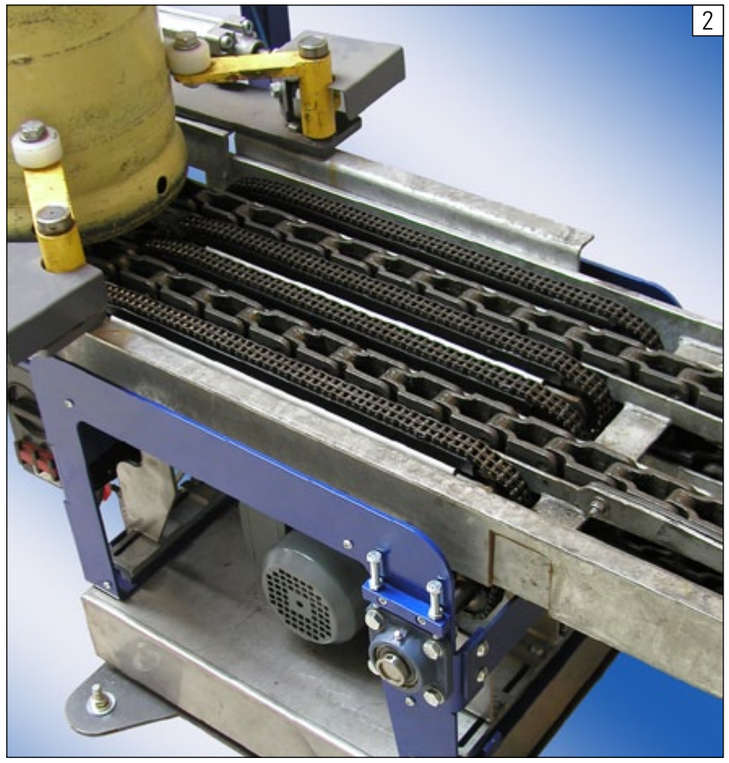
CHECK WEIGHING SYSTEMS

Kosan Crisplant's check weighing systems are designed for accurate and quick control of the net content in LPG cylinders. The systems ensure correctly filled cylinders.

- Safe cylinders to your end-users
- Automatic sort-out of under- and overfilled cylinders
- Capacity up to 1,800 cylinders per hour
- Flexible for all cylinder diameters and heights
- Easy installation in existing plants
- Competitive price

Fully automatic ECS check weighing system for LPG cylinders for installation in-line in chain conveyor

ECS dynamic check scale for installation in-line in chain conveyor



Your benefits

- Check weighing of all filled LPG cylinders
- Automatic sort-out of under- and overfilled cylinders saves manpower and eliminates human errors
- High safety due to intrinsically safe network
- Easy and safe operation
- Easy calibration and zero-setting
- Minimum maintenance and service requirements
- Easy adjustment and maintenance
- Ready for integration in filling system network
- Ready for communication with PC for data collection
- Low installation costs

Your possibilities

- Fully automatic, semi-automatic or manual operation
- Check weighing system in-line in chain conveyor with lifting table for stationary check weighing or with dynamic weighing table for continuous check weighing
- Check weighing system in-line in chain conveyor for fully automatic check weighing with automatic transfer of tare weight from central encoding station
- Check weighing system in-line in chain conveyor for semi-automatic check weighing with manual encoding of tare weight
- Check weighing system in-line in chain conveyor for semi-automatic check weighing with tare compare carried out by operator
- Stationary check scale for installation on floor

Detailed view of accumulation stop on chain conveyor (including photocell), underweight and lifting table

Stationary ECS check scale for installation on floor

Fully automatic ECS check weighing system installed in-line in chain conveyor with roller conveyor for ejection of incorrectly filled cylinders

Fully automatic ECS check weighing system installed in-line in chain conveyor with automatic ejection of incorrectly filled cylinders

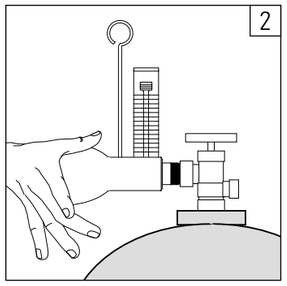
Your safety

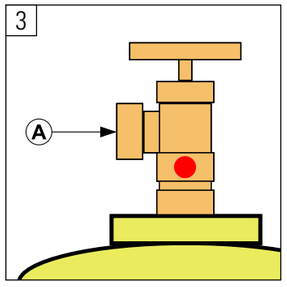
- All check weighing systems are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All check weighing systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- All check scales have weighing Accuracy Classification C3 according to OIML R 76/EN45501
- National/local approvals

MANUAL LEAK DETECTORS

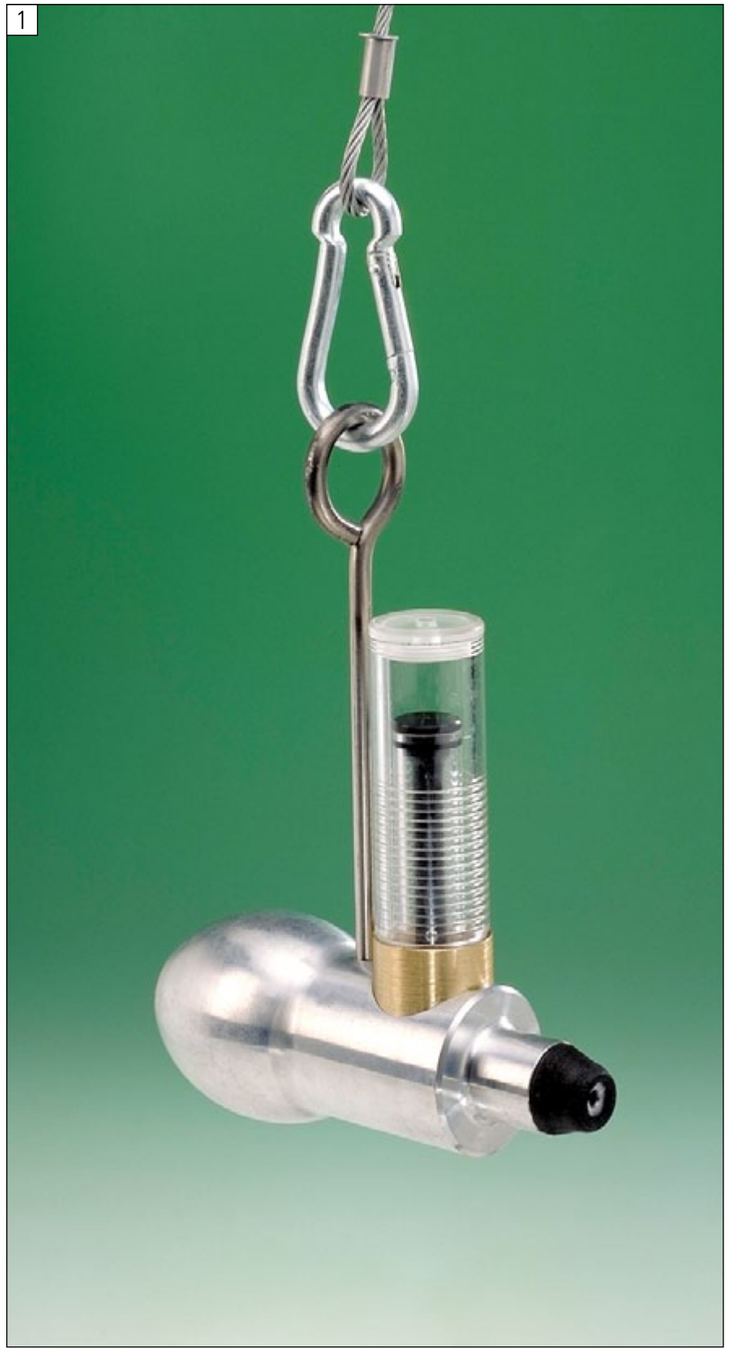
Kosan Crisplant's manual leak detectors are designed for manual leak detection on valve seats of LPG cylinder valves.

- Leak detection on the basis of visual inspection
- Ideal solution for low capacity filling plants
- Suitable after random filling of different cylinder types
- Easy installation in existing plants
- Small investment





The TSV leak detector can detect leaks from the valve seat, pos. A (with closed valve)



Manually operated TSV leak detector

Your benefits

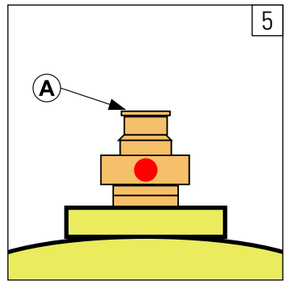
- Easy to use
- Hand-held and mobile units
- Minimum maintenance
- Minimum space requirements
- Flexible to all cylinder diameters and heights

Your possibilities

- Manual leak detectors for centre valves or screw valves
- Practical gallows suspension can be supplied
- Can be used as stand-alone unit or together with conveyor
- Automatics for control of cylinder flow at in-line chain conveyor

Your safety

- All manual leak detectors are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals



The TCV leak detector can detect leaks from the valve seat, pos. A

Manually operated TCV leak detector

ELECTRONIC LEAK DETECTORS AND VALVE TESTERS

Kosan Crisplant's electronic leak detectors and valve testers perform tests on LPG cylinder valves. The cylinders are approved or rejected according to preset permitted values.

- Provide maximum safety
- Fully automatic test with same sorting limit
- Eliminate human errors
- Detect all kinds of leak around the valve
- Check the valve form (centre valves only)
- Flexible for all types of valves
- Flexible for all cylinder diameters and heights
- Easy installation in existing plants
- Minimum space requirements
- Competitive price

Your benefits

- Safe cylinders to your end-users
- 100% test – all filled cylinders are tested
- Savings on manpower thanks to automatic sorting of cylinders with unapproved valves
- Easy to use calibration tools and procedure

1

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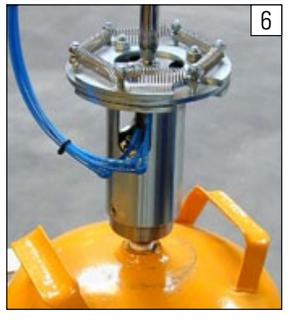
Gas detector with infrared radiation

2

Fully automatic ET-GD leak detector

Pressure sensor/transmitter

4



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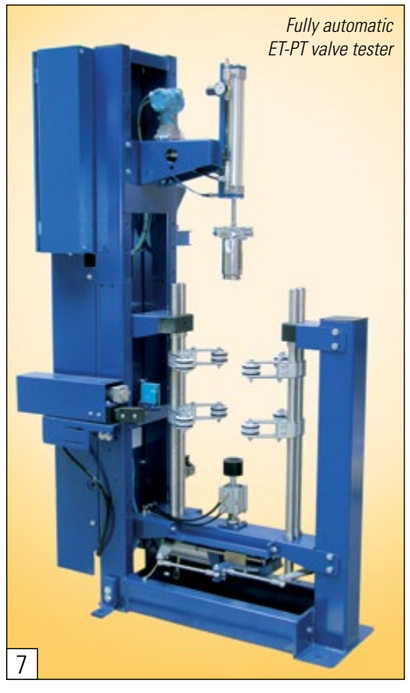


7

Fully automatic ET-PT valve tester

Test cylinder for calibration purposes

5

- Easy adjustment and maintenance
- Low power consumption
- Air service unit with extra filters to eliminate pollution in pneumatic air supply
- Minimum maintenance
- Easy to set up: all necessary software is installed in the HMI/CUC controller
- Easy to use: clear text display and sturdy keyboard
- Ready for integration in fully automatic filling system
- Ready for communication with PC for data collection

Your possibilities

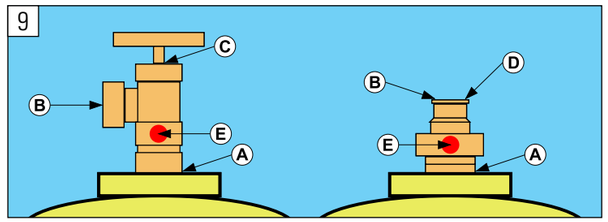
- Test heads designed for all types of valves
- Testing principle according to valve type and testing area on valve: gas analysis principle (leak detectors) or pressure rise principle (valve testers)
- Manually operated model for installation (1) stationary on floor, (2) by a chain conveyor or (3) by a roller conveyor. Available with gas analysis principle. Manually height adjustable
- Fully automatic model for installation in-line in chain conveyor. Performs test on all cylinders. Available with gas analysis principle or pressure rice principle. Manual change of test head for test of different valves. One- or two-headed machine. For one fixed cylinder height. Manually or automatically height adjustable
- Calibration and test equipment available on demand

Your safety

- All electronic leak detectors and valve testers are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All electronic leak detectors and valve testers are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

8

Manually operated ET-GD leak detector



9

Testing areas for screw valves (POL valves):

A Leaks from the threaded joint between the cylinder and the valve
B Leaks from the valve seat (with closed valve)
C Leaks from the valve spindle (with open valve with nut/plug)
E Leaks from the safety valve, if any

Testing areas for centre valves (self-closing valves):

A Leaks from the threaded joint between the cylinder and the valve
B Leaks from the valve seat
D Leaks from the regulator gasket
E Leaks from the safety valve, if any

10

Height adjustable, fully automatic, two-headed ET-GD leak detector

LEAK TESTING BATHS

Kosan Crisplant's leak testing baths are designed for full manual leak detection of LPG cylinders.

- Leak detection on the basis of visual inspection
- Full cylinder body test - including valve test
- Easy integration with chain conveyor
- Baths for continuous cylinder flow
- Capacity up to 1,200 cylinders per hour
- Baths for camping cylinders, domestic cylinders and industrial cylinders

Semi-automatic pneumatic EB-8 leak testing bath integrated in chain conveyor with discharge of leaky cylinders

This EB-8 leak testing bath is made in stainless steel

Your benefits

- Easy visual leak detection
- Simple technology
- Only one operator is required
- Minimum maintenance costs

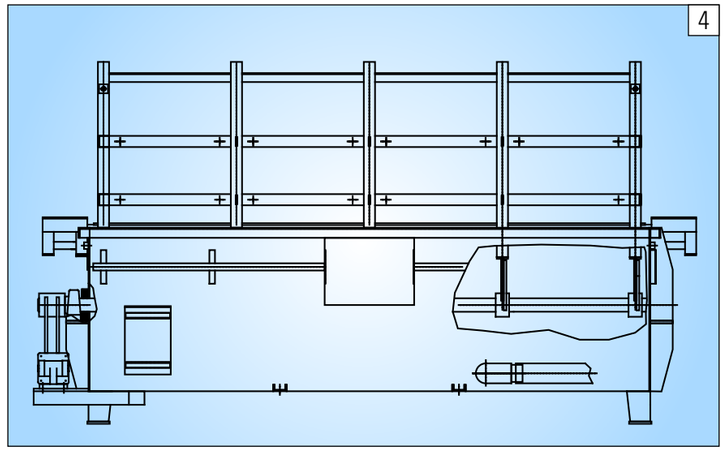
Your possibilities

- Baths for continuous flow, for camping cylinders or domestic cylinders
- Baths with tiltable cylinder racks and manual, semiautomatic or fully automatic cylinder handling (for 4, 8 or 10 domestic cylinders and for 2 or 4 industrial cylinders)

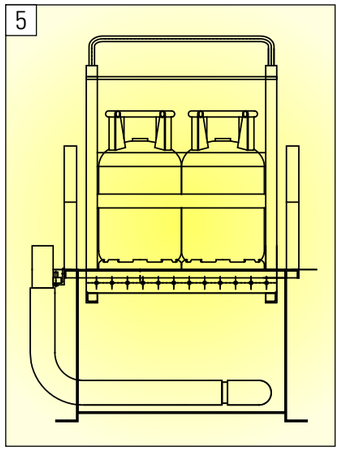
Your safety

- All leak testing baths are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All leak testing baths are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

PCD leak testing bath integrated in chain conveyor



EB-4 leak testing bath for installation in chain conveyor



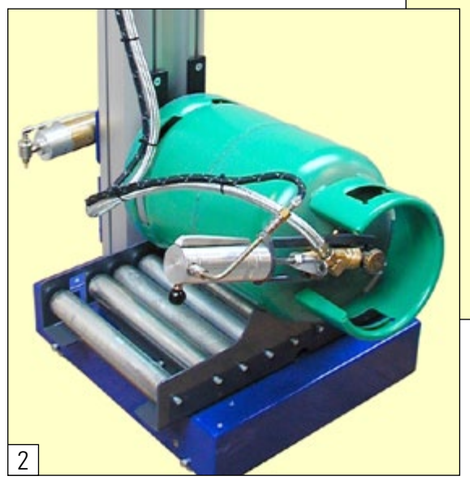
Manually operated EB-2 leak testing bath for installation in roller conveyor

WEIGHT CORRECTION MACHINES

Kosan Crisplant's weight correction machines are designed to perform safe and accurate weight correction of the LPG content in incorrectly filled cylinders. Weight correction is obtained by filling or evacuating the LPG cylinder.

- Weight correction on the spot
- Flexible for all valves types
- Flexible for all cylinder diameters and heights
- Automatic check weighing after weight correction
- Easy installation in existing plants
- Minimum space requirements
- Independent units
- Ready for communication with PC for data collection

1



2

The weight correction machine is designed for incorporation in a roller conveyor. This basic model can be equipped with manual pneumatic filling heads for screw valves, and/or manual mechanical filling heads for centre valves. The weight correction machine is available in models for all cylinder types.

Your benefits

- Fast and correct weight correction
- No accumulation of incorrectly filled cylinders
- Minimum time spent on incorrectly filled cylinders
- High safety due to intrinsically safe network
- Easy and safe to operate
- Low power consumption
- Minimum maintenance

Your possibilities

- Tiltable evacuation rack for domestic cylinders
- Stand-alone tiltable evacuation rack for industrial cylinders
- Manual or automatic head for filling and evacuation
- One machine can be equipped with various heads for filling and evacuation
- Stand-alone machine or incorporated in roller conveyor

Your safety

- All weight correction machines EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All weight correction machines are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- All weight correction machines have weighing Accuracy Classification C3 according to OIML R 76/EN45501
- National/local approvals

3

The tiltable evacuation rack for industrial cylinders is designed for stationary installation. It can be equipped with manual pneumatic filling heads for screw valves and/or manual mechanical filling heads for centre valves.

4

The weight correction machine with tiltable evacuation rack for domestic cylinders is designed for incorporation in a roller conveyor. It can be equipped with manual pneumatic filling heads for screw valves, manual mechanical filling heads for centre valves and/or automatic filling heads for centre valves.

EVACUATION SYSTEMS

Kosan Crisplant's evacuation systems are designed for easy and safe evacuation of LPG cylinders before repair as well as for evacuation of overfilled and leaky LPG cylinders.

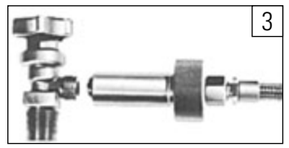
- Solutions for any evacuation requirement
- All systems have thoroughly tested designs
- Complete modular systems
- Minimum cylinder handling
- Means to avoid accumulation of leaky and incorrectly filled cylinders
- Ex-proof design for installation directly in filling hall

Your benefits

- Modular solutions with buffer tanks, pump, compressor and evacuation racks
- High safety level thanks to fast handling of leaky and incorrectly filled cylinders
- No bottlenecks - the total evacuation system including piping is designed by Kosan Crisplant
- Different evacuation heads mounted on the same evacuation rack

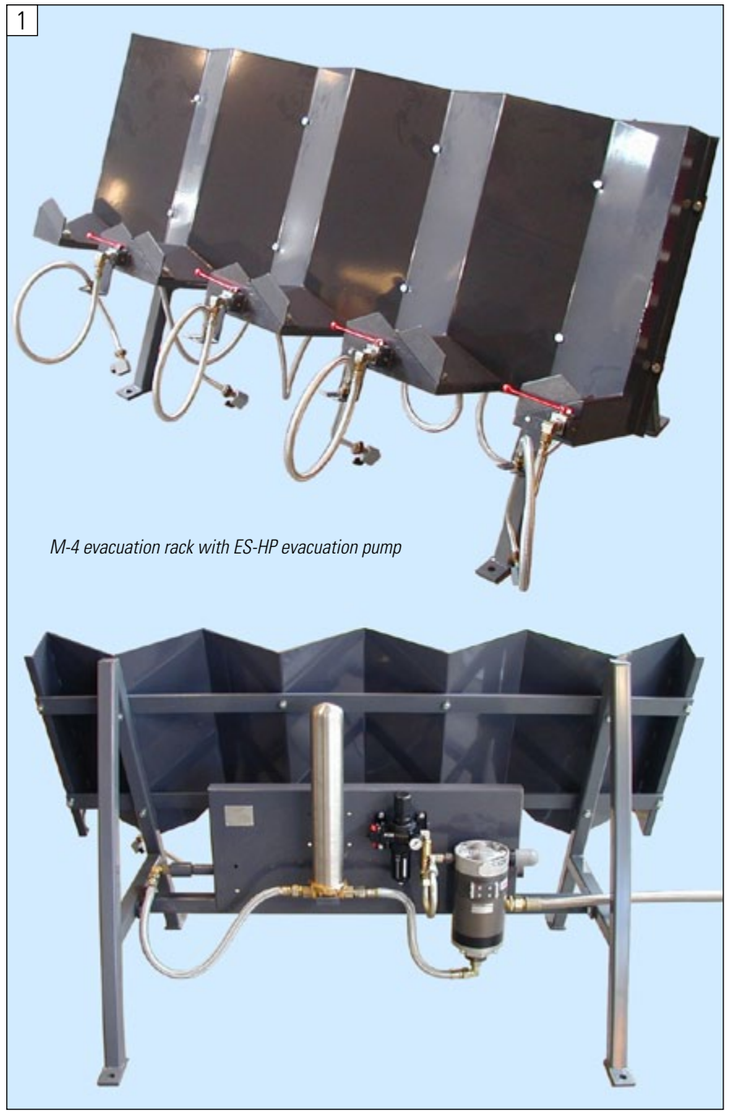
2

Almost all Kosan Crisplant's filling heads can also be used as evacuation heads



3

The MS-U evacuation head is especially designed for evacuation of LPG cylinders with screw valves with external thread



1

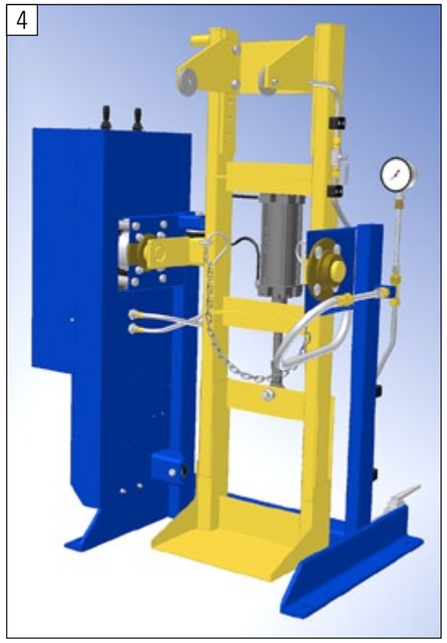
M-4 evacuation rack with ES-HP evacuation pump

Your possibilities

- Manual or automatic operation
- Manual or automatic, tiltable stand-alone evacuation racks for industrial cylinders
- Stationary evacuation racks for 1 to 12 domestic cylinders
- Tiltable evacuation racks for 4 to 8 domestic cylinders
- In-line or stand-alone evacuation racks for domestic cylinders
- In-line systems are supplied with chain conveyor for control of cylinder flow
- Air-driven compressor for small capacities
- Compressor/pump solutions for high capacities
- Evacuation heads for centre valves and screw valves

Your safety

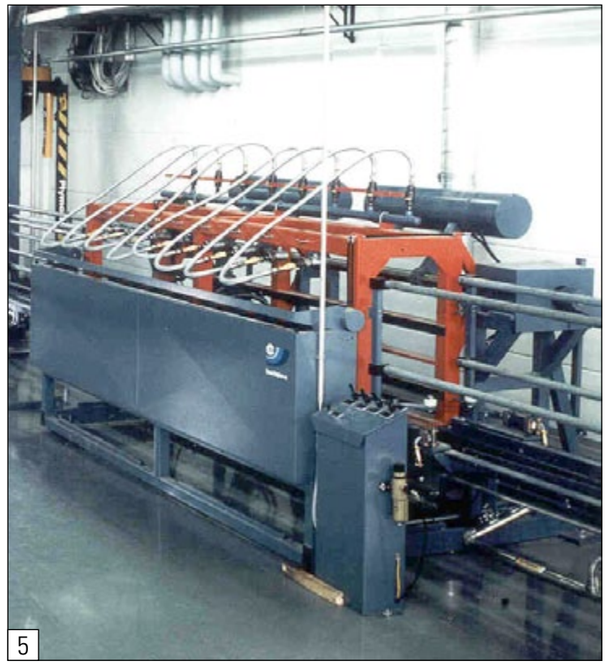
- All evacuation systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC) and the Pressure Equipment Directive (97/23/EC)
- All evacuation systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals



4

The tiltable evacuation rack for industrial cylinders is designed for stationary installation. It can be equipped with manual pneumatic filling heads for screw valves and/or manual mechanical filling heads for centre valves.

In-line ERI evacuation system integrated in chain conveyor



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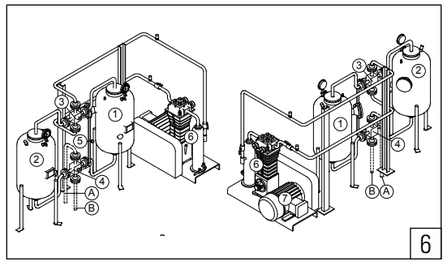


6

The ES-M evacuation system is designed for stationary installation on floor

A Connection to evacuation rack
B Connection to storage tank
1-2 Tanks
3-4 Four-way valves
5 Handle
6 Gas compressor
7 Electrical motor

7

VALVE ORIENTATION MACHINE

Kosan Crisplant's valve orientation machine is designed to perform a help function in connection with manual or automatic filling of cylinders with screw valves. The valve orientation machine ensures that the LPG cylinder is turned with the socket of the cylinder valve in the right direction for processing.

- Fully automatic orientation of screw valves
- Capacity increase
- Minimum need for manpower
- Flexible for cylinders with or without shroud
- Flexible for all cylinder diameters and heights
- Easy installation in existing plants

1

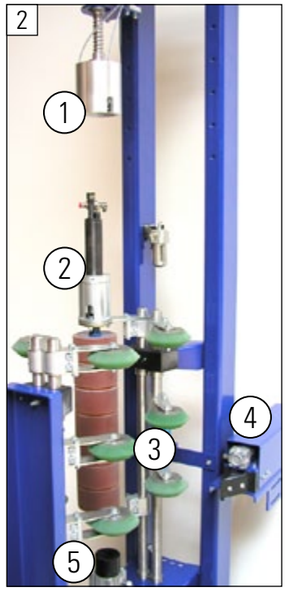
The VOS valve orientation machine is designed to be incorporated in-line in a chain conveyor. It is used for automatic orientation of screw valves on gas cylinders, prior to various automatic processes as e.g. filling or application of caps.

In connection with fully automatic filling on carrousel, the machine is placed before the introduction unit in order to ensure correct orientation of the cylinder valve before introduction of the cylinder onto the filling machine.

Your benefits

- Fast and uniform orientation of screw valves
- Minimized number of breakdowns
- Cylinders can be processed automatically after orientation
- Capacity increase thanks to optimisation of manual processes
- Optimised ergonomics due to elimination of one-sided repeated work
- Easy to set up: all necessary software is installed in the HMI/CUC controller
- Ready for integration in fully automatic filling system
- Easy adjustment and maintenance
- Low power consumption

2

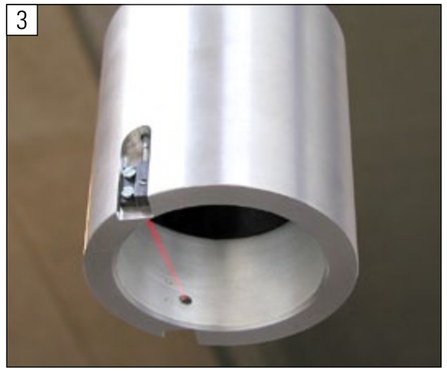


Main components of the valve orientation machine: orientation head (1), cylinder rotation unit (2), cylinder centring unit (3), cylinder stop (4), and cylinder lifting unit (5)

The rollers on both the centring unit (green) and the rotation unit (red) are made of polyurethane (PUR), an extremely durable material, which ensures a good grip of the cylinder

4

3



The orientation head is lowered upon the valve and the cylinder is rotated. When the valve is in the right position inside the orientation head, a fibre optic beam (on the picture shown as a read beam) is cut off, and the cylinder stops rotating.

Your possibilities

- Good for installation before all in-line process machines demanding uniform orientation of screw valves
- Possibility for communication with the following system-integrated machine
- Height adjustable model available
- Stand-alone model available

Your safety

- All valve orientation machines are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All valve orientation machines are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

VALVE OPENER AND CLOSER

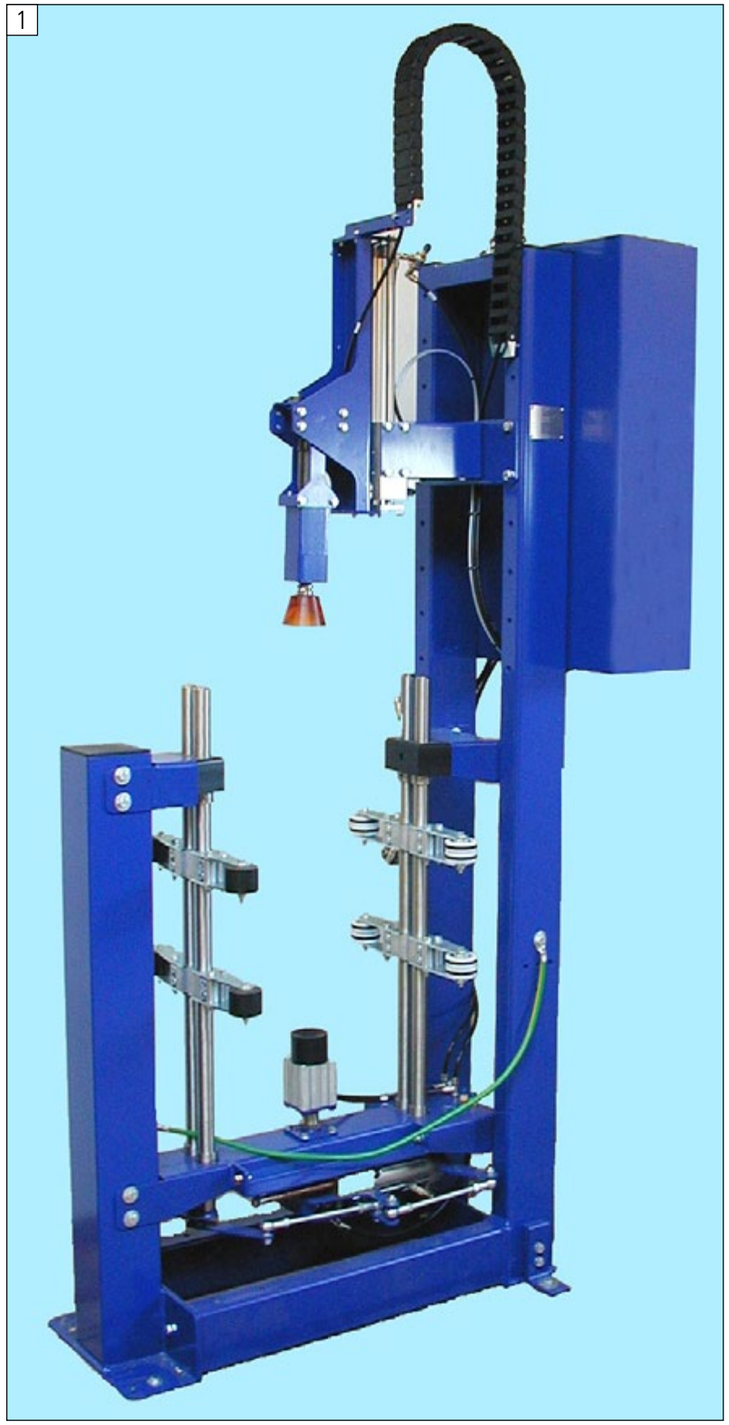
Kosan Crisplant's valve opener and closer is designed for opening or closing of screw valves by means of a preset opening or closing torque. The valve opener and closer is used in connection with filling of LPG cylinders with screw valve and leak test of screw valves with open valves.

- Avoid one-sided repeated work
- Obtain homogenous and sufficient valve closing torque
- Avoid locked hand wheels
- Flexible for all cylinder diameters and heights
- Flexible for all types of screw valves
- Minimal space requirements
- Easy installation in existing plants

Your benefits

- Reliable equipment
- Savings on manpower
- Screw valves last longer
- Easy adjustment of opening or closing torque
- No valves are locked when opened
- Automatic in-line valve opener has a built-in revolution counter

1



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Your possibilities

- Manual valve opener and closer
- Automatic valve opener for in-line installation
- Automatic valve closer for in-line installation
- All models are available with manually operated height adjustment device
- Additional friction rubber spanners for other screw valve types
- Valve opener can be supplied with safe closing of valve before opening it by a preset number of rotations

Your safety

- All valve openers and closers are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All valve openers and closers designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

THERMOSEALING MACHINES

Kosan Crisplant's thermosealing machines are designed for safe and efficient shrinking of thermoplast caps or sleeves around LPG cylinder valves.

- Sealed valves are protected and safe valves
- Logo can be printed on the seal
- Sealed valves are a guarantee for correct cylinder net weight
- Cylinders with sealed valves are filled by authorised fillers

Your benefits

- Satisfied end-users due to safe and correctly filled cylinders
- Image building as regards quality and safety
- Visual difference between empty and filled cylinders
- Sealing of most valve and cylinder types
- Electricity savings; automatics ensure limited use of full power
- Integrated automatics protect against overheating

The fully automatic SMS thermosealing machine, which shrinks seals by means of water steam, is designed for installation in a chain conveyor

Your possibilities

- Shrinkage by means of water steam or hot air
- Manual, semiautomatic or automatic solution
- Installation as stand-alone unit or in-line in conveyor
- With in-line conveyor the process can be fully automatic
- For fixed cylinder height or manually height adjustable
- Sealing of valves with hard caps
- Ex-proof steam generator for installation in hazardous area when shrinking with water steam
- Separate seal application system for manual or automatic application of shrinkable caps or sleeves

The pneumatic manually operated SMS thermosealing machine, which shrinks seals by means of water steam, is designed for stationary installation on floor by e.g. a chain conveyor or a roller conveyor

The fully automatic SMA thermosealing machine, which shrinks seals by means of hot air, is designed for installation in a chain conveyor

Your safety

- All thermosealing machines are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All thermosealing machines are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

SEAL APPLICATION SYSTEMS

Kosan Crisplant's seal application systems are designed for application of all kinds of shrinkable seals on LPG cylinder valves.

- Sealing of both centre valves and screw valves
- Sealed valves are protected and safe valves
- Automatic application of shrinkable seals or caps
- High capacity
- Minimum space requirements

Your benefits

- Savings on manpower
- Avoid one-sided repeated work
- Automatic feeding of shrinkable seals from buffer storage

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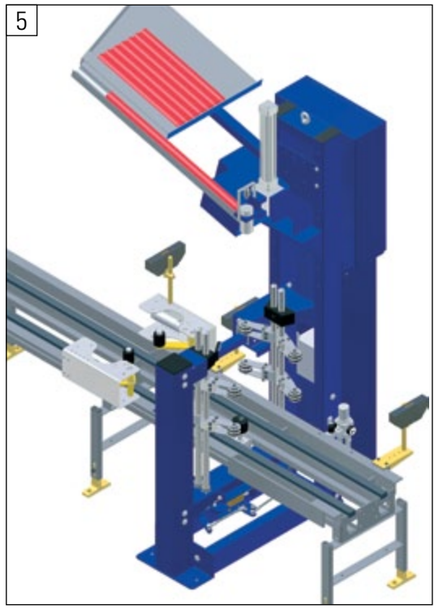

Fully automatic cap applicator

Fully automatic sleeve applicator

6


7


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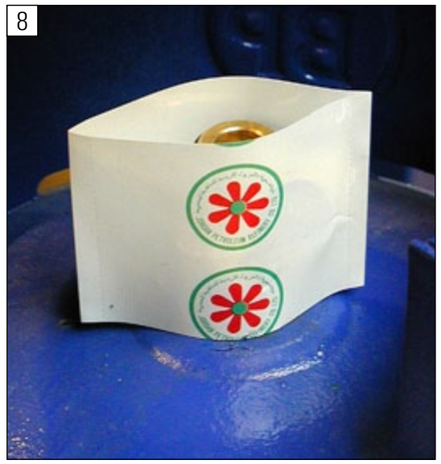


- Integrated control and supervision unit initiates stop when buffer storage is empty
- Uniform application of shrinkable seals
- No human errors

Your possibilities

- In-line installation in standard chain conveyor systems
- Supply of hard caps with gas-tight sealing
- Installation of thermosealing machine right after seal application system
- Supply of shrinkable sleeves in rolls with automatic cut off
- Supply of shrinkable caps in sticks
- Supply of hard caps in bulk

9

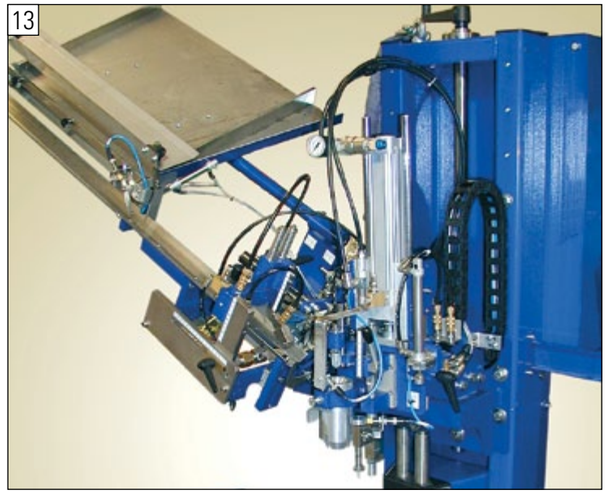

10


11


12


Examples of shrinkable caps

Fully automatic cap applicator

13


Your safety

- All seal application systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All seal application systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

WASHING SYSTEMS

1

Example of Kosan Crisplant's stainless washing system with washing section and blow-off section

Kosan Crisplant's washing systems specially designed for LPG cylinders are developed in cooperation with leading suppliers of industrial washing machines. The washing systems are highly efficient and ensure optimal cleaning of the cylinders.

- The most efficient washing systems on the market
- Hot water washing with soap
- Extension of the cylinders' life cycle
- End users perceive clean cylinders as safe cylinders
- Clean cylinders lead to increased sales

Your benefits

- All kinds of dirt and grease is removed from the cylinders
- Thorough washing of cylinders due to optimal location of nozzles and rotation of cylinders
- Cylinders are dried immediately after washing thanks to a surface-active agent and efficient water blow-off
- Minimum water consumption thanks to recirculation of water and optimal water blow-off
- Minimize corrosive action on the cylinder surface
- Easy cleaning of filters

A piping system with fitted nozzles is installed on the inner side of the washing tunnel. The piping system as well as the placement of the nozzles is adapted to the relevant cylinder type(s), which ensures an optimal washing result.

2

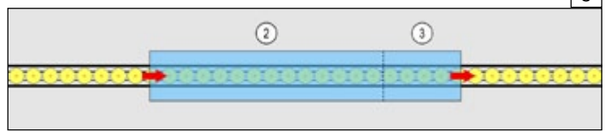
Your possibilities

- Modular washing tunnel with various processes
- Water tanks with heating elements
- Water tanks with filters
- Rinsing section
- Blow-off section
- Machines for various cylinder heights

Your safety

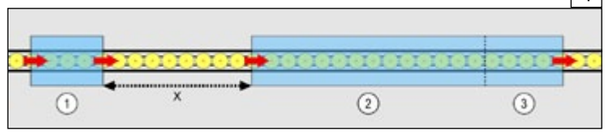
- All washing systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All washing systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

3

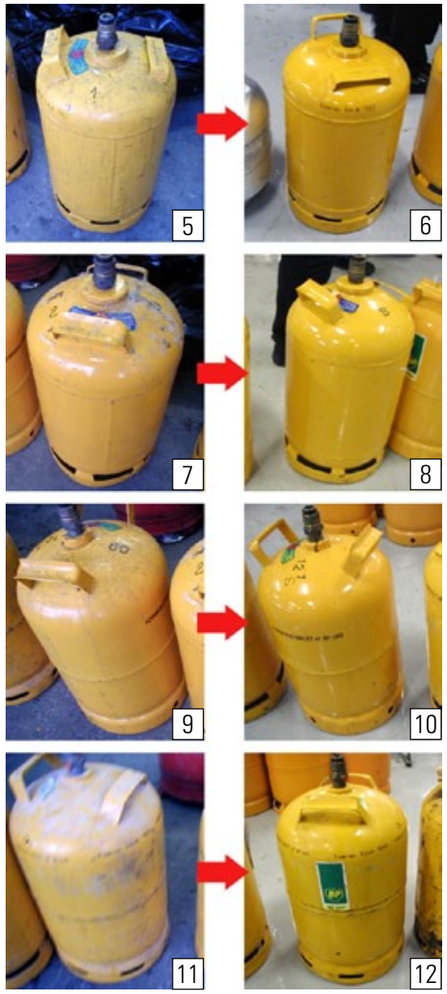


Kosan Crisplant's standard washing systems consist of a washing section (2) for washing and rinsing of cylinders by means of temperate soapy water, as well as a blow-off section (3) for blowing off excess water of cylinders

4



In case of particularly dirty cylinders a soap application section can be installed (1) before the washing section. The X distance depends on the time necessary for the soap mixture to dissolve the dirt on the cylinders before rinsing in the washing section (2).



The above series of pictures illustrates cylinders, which have been washed one time in a standard washing system

All filters in the washing system are easily accessible and can be cleaned easily and rapidly

13

Ex-proof motor for water pump

14

15

The integrated heating elements ensure that the soap water has the right temperature

LPG PIPING SYSTEMS

Kosan Crisplant's LPG piping systems are designed for supply of LPG to both filling machines and evacuation systems.

- 50 years' experience with design of LPG piping systems
- Dimensioning and supply of complete LPG piping systems
- We only use internationally acknowledged suppliers of components
- Maximum safety
- Competitive prices
- Future-oriented solutions with possibilities of expansion

1

2

3

4

Your benefits

- Clear vendor/client interface
- Constant filling pressure ensured
- Homogenous basis for dimensioning and design
- Unambiguous colour code on pipes
- Full supply including all necessary pipe fittings, bolts and gaskets
- Long life cycle
- Minimum maintenance

Your possibilities

- Engineering, projecting and documentation
- Differential pressure valves
- Pressure relief valves
- Connections by means of flanges or welded pipes
- LPG pumps
- LPG compressors
- LPG filters
- Manometers
- Gas stop valves
- Blow-off valves
- Ball valves
- Hydraulic quick-closing valves
- Protection against dry running
- Y-strainers
- By-pass valves
- Non-return valves
- Loading and unloading hoses
- Hose couplings
- Mass flowmeters
- Flowmeters

5

6

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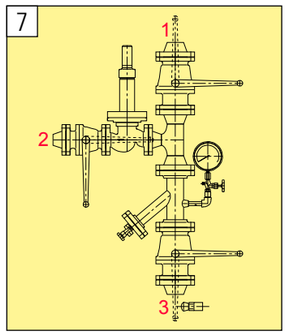


Example of a pressure regulation arrangement used to maintain the desired constant filling pressure in an LPG filling system

Supply line from LPG pump (1)
Return line to storage tank (2)
Supply line to filling system (3)

Your safety

- LPG pipe engineering according to all known international norms
- All LPG piping systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

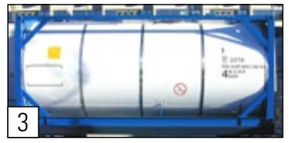
TANK YARD EQUIPMENT

Kosan Crisplant's tank yard equipment is an optimal solution for LPG storage. We supply complete systems dimensioned according to any recognized international standard.

- 50 years' experience with supply of tank yard equipment
- Maximum safety
- Competitive prices
- Future-oriented solutions with possibilities of expansion
- We only use internationally recognized suppliers of components


1 *Cylindrical tanks*


2 *Spherical tank*


3 *ISO tank 20"*


4 *LPG pump installation*

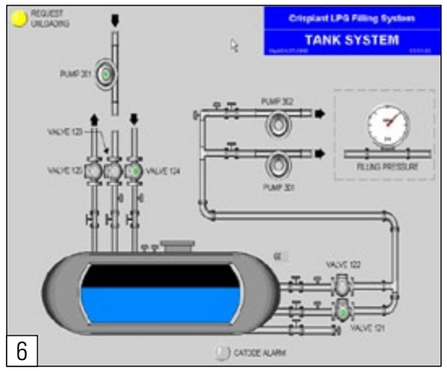

5 *Mounded tank*

Your benefits

- Complete equipment for tank yards including safety equipment, measuring and control equipment as well as operating equipment and shut-off valves
- Equipment with long life cycle
- Minimum maintenance
- Homogenous basis for dimensioning and design
- Clear supply interface

Your possibilities

- Spherical tanks
- Cylindrical tanks
- Mounded tanks
- Tank supervision systems
- Pump and compressor equipment
- Loading and unloading points for road tankers, rail tank wagons and ships



6 *Kosan Crisplant's tank supervision system gives complete overview of the tank yard and can be adapted to any need. The valve overview indicates present status for all valves and the tank overview lists all information about pressure, temperature and filling degree for each tank.*


7 *Road tanker loading and unloading point*

Your safety

- All tank yard equipment is EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All tank yard equipment is designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

FIRE WATER SYSTEMS

Kosan Crisplant supplies complete and efficient fire water systems for LPG filling plants, dimensioned according to international standards.

- 50 years' experience in design of fire water systems
- Maximum safety
- Competitive prices
- We only use internationally recognized suppliers of components

Your benefits

- Fire water systems with long life cycle
- Minimum maintenance
- Homogenous basis for dimensioning and design
- Future oriented solutions with possibilities of expansion
- Clear supply interface

Fire water pump system

Fire water system on cylindrical LPG storage tank

Test of fire water system on spherical LPG storage tank

Your possibilities

- Electrically driven or diesel-powered fire water pump systems
- Jockey pumps
- Fire water tanks
- Sprinkler systems for filling plants, tanks, loading points, pumping stations etc.
- Sprinkler systems for water curtains or for coverage of total areas
- Cooling systems for spherical tanks
- Deluge sets
- Dry chemical extinguishers and other equipment
- Integration with alarm systems and direct alarm to fire departments

Your safety

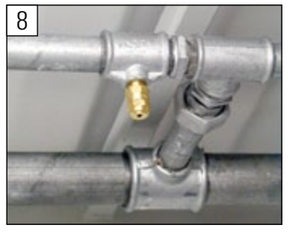
- All fire water systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All fire water systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

Diesel-powered fire water pump

Water canon test

Fire water tank and fire pump house

Sprinkler system integrated in container filling plant



Sprinkler system at road tanker loading and unloading point

CUC POWER AND DATA NETWORK

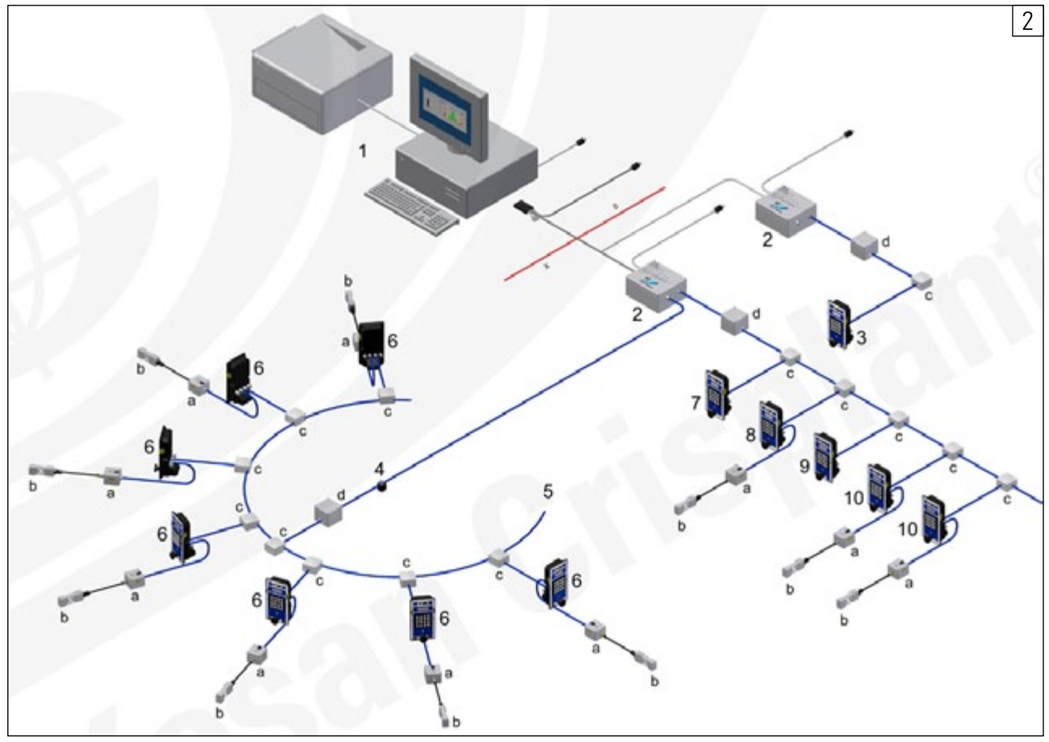
Kosan Crisplant's CUC power and data network is designed for intrinsically safe power supply to CUC controlled machines and for data communication between CUC controlled machines.

- 100% intrinsically safe network approved for hazardous area
- Network communication between machines without PC intervention
- Total protection and isolation of intrinsically safe network via CPI-Ex power supply
- High safety thanks to intrinsically safe network, all cables can be broken without any risk

1

Example of CUC configuration

2



1 PC system (hardware and software)
2 Ex-proof CPI-Ex power supply
3 HMI/CUC controller for palletizer
4 Slip ring
5 Carrousel filling system
6 HMI/CUC controller for UFM filling machine installed on filling carrousel
7 HMI/CUC controller for introduction at filling carrousel
8 HMI/CUC controller for ejection at filling carrousel and for ECS check scale
9 HMI/CUC controller for leak detector
10 HMI/CUC controller for stationary UFM filling machine
a Load cell module
b Load cell
c T-connector
d Connection box
S Non-hazardous area
X Hazardous area

3

Kosan Crisplant's HMI/CUC controller

Your benefits

- Low installations costs
- Simple cables and connections
- Easy cabling - power and data in the same cable
- Every HMI/CUC controller can control any machine in the network
- Software for different machine functions is already installed on HMI/CUC controllers
- Few components to be kept in stock thanks to uniform components
- Built-in transient protection in CPI-Ex power supply with protection against excess voltage
- Variation in input signal to CPI-Ex power supply between 85 and 264 VAC/ 47 and 63 Hz
- Easy expansion of and communication between parallel network

Your possibilities

- CPI-Ex power supply approved for installation in hazardous area
- Parallel use of several CPI-Ex power supplies
- HMI/CUC controllers available with different I/O configurations, up to 16 outputs and 32 inputs
- UPS (Uninterruptible Power Supply) to the PC and the CPI-Ex power supply in order to ensure correct close-down of PC and to secure data of ongoing filling
- Installation of PC in non-hazardous area up to 500 meters from filling hall
- One PC can collect and handle data from up to 10 carrousel systems simultaneously

Your safety

- All equipment and machines in the network are EU approved and designed in accordance with current EU directives EN 50014, EN 50020, EN 50081, EN 50082, EN 55022, incl. the ATEX Directive (94/9/EC)
- All equipment and machines in the network are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

4

5

Kosan Crisplant's CPI-Ex for supply of power and data to intrinsically safe network

6

Complete PC system including standard software and Kosan Crisplant software for collection and handling of data

PRODUCTION DATA MANAGEMENT SYSTEM

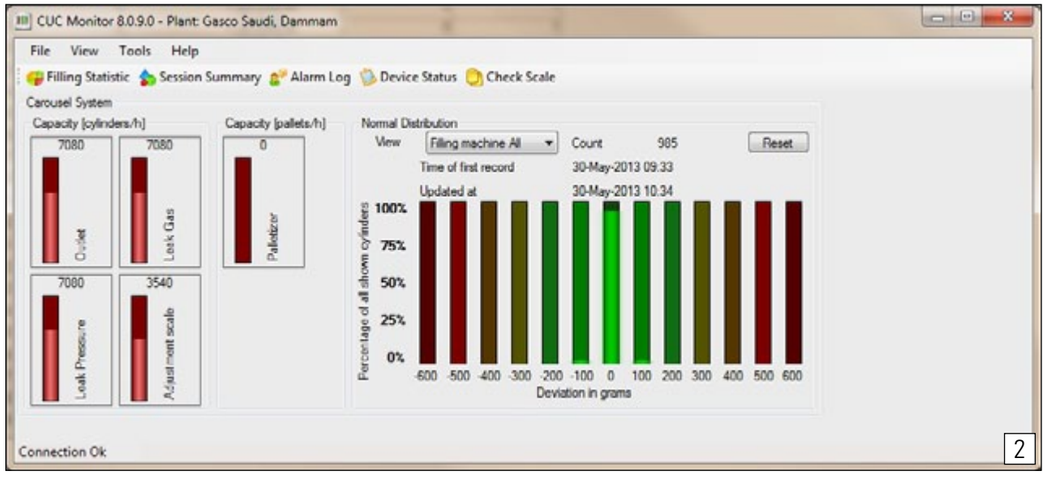
Kosan Crisplant's Production Data Management System collects data from filling process machines controlled by the HMI/CUC controller. The data is monitored and serves as a basis for reports concerning the filling process.

- Automatic collection of all important production data
- High safety level due to production surveillance
- Effective tools for viewing and analysing production data
- PC monitoring of real time production status
- Report statistics for filling hall production overview
- Easy identification of maintenance and adjustments needs
- Ready for direct connection to existing CUC network

1

Kosan Crisplant's HMI/CUC controller

Graphic display of total filling capacity and filling accuracy



2

3

Complete PC system including standard software and Kosan Crisplant software

Your benefits

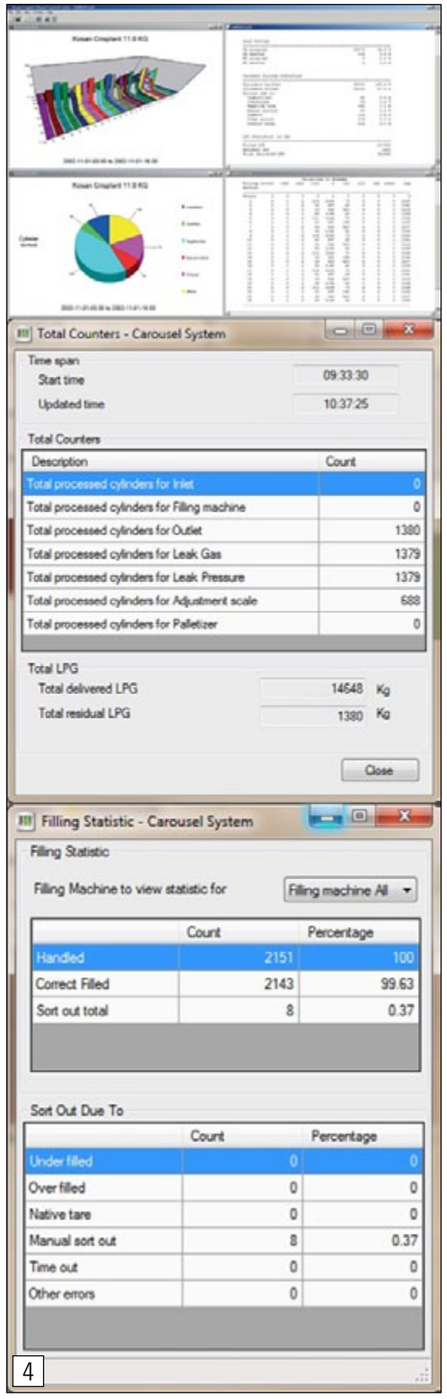
- Analysis of both single machine capacity and filling plant capacity
- Overview of production interruptions and of development in filling capacity
- Analysis of single machine filling accuracy and adjustment need
- Survey of total production filling accuracy
- Review of cylinders rejected at check scales and leak detectors
- Reports per cylinder type and for given time periods
- On-line supervision of all HMI/CUC controllers including alarm log and status overview
- Elaboration of presentation graphs on the basis of report data
- Efficient data storage and search in database
- Disaster recovery incl. quick re-installation of PC in case of crashing

Your possibilities

- Installation of PC in non-hazardous area up to 500 meters from filling hall
- One PC can collect and handle data from up to 10 carrousel filling systems simultaneously
- Update of software via modem
- Standard high-quality PC with DVD-RW drive, keyboard, mouse, flat screen, and colour printer
- Standard software (e.g. Microsoft Windows, SQL database, etc.)
- Kosan Crisplant software (CUC Monitor, RCC Reports)

Your safety

- Hardware and software according to international standards



4

Various displays

ELECTRICAL EQUIPMENT

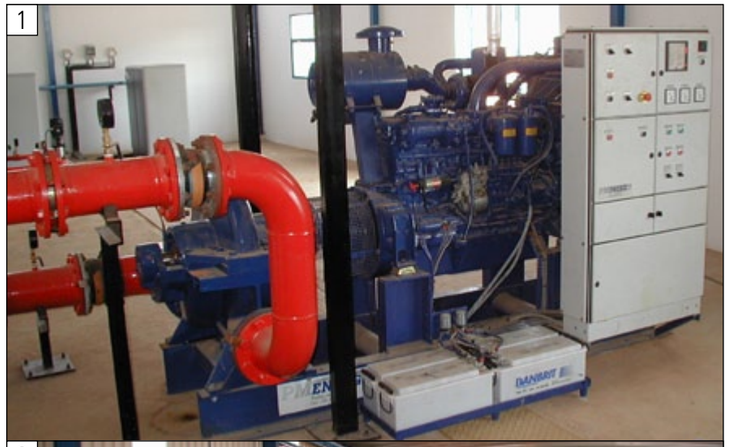
The purpose of Kosan Crisplant's range of electrical equipment is to obtain safe and optimal operation of complete filling plants.

- 50 years experience with electrical engineering in hazardous areas
- Future-oriented electrical solutions capable of improvement
- Ex-proof components according to European norms
- Our suppliers are all internationally approved and certified
- Competitive prices

Your benefits

- Kosan Crisplant can supply an integrated system solution including both filling equipment and electrical equipment
- An integrated system solution provides you with a simple interface, optimal safety and easy-to-operate filling halls
- Kosan Crisplant provides after-sales service on both filling equipment and electrical equipment

1



2

Electrical installation (in non-hazardous area) for firewater pump system

3

Ex-proof power panel

4

Power panel for non-hazardous area

5

Pole with start/stop switches and emergency stop switch

6

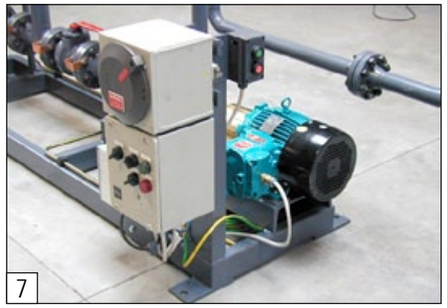
Ex-proof power panel including all switches (main switch, start/stop switch, lighting switch, emergency stop switch, etc.)

- Ex-proof certificates supplied with machines for your safety

Your possibilities

- Engineering, projecting and documentation
- Main switchboards and secondary switchboards in non-hazardous area and hazardous area
- Ex-proof start/stop switches
- Emergency stop systems including switches
- Local power supply (generator)
- Emergency power plant (generator) with manual or automatic switching on
- Earthing including equipotential bonding and earthing rod
- Machine protection
- Cabling, cables, cable trays
- Lighting in buildings
- Outdoor lighting, lamp poles in tank yard, drive ways etc.

7



Ex-proof power panel for LPG pump unit

- Sirens
- Lightning protection
- Fire/gas alarm systems
- Firewater installation

Your safety

- Electrical engineering according to all known international norms
- All ex-proof electrical equipment is designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

8

Kosan Crisplant's CPI-Ex for supply of power and data to intrinsically safe network

9

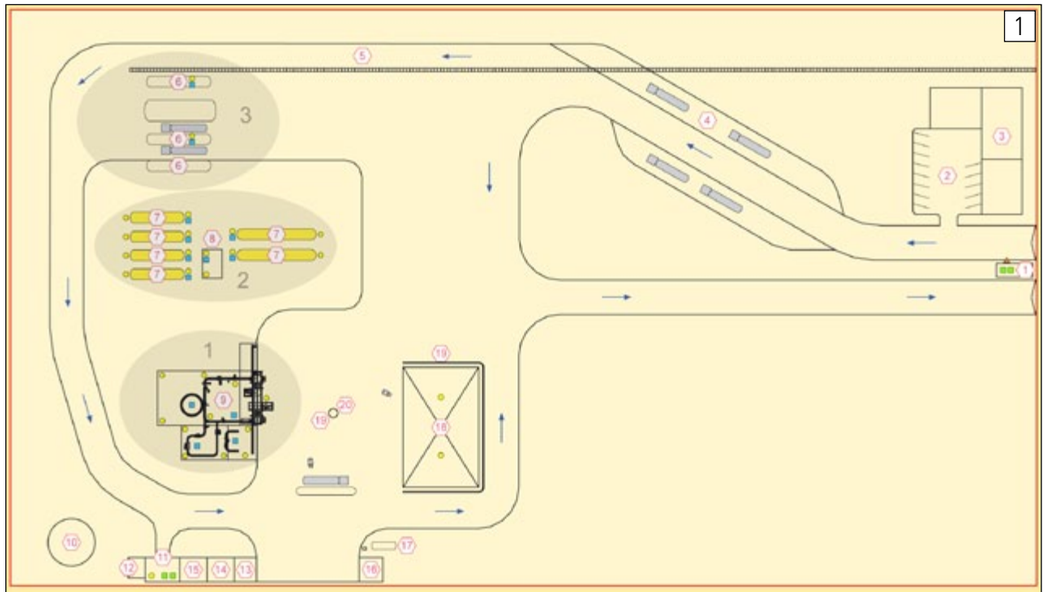
Example of lighting

FIRE AND GAS ALARM SYSTEMS

Kosan Crisplant's fire and gas alarm systems are simple and efficient modular systems which provide maximum safety and meet any requirement for gas and fire detection.

- Remote control panel
- Audio and/or visual alarm
- Visual alarm overview on control panel
- Minimal maintenance
- Detectors designed for harsh industrial environments

Basic layout for installation of a fire and gas alarm system in connection with an LPG filling plant



- Gas detector
- Fire detector
- Control panel
- Fire alarm sirene

Examples of fire zones

1 Gate house
2 Parking area
3 Administration building
4 Parking area for trucks
5 Railroad
6 Loading points
7 Storage tanks
8 Pump house
9 Filling hall
10 Fire water tank
11 Pump house
12 Air compressor room
13 Workshop
14 Changing room for the personnel
15 Switchboard room
16 Emergency generator
17 Diesel tank
18 Storage for filled/ empty cylinders
19 Kerbstone
20 Lighting pole

Your benefits

- Built-in battery back-up
- Easy integration with existing equipment
- Simple and easy calibration
- Detectors can be checked from control panel

Example of fire detector

Gas detector at loading and unloading point for rail tank wagons

Examples of gas detectors

Examples of gas monitors

Your possibilities

- Flexible output options
- Direct alarm to fire departments in the event of fire
- Detectors can be placed anywhere at the filling plant
- Preset actions for alarm situations, e.g. stop of LPG pumps
- Alarms can be set for rising and falling gas levels

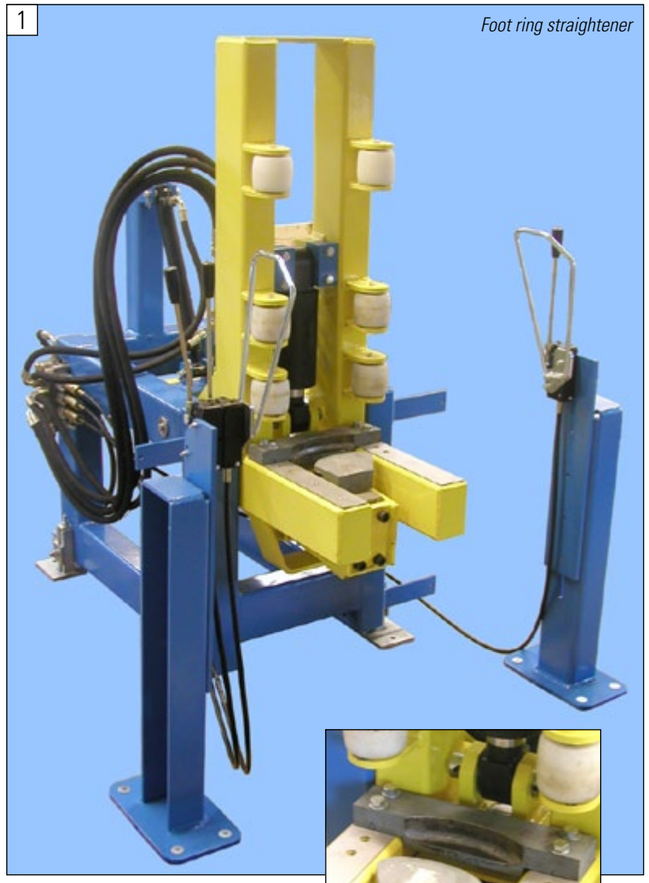
Your safety

- All fire and gas alarm systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All fire and gas alarm systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

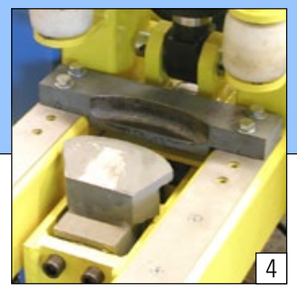
SHROUD AND FOOT RING STRAIGHTENERS

Kosan Crisplant's shroud and foot ring straighteners are designed for rapid, precise and safe repair of damaged shrouds and foot rings on LPG cylinders.

- Obtain nice-looking cylinders with high market value
- Avoid accumulation of damaged cylinders in the filling hall
- Avoid production stops and breakdown because of damaged shrouds and foot rings
- Ex-proof equipment for installation directly in filling hall
- Delivered ready for use


1 *Foot ring straightener*


2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3

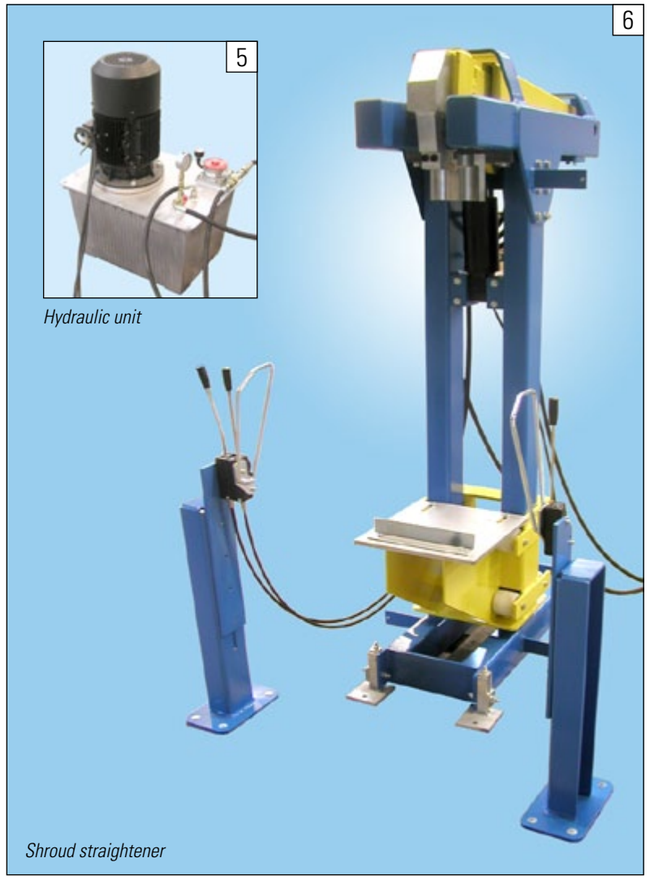
Your benefits

- Easy operation
- Semi-automatic process
- Integrated safety device for maximum operator safety
- Complete delivery including hydraulic unit
- Rapid and easy replacement of straightening tools

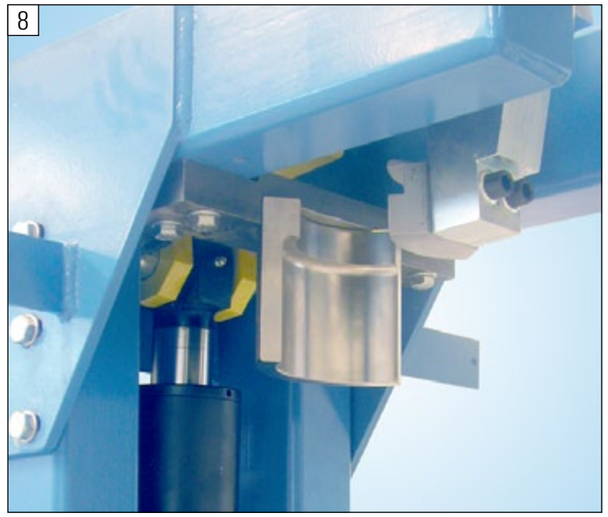
Your possibilities

- Shroud and foot ring straighteners can be supplied as individual machines or together
- Supply of tailor-made straightening tools for any shroud and foot ring diameter
- Each straightening tool can be used for shrouds and foot rings with a 10 mm variation in diameter
- Supply of extra straightening tools
- Hydraulic unit for operation of one machine at a time, or for operation of both machines simultaneously

5 *Hydraulic unit*


6 *Shroud straightener*


7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Your safety

- All shroud and foot ring straighteners are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All shroud and foot ring straighteners are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

PRESSURE TESTING EQUIPMENT

Kosan Crisplant's pressure testing equipment is designed for rapid and safe pressure testing of LPG cylinders. Pressure testing is a part of the general requalification and testing procedure.

- Pressure tested cylinders are safe cylinders
- Flexible solutions which meet any requirement
- High capacity up to 450 cylinders per hour
- Variable test pressure up to 45 bar

Your benefits

- Stand-alone racks can be installed directly in the filling hall
- Visual inspection of the total cylinder surface
- Recirculation of water means low water consumption

1

PTU pressure testing unit for industrial cylinders

2

PTC pressure testing carrousel for domestic cylinders

- The test period can be varied
- High safety thanks to the use of water as pressure medium
- High filling/evacuation speed

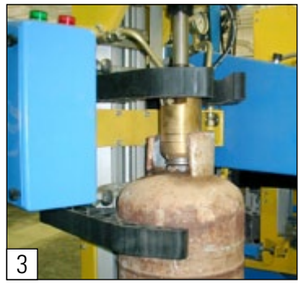
Your possibilities

- Carrousel system with up to 20 pressure testing units for domestic cylinders
- Pressure testing unit for carrousel with manual or automatic horizontal rotation
- Pressure testing unit for carrousel for one cylinder size or manually height adjustable
- Stand-alone pressure testing rack for 5 or 10 domestic cylinders
- Stand-alone pressure testing rack for one cylinder size or manually height adjustable
- Stand-alone pressure testing rack for one cylinder size, manually height adjustable, for industrial cylinders and domestic cylinders
- Pump unit (low pressure/high pressure pump) incl. water tank with a volume of 1,000 or 2,000 litres
- Carrousel solution with integrated pump unit and water tank
- Pressure test heads with integrated immersion pipe
- Immersions pipes for all cylinder flange types

Your safety

- All pressure testing equipment is EU approved and designed in accordance with current EU directives
- National/local approvals

3



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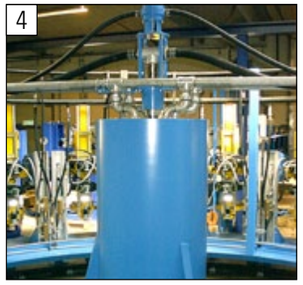


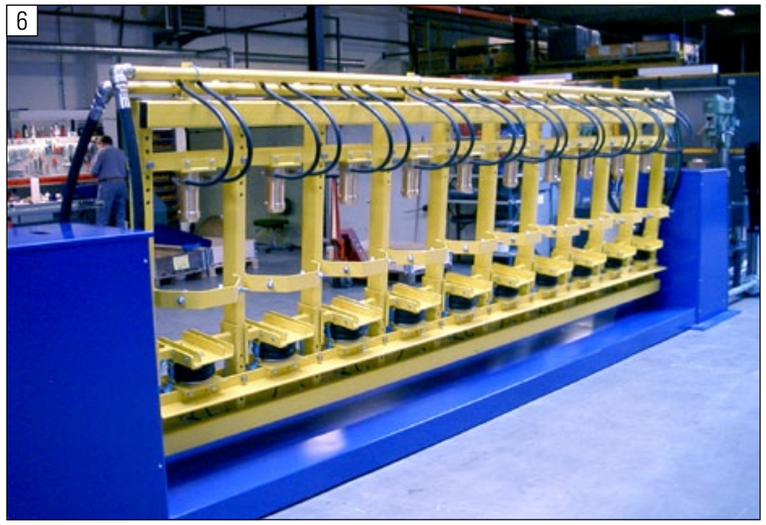
***Left**: Cylinder being pressure tested on a carrousel*

***Right**: WT-2500 water tank for pressure testing carrousel*

5

PTL-5 linear pressure testing rack for domestic cylinders

6



PTL-10 linear pressure testing rack for domestic cylinders

PURGING SYSTEMS

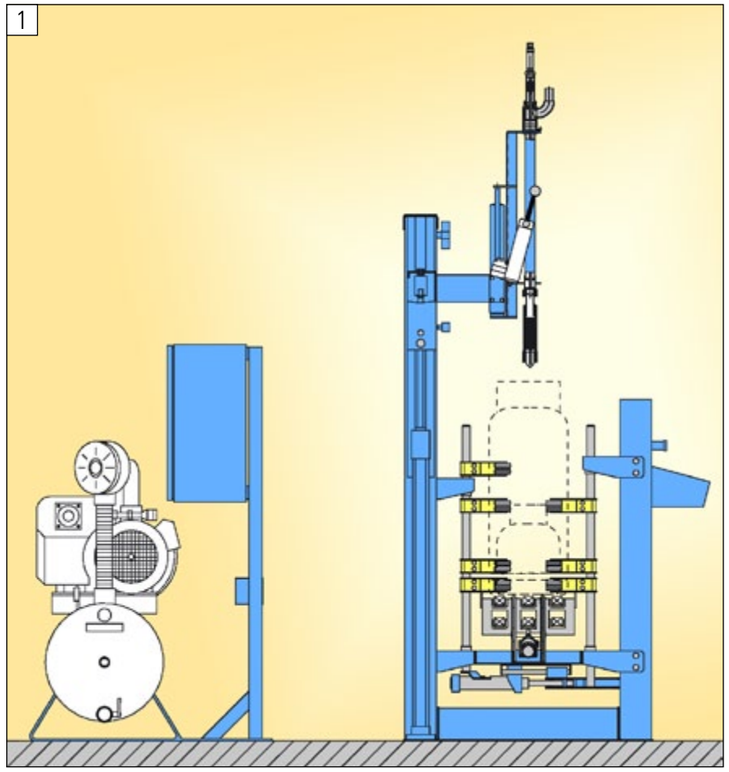
Kosan Crisplant's purging systems are designed for quick and safe replacement of atmospheric air in cylinders with LPG in vapour state. The process is applied on LPG cylinders without valves. Valves should be mounted right after the purging process.

- Avoid dangerous mix of LPG and atmospheric air in cylinders
- Filling speed at maximum level
- Avoid capacity reduction
- Controlled process: no dangerous aeration of cylinders after filling
- No aeration of cylinders when end-users start using them

Your benefits

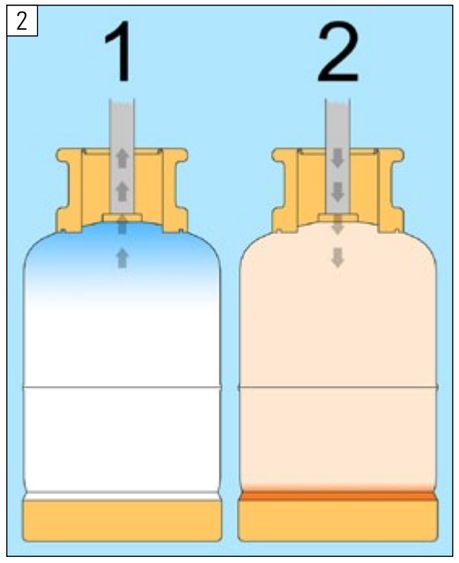
- High safety for end-users
- Easy to use manual purging unit
- The manual purging unit requires minimum space
- Minimum maintenance
- Flexible to all cylinder diameters and heights
- Easy installation in existing plants

1



Fully automatic purging unit

2

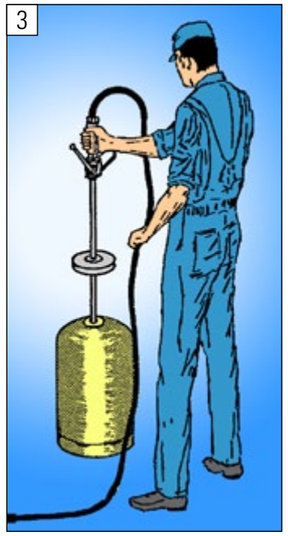


Fully automatic purging: the purging head is lowered upon and fitted tightly to the cylinder flange. The subsequent purging process includes two steps: first all atmospheric air is sucked out of the cylinder (1) and afterwards a predetermined quantity of gas is filled into the cylinder (2). The gas is dosed according to the cylinder volume in a quantity which makes the gas vapour settle at approximately the same level as the cylinder flange. In this way the cylinder is protected against unnecessary gas leaks.

Your possibilities

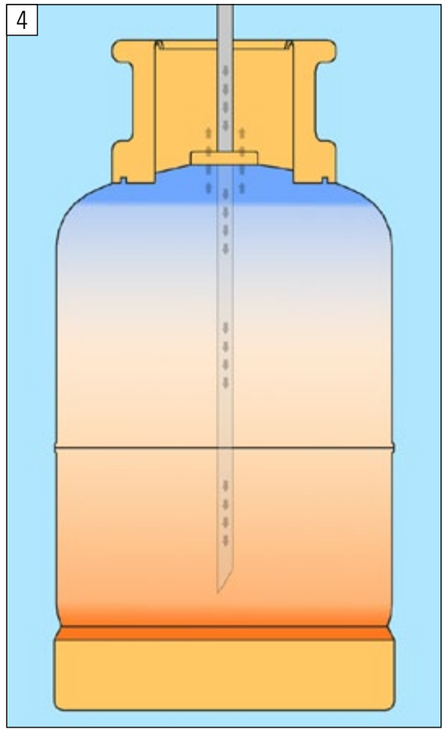
- Manuel, semiautomatic or automatic process
- Manual purging unit can be used as stand-alone unit or together with conveyor
- Automatic purging is integrated in chain conveyor
- Dozing of variable quantity of LPG depending on cylinder size
- Vacuum suction and/or gas dosing
- Automatics for control of cylinder flow with manual purging unit in-line in chain conveyor

3



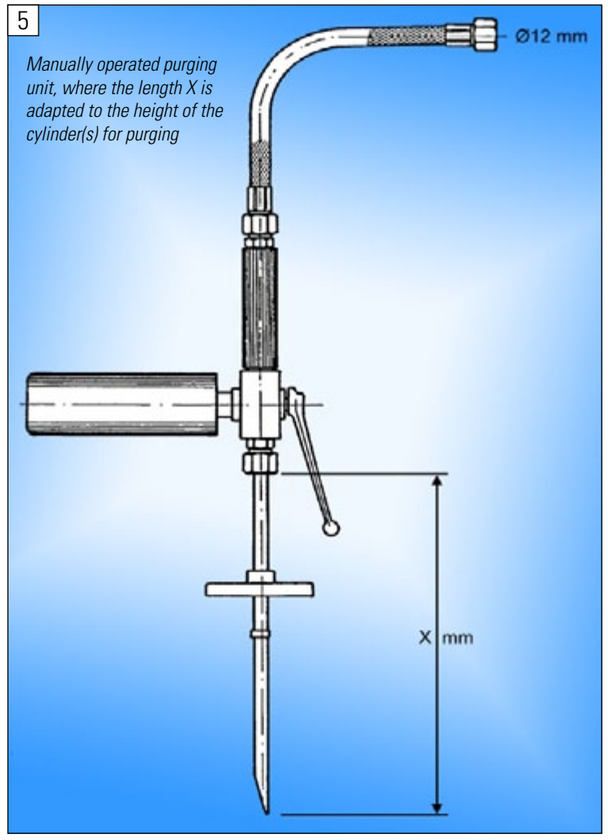
Manual purging

4



Manual purging: the operator inserts the purging unit into the cylinder all the way to the bottom. Afterwards, the operator fills a predetermined quantity of gas into the bottom of the cylinder, and the evaporated gas presses all atmospheric air out of the cylinder. The gas is dosed according to the cylinder volume in a quantity which makes the gas vapour settle at approximately the same level as the cylinder flange. In this way the cylinder is protected against unnecessary gas leaks.

5



Manually operated purging unit, where the length X is adapted to the height of the cylinder(s) for purging

Your safety

- All purging systems are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All purging systems are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

VALVE CHANGING MACHINE

Kosan Crisplant's valve changing machine is designed for quick and safe change of LPG cylinder valves.

- Quick and efficient screwing and unscrewing of valves
- Change of both centre valves and screw valves
- Special keys for all valve types
- Means to avoid accumulation of leaky and incorrectly filled cylinders
- Ex-proof design for installation directly in filling hall or maintenance hall

PVS valve changing machine for installation in chain conveyor

PVS valve changing machine for stationary installation on floor

The valve changing machine is easy and safe to operate

Each valve changing key can be fitted to the valve type in question (or possibly to the valve types in question)

Your benefits

- No need for hand tools
- Minimum cylinder handling with in-line chain conveyor
- Extra moment of rotation for positioning of screw valves according to cylinder shroud
- Quick change of special key when changing valves

Your possibilities

- Manual machine as stand-alone unit or in-line in roller conveyor
- Semiautomatic machine in-line in chain conveyor
- Available in different heights
- Available with manual height adjustment
- Ekstra equipment for dosing of thread paste and for cleaning of thread
- Extra control box for handling tall cylinders

Your safety

- All valve changing machines are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All valve changing machines are designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

EQUIPMENT FOR INTERNAL CLEANING AND INSPECTION OF LPG CYLINDERS

With Kosan Crisplant's equipment for internal cleaning and inspection of LPG cylinders you can perform efficient cleaning of LPG cylinders as well as visual control of the state of LPG cylinders after cleaning.

- Internal cleaning and inspection of LPG cylinders is part of the requalification procedure
- Requalification of LPG cylinders is important because of the cylinders' high value
- Internal cleaning and inspection of LPG cylinders is easy to perform while changing valve
- Internal cleaning of cylinders contributes to high safety
- Cylinders with long life cycle

Your benefits

- When cylinders are cleaned internally, the water used during the pressure testing process is clean
- Residue emptying device removes bad smelling slurry from cylinders
- Efficient high pressure cleaning with rotating nozzle
- Only little water is consumed during internal cylinder cleaning process
- Collection of slurry in closed container prevents obnoxious smells and environmental pollution

Equipment for internal inspection of LPG cylinders

1

2

Your possibilities

- Fully automatic cleaning equipment for installation in-line in chain conveyor
- Cleaning equipment can be supplied with pump unit and water tank
- Fully automatic water and slurry emptying device for installation in-line in chain conveyor
- Manual residue emptying device for installation in-line in chain conveyor or as stand alone unit
- Cleaning equipment and emptying device with 1,000 litre water tank with filter and pump unit
- Video equipment or simple inspection equipment with light source for manual internal cylinder inspection. Both solutions are available for installation in-line in chain conveyor or as stand alone units

Your safety

- All equipment for internal cleaning and inspection of LPG cylinders is EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- All equipment for internal cleaning and inspection of LPG cylinders is designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500
- National/local approvals

4

Equipment for internal inspection of LPG cylinders installed in-line in chain conveyor

Equipment for internal cleaning of LPG cylinders installed in-line in chain conveyor

5

3

Combined machine for internal cleaning of LPG cylinders with steam and suction of residual water and dissolved dirt. The illustrated machine is to be installed in-line in chain conveyor and can handle two types of cylinders with different heights.

6

MARKING OF LPG CYLINDERS

Kosan Crisplant's extensive programme of select equipment for marking of LPG cylinders offers all sorts of marking jobs including statutory safety instructions, commercial logos, guidelines for end-users and other promotion features. In addition, there is a series of options for individual marking of cylinders with data to be used in the filling and control processes (tare marking, process date etc.).

1

Example of ink-jet printed cylinder data as clear text

2

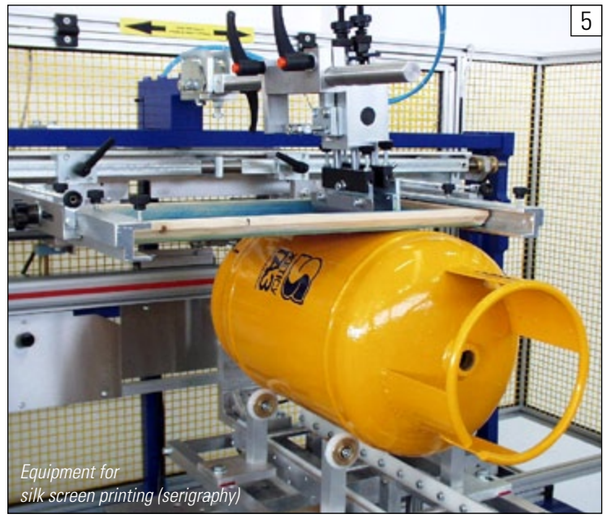
Example of ink-jet printed bar code

- Mark your cylinders with codes for automatic reading and automate the filling and control processes
- Observe statutory demands for marking of cylinders
- Use your cylinders for promotion displays
- Strong company profiling
- Safety instructions and general guidelines on your cylinders for end-users increase safety

4

3

Full-bodied cylinder sleeve application equipment



5

Equipment for silk screen printing (serigraphy)

Your benefits

- Equipment can be installed in existing plants
- Image building as regards quality and safety
- Clear marking of inspection date increases safety
- Clear tare marking reduces operational stops and ensures correct filling
- Automatic reading of process data (bar codes or electronic data carrier) increases capacity and reduces the number of human errors

6

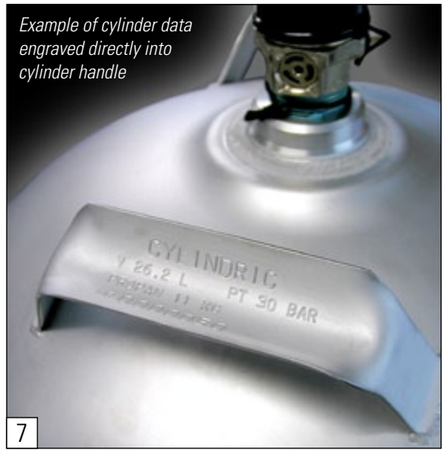
Example of cylinder spray painted through screen

8

Example of stickers on cylinders

Your possibilities

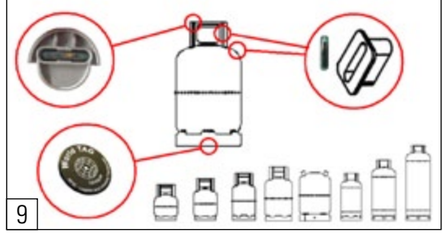
- Silk screen printing (serigraphy) or pad printing
- Brush or spray painting through screen
- Application of label or sticker
- Ink-jet printing of bar codes and/or clear text
- Application of plastic or cardboard disc around the cylinder valve
- Electronic data carrier in the shape of a chip
- Engraving or stamping of cylinder data directly into foot ring, shroud or valve bung
- Plastic sleeve around the cylinder body
- Bar codes and electronic data carriers can contain either individual data or a unique serial number that refers to a central database



7

Example of cylinder data engraved directly into cylinder handle

9 & 10 – Examples of cylinder tagging with electronic data carriers



9

10

11

Example of plastic disc around cylinder valve

Your safety

- All equipment for marking of LPG cylinders are EU approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC)
- National/local approvals

SURFACE TREATMENT OF LPG CYLINDERS

Manually operated powder paint gun

Spray booth for manual application of wet paint

Spray booth for automatic application and recovery of powder paint

Tunnel oven for drying after pre-treatment, curing/drying wet paint or curing powder paint

Dry-filter booth for wet painting

Automatic transfer of cylinders from chain conveyor system to overhead conveyor system

Overhead conveyor system

Fully automatic powder painting equipment

Kosan Crisplant's vast product line of equipment for surface treatment of LPG cylinders is a means to obtain high cylinder quality and long cylinder lifetime. Surface treatment, including cleaning and painting, is an important and natural part of the regular standard inspection procedure.

- Nice-looking cylinders have high market value
- End-users prefer newly painted cylinders
- Surface treatment extends cylinder lifetime
- Distributors and end-users treat newly painted cylinders with care

Your benefits

- A smooth unbroken cylinder surface can be cleaned easily
- Surface treatment protects against corrosion
- Kosan Crisplant only uses internationally recognized sub-suppliers
- Use manpower for cylinder maintenance in quiet periods
- Reduction in procurement of new cylinders

Your possibilities

There are three main methods for surface treatment of LPG cylinders:

1 Make-up wet painting in filling hall (hazardous area)

- In-line in chain conveyor
- Drying of cylinders on chain conveyor
- Operation can be manual or fully automatic

2 Wet painting in non-hazardous area

- Cylinders suspended in overhead conveyor
- Can be used in combination with shotblaster and drying oven
- Operation can be manual, semi-automatic or fully automatic

3 Powder painting in non-hazardous area

- Cylinders suspended in overhead conveyor
- Must be used in combination with shotblaster and drying oven
- Operation can be manual, semi-automatic or fully automatic

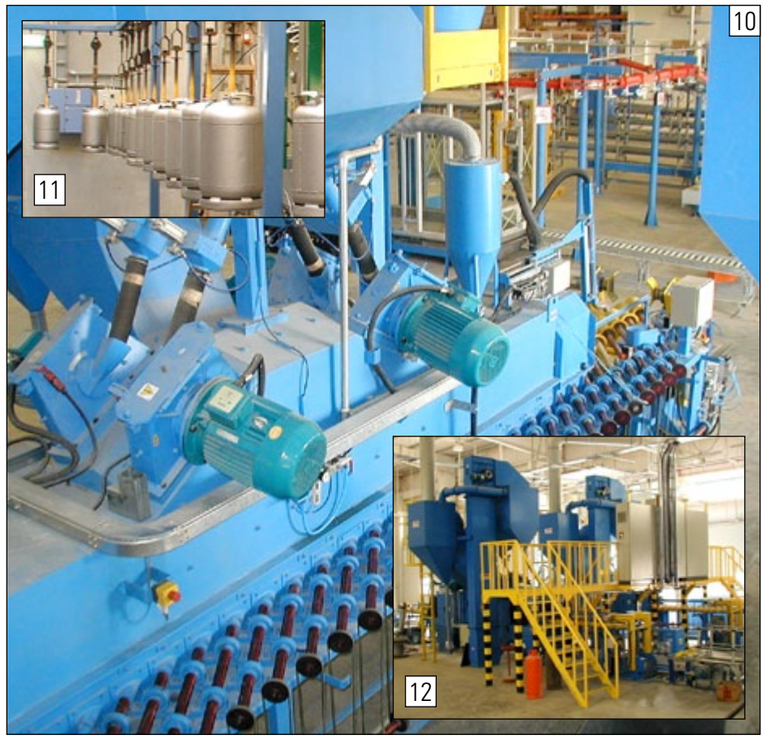
When using the above methods, the following equipment can be applied:

- Stand-alone cabins for shotblasting
- In-line shotblasting with automatic loading onto or unloading from chain conveyor
- Ovens for burning off old painting before shotblasting for obtaining the best possible starting point for new surface treatment
- Manual spray booths
- In-line wet painting booths
- Fully automatic powder painting plants with overhead conveyor system and loading onto or unloading from chain conveyor

Your safety

- All equipment for surface treatment of LPG cylinders is EU approved and designed in accordance with current EU directives
- National/local approvals

Shotblasting equipment with automatic loading and unloading of cylinders



HOT REPAIR OF LPG CYLINDERS

Kosan Crisplant offers a complete product line for hot repair of LPG cylinders that cannot be repaired by Kosan Crisplant's shroud or foot ring straighteners because of very deformed shrouds or foot rings. Kosan Crisplant's equipment for hot repair includes accessories for cutting and surface welding of shrouds and foot rings as well as equipment for normalizing LPG cylinders.

- Obtain nice looking cylinders with high market value
- Avoid production stops and breakdown because of damaged shrouds and foot rings
- Considerable savings thanks to less need of new cylinders
- Installation of complete working places for cutting and welding

Your benefits

- Minimum waste of cylinders thanks to reuse of intact cylinder bodies

1

Annealing furnace (630°C) including automatic loading/unloading system for cylinders and cooling section

2

Grinding tool for preparation of welding surfaces

3

Work place for straightening of dents by use of pressure, burner and hammer

- High filling hall capacity due to continuous production with no stops and breakdowns
- Minimum use of spare parts
- Minimum repair of filling hall equipment
- No accumulation of damaged cylinders in the filling hall
- We only use internationally recognized subsuppliers
- Use of manpower for cylinder maintenance in quiet periods

Your possibilities

- Vast product line from manual hand tools to automatic processing machines

4

5

Semi-automatic surface welding equipment

Cutting equipment

6

7

8

- Manual or semi-automatic process for cutting off shrouds and foot rings
- Various possibilities for cutting process, e.g. plasma cutting, ordinary flame cutting, hydraulic shearing-off or chiseling
- Grinding tool for preparation of welding surfaces
- Manual or semi-automatic surface welding of new shrouds and foot rings
- Normalizing furnaces (920ºC) or annealing furnaces (630ºC) for in-line continuous operation or solutions for stand-alone manual or semi-automatic operation
- Straightening of dents in cylinders by use of pressure, burner and hammer

Your safety

- All equipment for hot repair is EU approved and designed in accordance with current EU directives
- National/local approvals

OXYGEN AND NITROGEN PLANTS

With Kosan Crisplant's oxygen or nitrogen plants you can make money on the basis of atmospheric air. Install an oxygen or a nitrogen cylinder filling station and create a new business or secure your own supply of oxygen or nitrogen.

- Small mobile and prefabricated plants – plug & play
- The individual plant is for one product only
- Capacity according to customer needs
- Expand your business
- Ideal solution for fast entry to markets
- Small initial investment
- Competitive prices
- Already established network can be used for distribution of oxygen and nitrogen cylinders

Your benefits

- Fast pay-back time
- Security of supply
- High quality equipment
- Fast daily production start-up
- Easy to operate
- Minimum civil work and engineering
- Skid mounted plants for easy installation
- Only electricity is needed for operation of the plant
- Minimum space requirements
- Minimum and simple maintenance
- The plant can be made independent of external power supply (e.g. in rural areas)
- Integrated supervision and alarm system
- Monitoring system generates process information

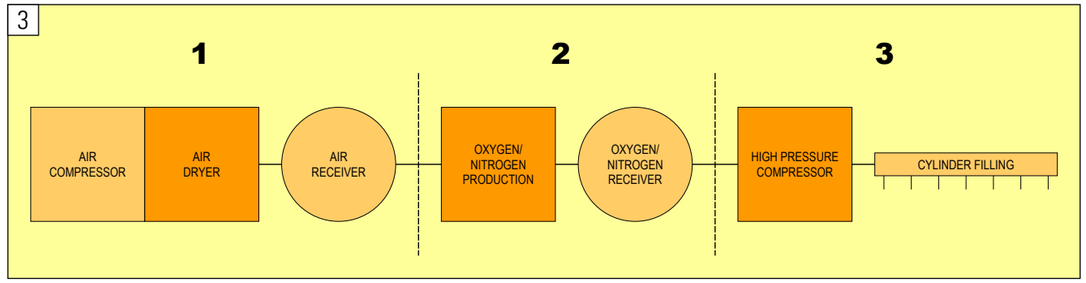
Your possibilities

Utilization areas for nitrogen:

- Cooling of foodstuffs; liquid nitrogen (-196°C) quickly cools down foodstuffs
- Filling of pipes with nitrogen before welding
- Rinsing in order to avoid oxidation

Oxygen plant
1

Nitrogen plant
2



Functional description
An oxygen/nitrogen plant may be devided into the following three basic processes or steps. All processes are executed simultaneously and continuously.

Step 1: Production of clean compressed atmospheric air
Step 2: Production of oxygen/nitrogen
Step 3: Storage and filling into cylinders

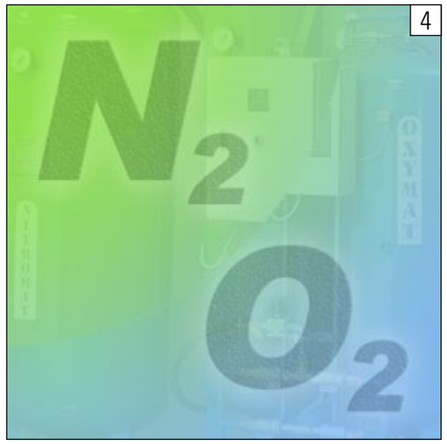
- To avoid oxidation of foodstuffs/biological material during storage
- To avoid rancidness of oil
- Cooling/congelation of the soil during ground work/sanitary and heating installations
- Pressure agent creation of overpressure in containers to avoid oxidation/corrosion
- To avoid carburization/annealing of steel during production of metal
- Production of glass – cooling of electrodes
- Anticorrosive
- High-pressure casting during production of tyres
- In the electronics industry – to create a different atmosphere during production of transistors, diodes etc.
- In the ammonia industry – during production of ammonia
- In the oil industry – for creation of pressure during drilling to force crude oil to move upwards
- Fluorescent tubes – the tube is filled with nitrogen
- Welding – used as welding gas with other types of gases

Utilization areas for oxygen:

- Combustion - creates higher temperatures than normal air
- Fermentation of foodstuffs
- Preserves the red colour of meat
- Inhibits micro-organisms in foodstuffs at a high concentration
- To avoid rancidness of oil
- Oxidation processes
- Production of paper
- pH control
- Oxidation of water - during breeding of fish
- Generation of ozone (waste water)
- Medical use

Your safety

- All oxygen and nitrogen plants are designed in accordance with current EU directives, incl. The Pressure Equipment Directive (97/23/EC)
- Kosan Crisplant has 50 years' experience as a global supplier of turnkey projects to the gas industry



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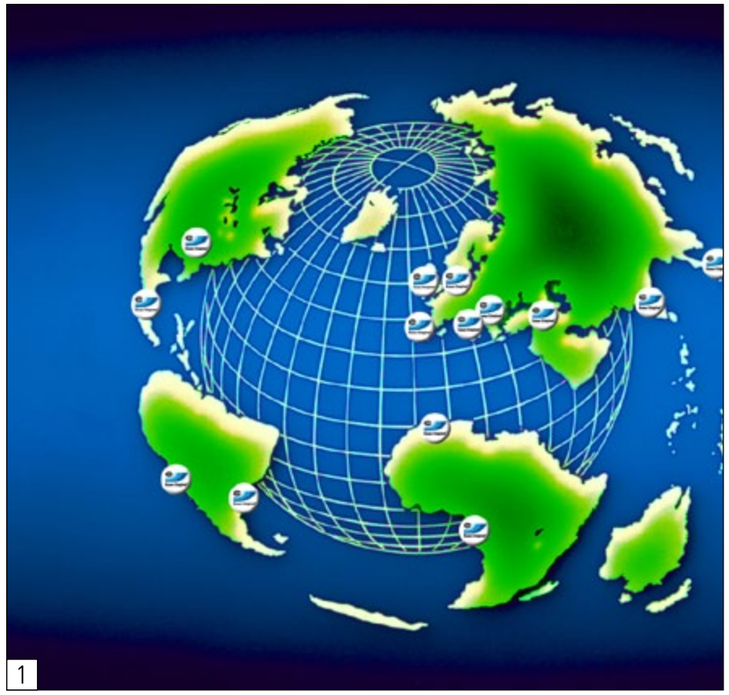
SERVICE AND TRAINING

Kosan Crisplant offers a wide range of service from many service points around the world. We can assist you with everything from machine repair to training of your personnel and how to expand your LPG business.

- Professional assistance from an experienced supplier with more than 50 years in the LPG business
- Equipment malfunctions are located and corrected, often before they become critical
- Continuous training of management, maintenance personnel and operators
- Thorough status check of the entire operation
- Improvement suggestions given by our experienced service supervisors
- Optimisation of the spare parts stock
- Prevention of emergency breakdowns
- Fine tuning of the filling equipment

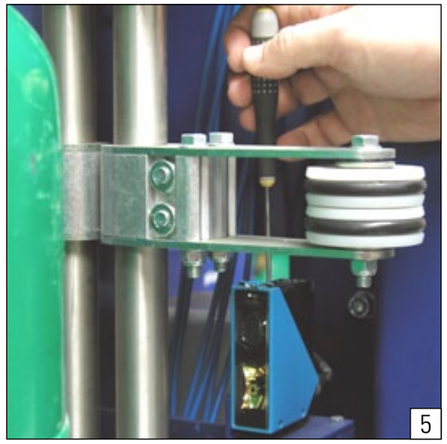


Kosan Crisplant service points

Your benefits

- One supplier who can assist you with everything related to the LPG business
- Be resourceful with skilled personnel
- Avoid costly production stops
- Less human errors
- Increase production output
- Reduce spare parts stock
- Improved safety
- Reduce gas giveaway
- Long service life of the equipment

Kosan Crisplant offers tailor-made training courses for e.g. operators, maintenance staff, technicians and plant managers



Your possibilities

- Flexible service - service when you want it and how you want it
- Service contracts, service tour or service on demand
- Warranty checks
- Telephone hotline around the clock
- Training of management, operators and maintenance personnel
- Service seminars
- Service on all types of LPG filling equipment and cylinder requalification equipment
- Stationing of Kosan Crisplant advisor

Your safety

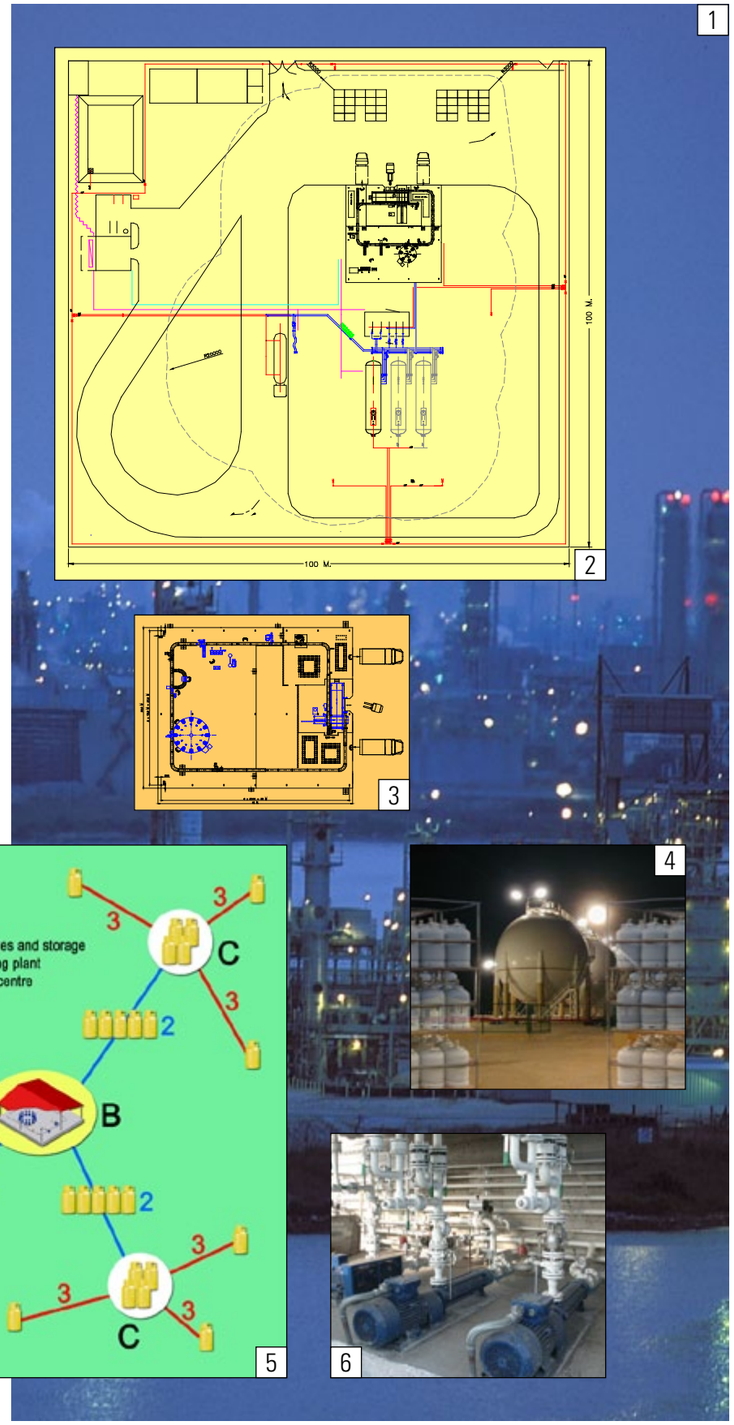
- Kosan Crisplant has been in the LPG business for more than 50 years and is most experienced in all aspects of this business
- All service personnel is skilled and professional

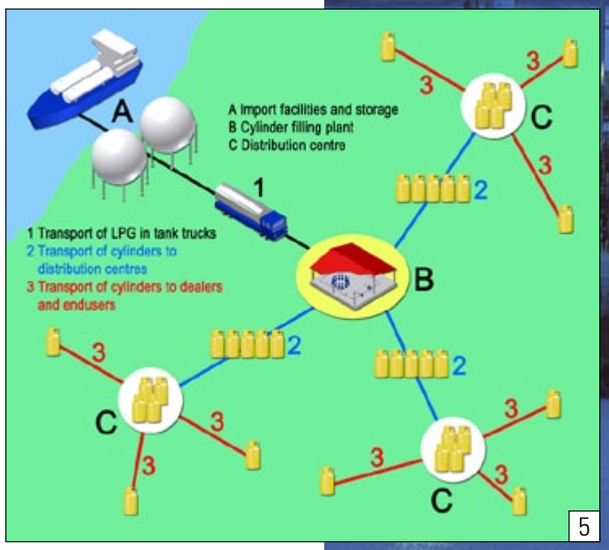
At your service – 24 hours a day, 7 days a week

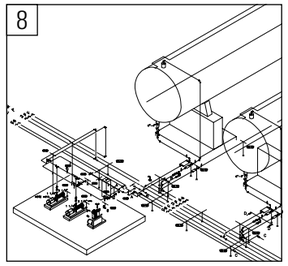
ENGINEERING

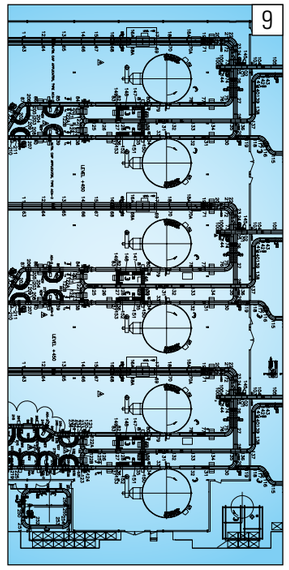
Kosan Crisplant's staff of experts makes calculations and dimensioning within all fields related to installation, extensioning, upgrading and renovation of filling plants, LPG storage facilities, distribution centres and maintenance plants. In addition our staff also elaborates market analyses, operational analyses and efficiency tasks for customers all over the world.

- Kosan Crisplant has more than 50 years' experience in engineering and analytic work
- Make use of Kosan Crisplant's extensive knowledge about the LPG business
- Tailor-made solutions
- No job is too small or too big for Kosan Crisplant – all jobs are exciting jobs









Your possibilities

- General layouts
- Layouts for filling plants
- Layouts for maintenance plants
- LPG pump and piping installations
- Fire water installations, incl. electric, diesel or gas driven pumps
- Compressed air installations
- Fire and gas alarm systems
- Complete tank yards for LPG storage
- Engineering of power supply
- Civil works
- Foundation drawings
- P & I diagrammes (piping and instruments)
- Provision of pressure test certificates, material certificates etc.
- Elaboration of market analyses
- Elaboration of operational analyses
- Elaboration of efficiency tasks
- Consultancy

Your safety

- Engineering according to all known international norms
- National/local approvals

Your benefits

- All engineering work delivered by one supplier
- Clear vendor/client interface
- Competitive prices
- Homogenous basis for dimensioning and design
- Future-oriented solutions
- Fully documented engineering job
- Layouts are elaborated on the basis of thorough logistical analyses

SUPERVISION OF INSTALLATION

Kosan Crisplant's staff of highly qualified technical field supervisors ensures a quick, safe and efficient installation, commissioning and handover of equipment and plant.

- Supervision of installation of the supplied equipment by local labour
- Technical guidance to meet customer expectations the best way possible
- Perfect control of the installation work ensures the shortest possible installation time
- Efficient communication between Kosan Crisplant and the customer
- Avoid errors in the installation work

Your benefits

- Relevant practical and theoretical training of the customer's staff and interpretation of manuals and spare parts lists
- Elaboration of progress reports on the installation work
- Efficient decisions on the spot
- Kosan Crisplant specifies the number and required skills for local labour
- Performance Test in connection with Handover


1


2

Your possibilities

- Possible use of supervisor team on large installation jobs
- Thorough going through of existing plant with recommendations regarding maintenance and safe operation of the equipment and plant
- Kosan Crisplant can supply manpower for the installation works
- Performance Test and fine tuning of equipment
- Mechanical erection and commissioning of all equipment within the fence
- Installation of electrical equipment
- Installation of PC systems for data collection and processing
- Installation and purging of tanks and piping system
- Installation of compressed air systems

Your safety

- All Kosan Crisplant field supervisors follow the guidelines laid down in the "Kosan Crisplant's Safety Regulations" - the Book on safety
- Highest possible safety level in the installation stage
- Supervision of installation will lead to safe functioning of equipment and plant


3

Our team of supervisors has all the necessary qualifications to get the job done; an advanced professional background, a thorough knowledge of our products and systems, a high sense of responsibility, flexibility and creative approach, and the ability to adapt to different conditions and cultures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In full operation as agreed at the agreed time


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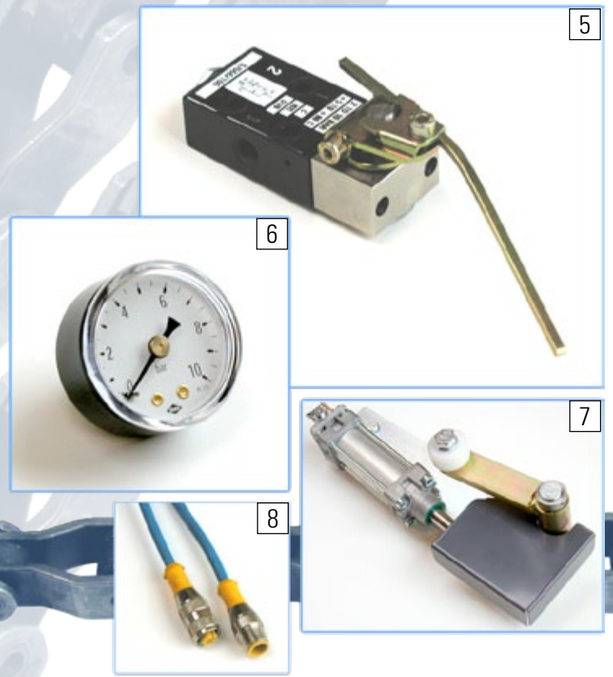
SPARE PARTS

Original Kosan Crisplant spare parts for filling equipment ensure long service life and continuous high production.

- Spare parts in compliance with original equipment standards
- Scheduled replacement of spare parts leads to high reliability in operation
- Spare parts in stock ensures immediate repair
- Kosan Crisplant's stock handling system provides full overview

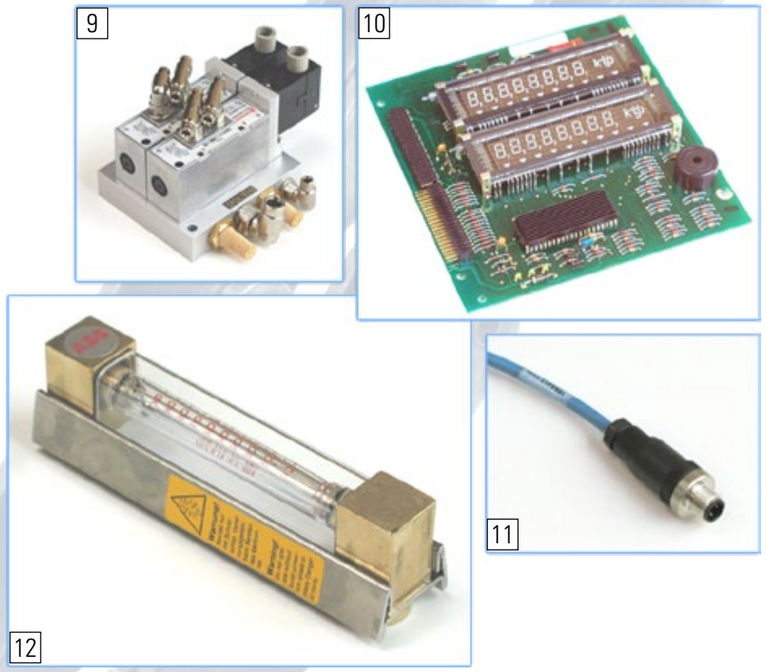


Your benefits

- Cost saving through repairing
- Minimization of down time
- Increase in production
- Regular maintenance preserves high quality of the equipment
- Scheduled maintenance minimizes number of emergency breakdowns

Your possibilities

- Replacement and repair of expensive and complicated components
- Spare part kits and overhaul kits available
- Ordering by phone/fax/e-mail
- Identification of item numbers by means of full technical documentation
- Keep only recommended spare parts in stock
- Kosan Crisplant's stock handling system to control the spare parts stock
- Access to experienced technicians 24 hours a day



At your service – 24 hours a day, 7 days a week

Your safety

- Spare parts of the same high quality as the original equipment
- You are assured of ten years' component supply at purchase of filling equipment

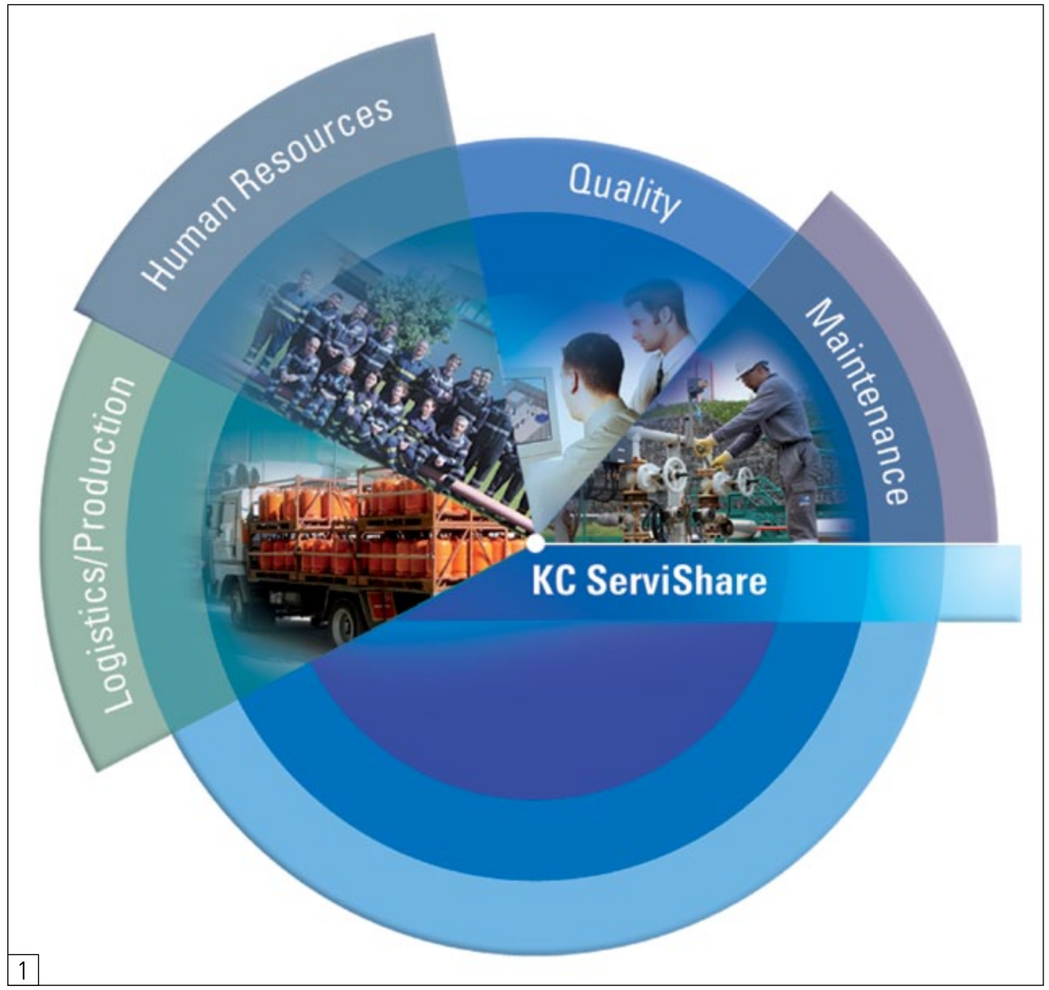
KC ServiShare

KC ServiShare is software designed to support management and operation of filling plants with regard to logistics, production and maintenance.

- Developed according to customer needs and KC's lifelong experience
- Flexible, customizable according to customer needs
- Easy to use and to maintain
- Powerful reporting tool
- Accessible through the internet
- Small investment

Your benefits

- Improved productivity
- Supplies an up-to-date knowledge base
- Centralizes all information
- Creates communication channels between all entities
- Can be integrated with other applications within the KC portfolio



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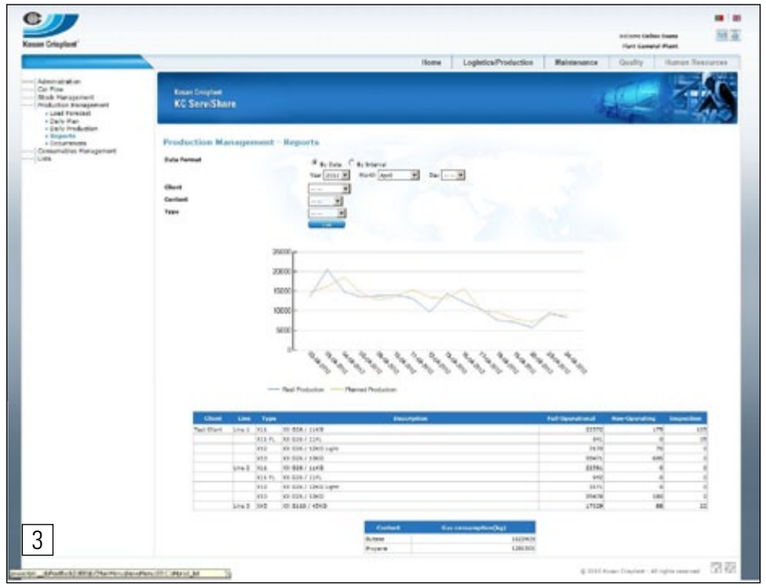
- Can be integrated with other ERP systems
- Global knowledge exchange

Your possibilities

- Manage corrective and preventive maintenance procedures
- Generate detailed maintenance/service reports
  - Corrective and preventive maintenance activities
  - Manpower allocation
  - Execution rates
- Manage spare parts stock
  - Track and use spare parts
  - Forecast spare parts consumption
  - Place spare parts orders with KC
  - Report consumption and needs
- Manage logistics and production
  - Keep track of the vehicles flow in the filling station
  - Plan and manage the daily cylinder production
  - Manage the cylinder stock within the filling plant
  - Report production figures

Your safety

- Support from the KC team
- Encrypted and secure web access
- Daily backup assured (no data loss)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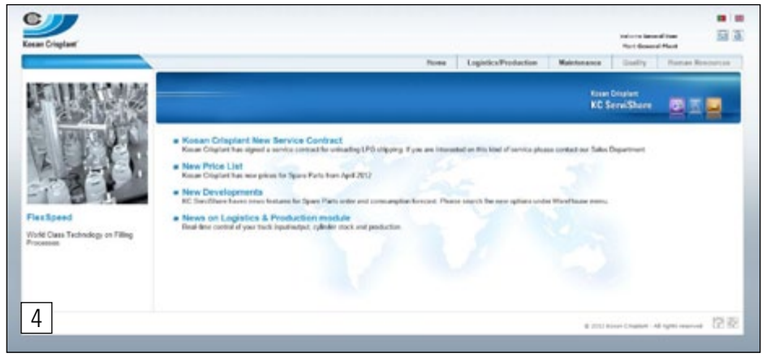
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PROJECT MANAGEMENT

Kosan Crisplant is not only a supplier of equipment. Our experienced staff of project managers ensures the implementation of projects within the economical terms and the agreed time limit.

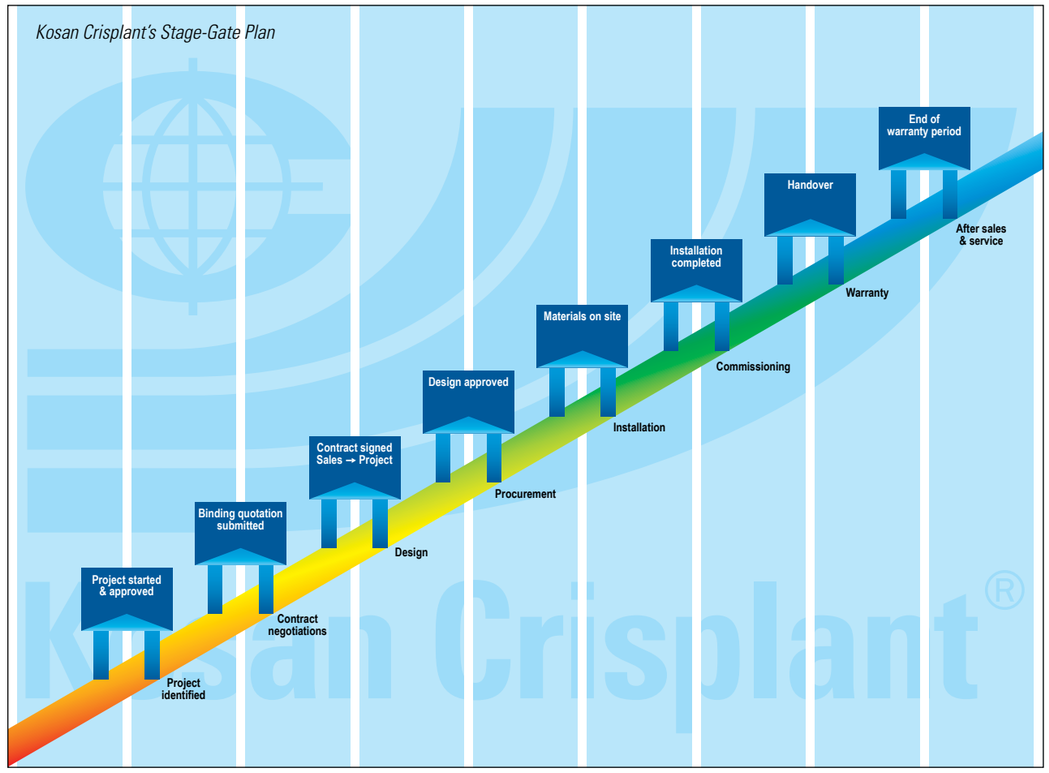
- Implementation of projects is a focus issue for Kosan Crisplant
- We offer professional project management which is of vital importance for the success of a project carried out by professionals
- Precise and standardized project management model used for all projects

Your benefits

- One person has full responsibility for the project from quotation to handover
- The project manager has the authority to make decisions on the spot
- Constant education and training of project managers make Kosan Crisplant world champion within project implementation in the gas industry
- Kosan Crisplant uses effective and modern IT tools for project management
- All project communication in: English, German, French or Spanish, according to your choice

Your safety: Kosan Crisplant's Stage-Gate Plan

- A set of common rules, which leads to an organized implementation of projects from start to finish
- A strong instrument, which ensures focus on achievement of targets and results in due time
- An instrument to divide complicated projects into smaller stages, each with a conclusion and a measurable result
- For further information about Kosan Crisplant project management and our Stage-Gate Plan, our folder "The Kosan Crisplant Project Management Model" is available upon request



EXPORT FINANCING PACKAGE

Kosan Crisplant offers attractive unbinding financing packages in collaboration with our bank and the Danish Export Credit Agency "Eksport Kredit Fonden" (EKF).

- Loans up to 85% of the contractual amount
- Advantageous terms
- Minimum borrowing costs

Your benefits

- The currency of borrowing is not necessarily the contract currency
- Lender is our bank Nordea Bank Danmark A/S
- Export credit guarantee issued by EKF

Your possibilities

- Floating or fixed interest
- Loan in EUR, USD or other currency accepted by Nordea Bank Danmark A/S
- Normally five years maturity
- Maturity for high loan amounts is negotiable

Your safety

- Internationally recognized lender
- Fixed interest: Commercial Interest Reference Rate (CIRR) fixed monthly by OECD
- Floating interest based on the six month London Interbank offered rate (LIBOR) for the loan currency plus a bank margin to be agreed
- Loan agreement based on Nordea Bank Danmark's standard format

KC ProSupply

KC ProSupply is Kosan Crisplant's trading division which offers gas-related components and equipment as well as consultancy services to the gas industry worldwide.

- One place to go for any type of gas component
- Expert guidance on component choice
- Collaboration with the leading suppliers of gas components
- Huge stock and collected shipments
- Customized engineering and stocking solutions
- Kosan Crisplant specialists available on-site

Your benefits

- A minimum of work by using a one-stop-shop
- We will track down the right component at the right price for you
- We have the widest third-party product range in the industry
- Our product range consists of high-quality products from leading suppliers
- Competitive prices
- Fast delivery – decentralized stock policy
- We have the know-how and expertise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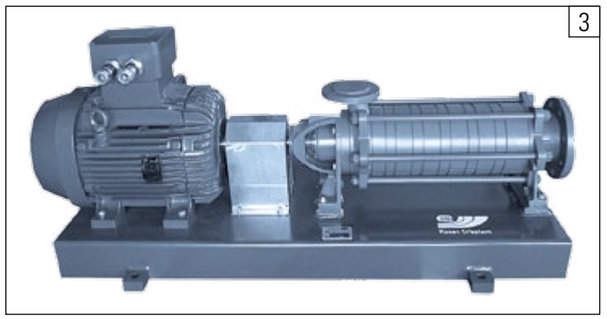
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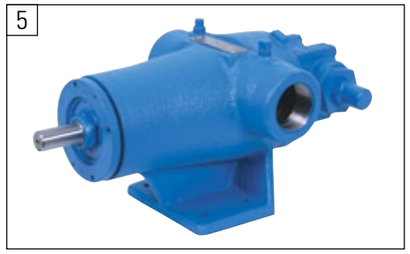
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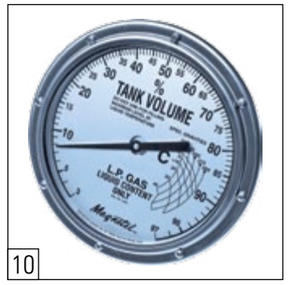

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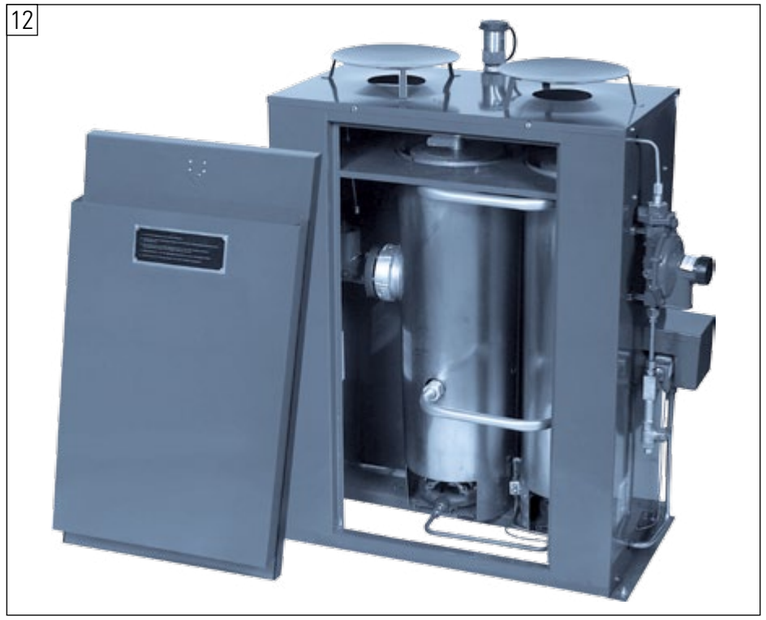
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Your possibilities

- Products for the LPG, NH_3 (ammonia) and cryogenic industries
- Components for LNG (liquefied natural gas) and CNG (compressed natural gas)
- Our wide product range also includes bobtails and semi-trailers
- Additional products and consumables (e.g. valve sealing caps, leak detection spray, etc)
- Requalification, inspection and calibration of equipment
- Access to Kosan Crisplant Group specialists and engineering capabilities
- KC ProSupply can assist you with:
  - Finding out which components need replacing
  - Finding out what to replace them with
  - Researching the market for suitable suppliers
  - Sending out inquiries to potential suppliers
  - Comparing offers
  - Ordering different components from different suppliers
- Whatever component you need – we'll find it for you!

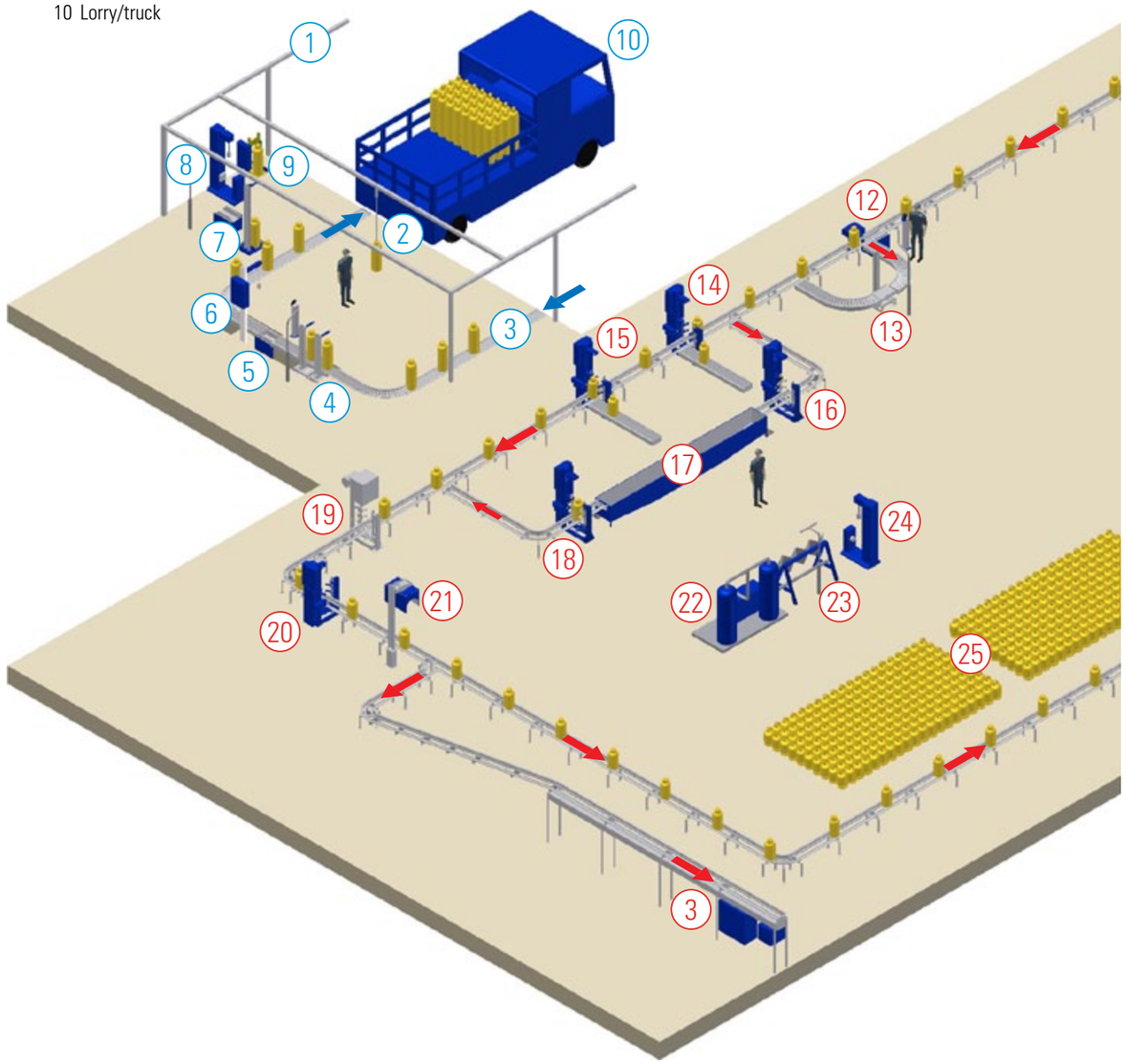
Your safety

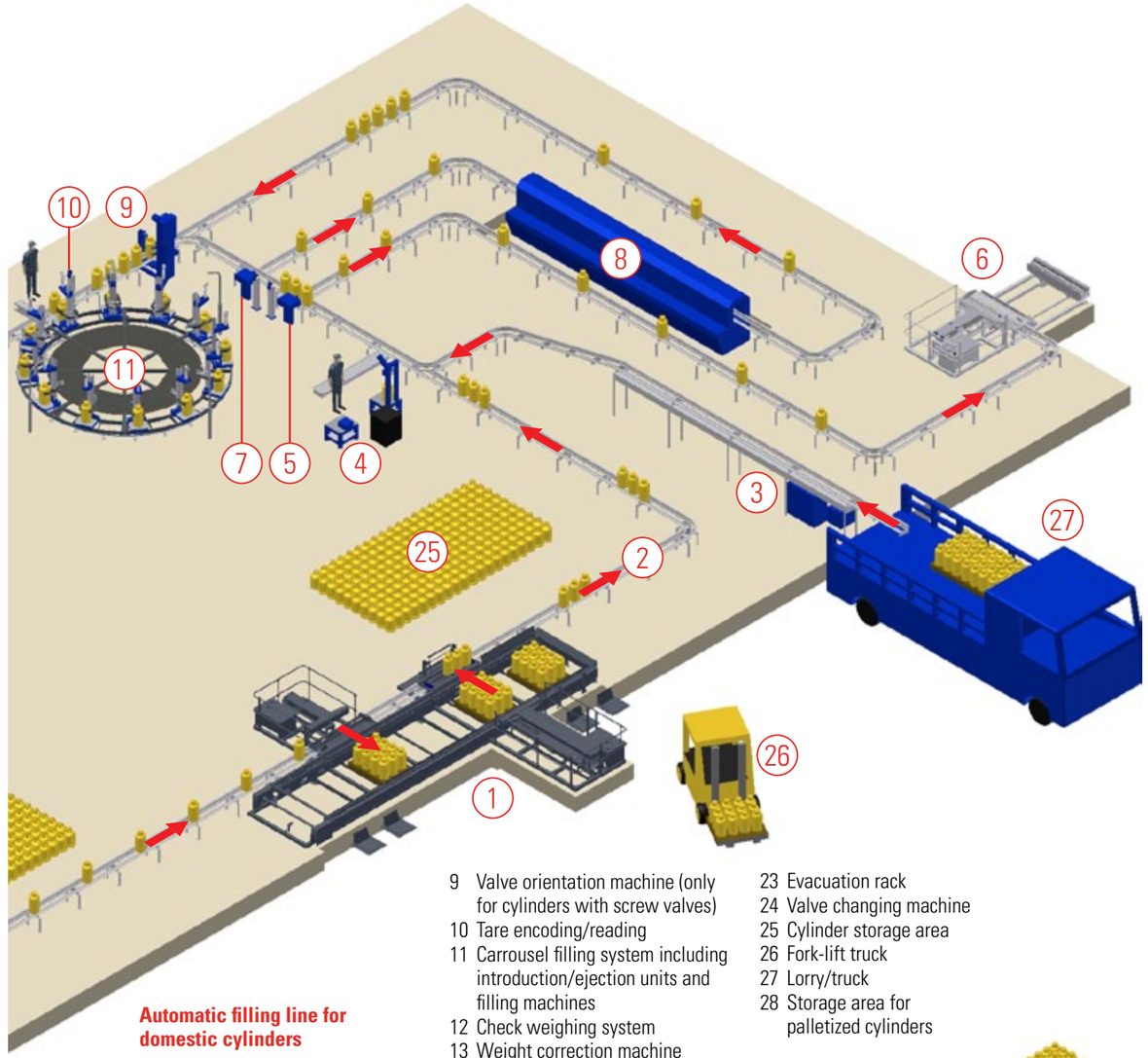
- KC ProSupply is part of the Kosan Crisplant Group that has more than 60 years of experience in the gas industry – know-how and engineering capabilities that ensure you always get the right product and solution
- We work exclusively with high-quality products and components

FILLING HALL PROCESS OVERVIEW

Manual filling line for industrial cylinders

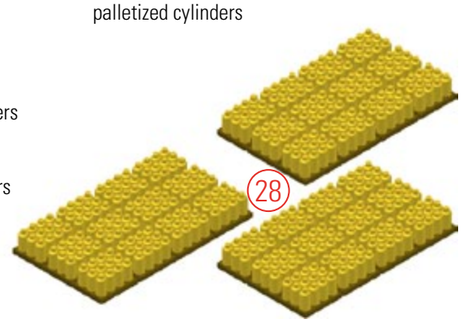
1 Overhead conveyor for cylinder handling system
2 Cylinder handling system
3 Roller conveyor
4 Filling machines (in-line)
5 Check scale
6 Leak detector
7 Filling machine (stationary)
8 Valve changing machine
9 Evacuation rack
10 Lorry/truck





Automatic filling line for domestic cylinders

1 Palletizing system
2 Chain conveyor system
3 Telescopic conveyor
4 Shroud and foot ring straightener
5 Sorting point for cylinders to reconditioning
6 Pallet loader for cylinders to reconditioning
7 Sorting point for cylinders to washing
8 Washing system
9 Valve orientation machine (only for cylinders with screw valves)
10 Tare encoding/reading
11 Carrousel filling system including introduction/ejection units and filling machines
12 Check weighing system
13 Weight correction machine
14 Valve tester
15 Leak detector
16 Valve opener (only for cylinders with screw valves)
17 Leak testing bath
18 Valve closer (only for cylinders with screw valves)
19 Seal applicator
20 Thermosealing machine
21 Seal detector
22 Evacuation system
23 Evacuation rack
24 Valve changing machine
25 Cylinder storage area
26 Fork-lift truck
27 Lorry/truck
28 Storage area for palletized cylinders



The Kosan Crisplant Group

Wherever you are, we are ...

Kosan Crisplant®

INNOVATING THE LPG CYLINDER FILLING BUSINESS SINCE 1951

SAFETY THROUGH QUALITY

100% Kosan Crisplant

SINCE 1951

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