

TILLQUIST

KANON

LOADING EQUIPMENT



**WE CARE
ABOUT
LOADING
SYSTEMS**



Loading equipment for marine, road, and rail tankers

WE CARE ABOUT LOADING SYSTEMS



KANON Loading Equipment B.V. is a Dutch company specialising in the design, manufacture and installation of loading and unloading systems for marine, road and rail tankers.

KANON operates on a world wide basis via a well-trained network of carefully selected agents and associate companies, fully able to promote all aspects of the KANON product range.

KANON Loading Systems are in use with the widest range of liquids and gases, from cryogenic to high temperature applications, and including the most hazardous or corrosive fluids.

KANON has supplied equipment direct to customers in all areas of the processing industry including chemical, petrochemical, storage terminals, pharmaceutical, healthcare, food and beverage as well as providing systems via many of the leading international engineering houses.

In addition to having a comprehensive standard product range, KANON has built an excellent reputation for developing custom made loading systems.

Through years of experience and know how KANON is well placed to give you the very best advice in liquid transfer systems.

Ease of handling and safety for the operator and environment, as well as a reliable performance for many years, are the basics for the design of KANON equipment.

KANON has built up a team of qualified engineers, who develop new loading systems incorporating the latest technology including 3-D CAD systems. The quality management system meets the requirements of the ISO 9001 quality assurance system, latest standards.

Our service department

KANON Loading Equipment B.V. have a modern and fully equipped service department specialised in truck loading arms, marine loading arms, safety access equipment and grounding devices.

From the head office in Zeewolde (The Netherlands) all service jobs are scheduled and coordinated worldwide. Highly skilled and experienced service engineers are available to service and maintain customers equipment. They all have the required knowledge of hydraulics, pneumatics, mechanics and electronics. These service engineers each have a fully equipped service van at their disposal, including all necessary tools and spare parts.

KANON is SCC (Safety Checklist Contractors) certified by Lloyds and our Service Engineers are each certified with both WA-1 (basic safety training) and WA-2 (advanced safety training for staff personnel).



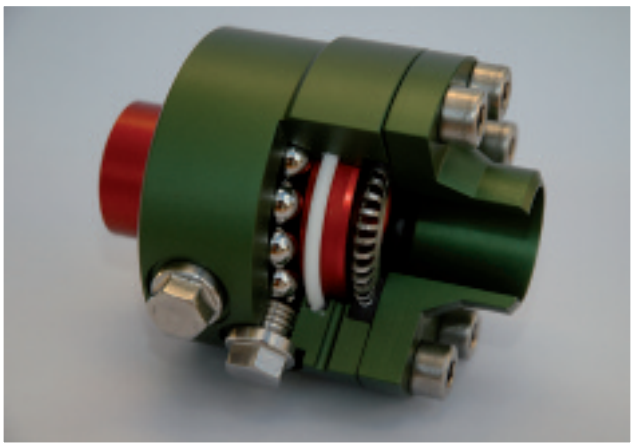
KANON can provide the following services:

- Installation
- Commissioning
- Supervision
- Periodical inspection
- Survey
- Maintenance, Repair & Modification
- Training on the job for operators and maintenance personnel

All KANON equipment is manufactured fully in compliance with applicable codes & standards, e.g.:

- PED 97/23/CE (Pressure Equipment Directive)
- ATEX Directive 94/9/EC
- OCIMF (Oil Companies International Marine Forum)
- ASME Codes
- EN/ISO Codes

KANON SWIVEL JOINTS



Absolute leak-free design

Swivel joints have been used in the processing industry for a long time.

The use of swivel joints in metal loading arms became critical because of the extraordinarily high bending and axial load combination, due to the reach of the loading arm and wind forces.

KANON swivel joints are developed to withstand all these loads without leaking. In fact, leakage and regular maintenance is something which is unknown with KANON swivel joints.



By using KANON swivel joints it is possible to make all kinds of flexible connections using rigid pipes instead of using hoses.

KANON swivel joints are available in various materials, including:

- Carbon Steel
- Low Temperature Carbon Steel
- Stainless Steel
- Carbon Steel with PTFE, rubber and other linings
- Hastelloy
- Titanium
- Plastics

Temperature range of -200° C up to +300° C

Pressure range up to 120 bar

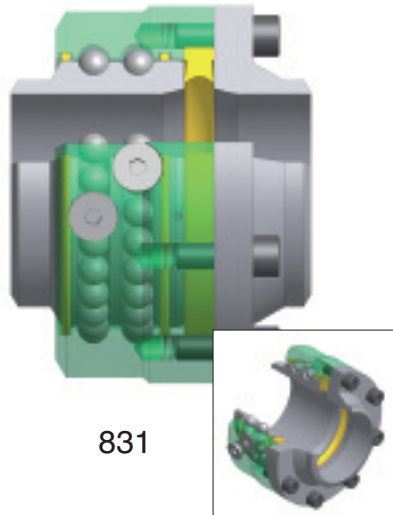
Sizes from 1" up to 24"

Specific features:

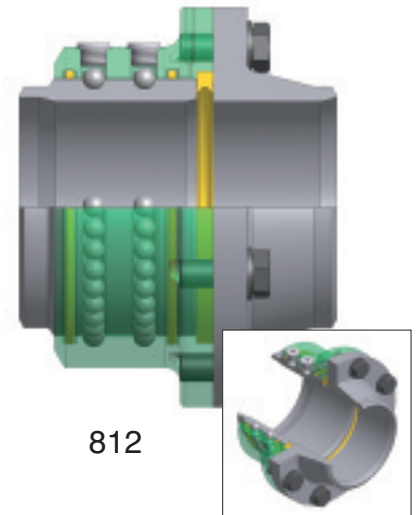
- Swivel joints can withstand much higher loads than conventional designs due to the special shape of the ball races in combination with relatively large diameter ball bearings
- The ball race chamber is completely separated from the sealing part
- The product seal can be replaced without removing the ball bearings
- Swivel joints are provided with long life lubrication, so there is no need for regular maintenance
- Double or single ball race depending on application
- Jacketing and trace heating option
- Full size bore
- Tell tale leakage indicator

Types & Purposes:

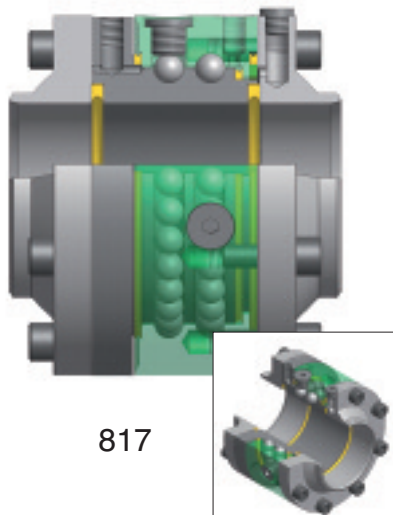
- SAN831 Multi Purpose, up to 4"
- SAN812 Multi Purpose, from 6" up to 24"
- SAC817 for Cryogenic Purposes
- SRL825 for Corrosive Purposes (PTFE lined execution)
- SRS822 for Toxic Purposes
- SAL835 Low Height Execution



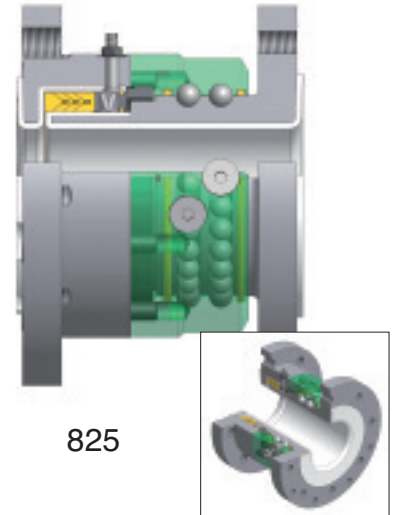
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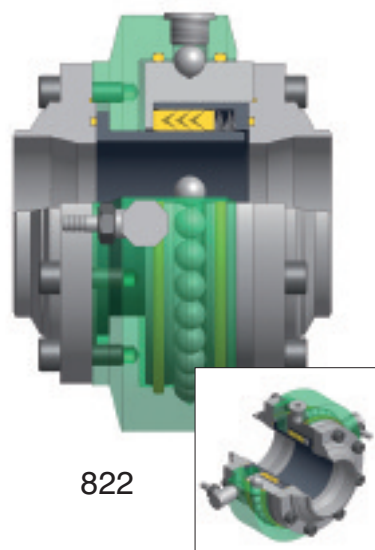
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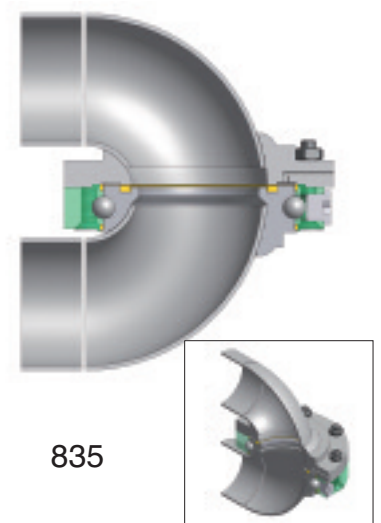
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KANON MARINE LOADING SYSTEMS



The transfer of all fluids and liquefied gases, into the smallest barge or the largest crude carrier may be safely and dependably accomplished using a KANON Marine Loading Arm system.

These loading systems are manufactured to the latest requirements of OCIMF and major oil companies. KANON's single counterweight balance system enables both hydraulically and manually operated arms to be manoeuvred easily and safely, saving both time and manpower.

KANON Marine Loading Arms require minimal maintenance and all product seals can be replaced without scaffolding or dismantling the loading arm itself.

Characteristics:

- Sizes 4" to 24" diameter
- Materials: carbon, stainless and low temperature steels, with PTFE or rubber linings and other special alloys
- Temperature range -200°C to $+300^{\circ}\text{C}$

All KANON arms, including manually operated models, can be provided with a virtually non-spill Emergency Release System.

This ensures, that, in the event of an emergency, the liquid and vapour lines are both sealed after disconnection. Once the emergency sequence commences, the arm automatically rises and returns to its parked position, allowing for immediate departure of the tanker if necessary.

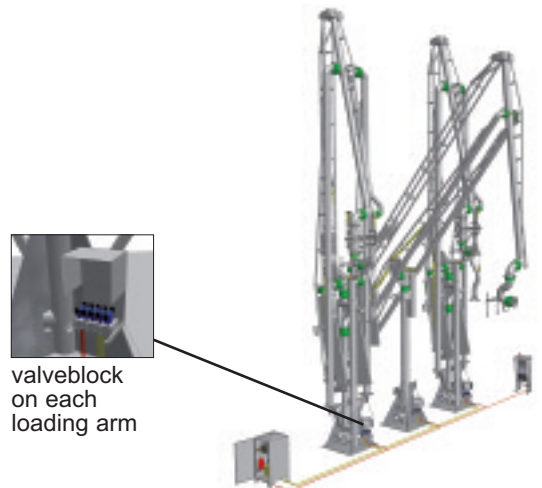


KANON LOADING ARM MODELS



The MLA260 series is the most efficient range of marine loading arms on the market, due to the slim design and the availability of a number of design options to ensure that specific site requirements are met in the best possible way.

The MLA260 can be used with virtually all liquids and gases that are capable of being transferred through pipes. The use of a unique double inboard arm has resulted in the smallest design footprint possible whilst ensuring that the loads encountered at the MLA260 base plate are the lowest when compared with any other type of arm.



valveblock
on each
loading arm

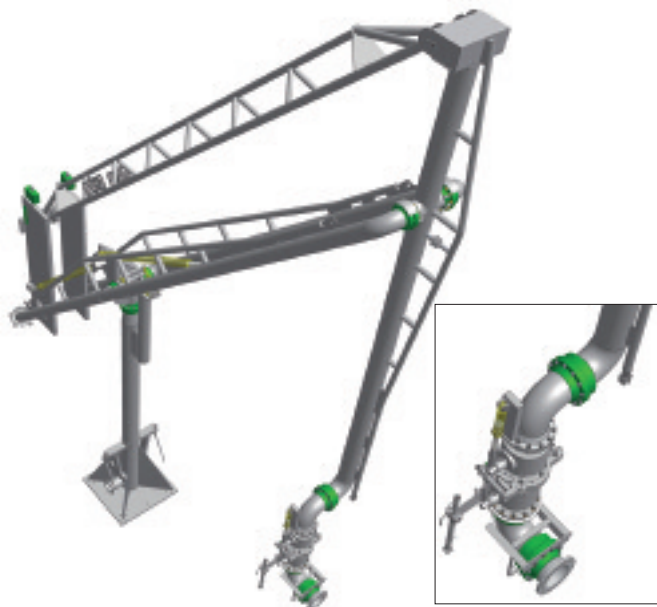
The **MLA260** model can be configured with more than one fully separated, self-supporting product lines, which are designed to absorb all possible forces associated with structural mass, fluid weight, pressure load and wind load.

The **MLA272** series is specifically used for cryogenic or highly corrosive or toxic chemical service.

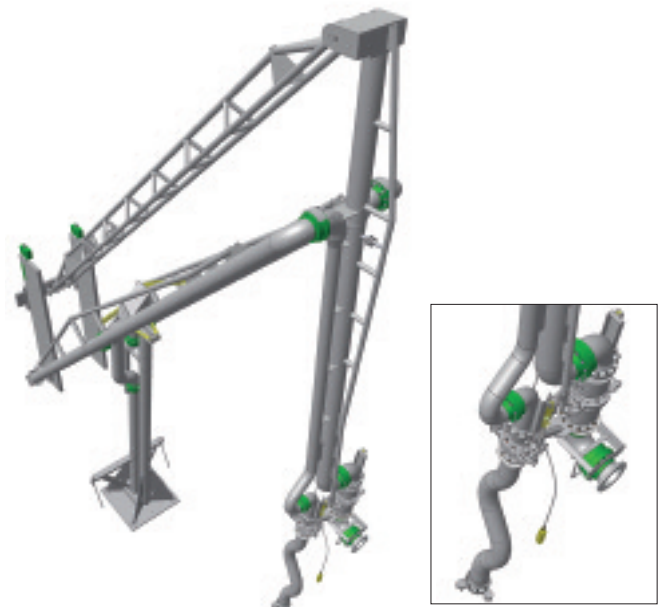
This type of loading arm has a separate supporting structure with floating product and/or vapour pipe.

Both types of loading arms **MLA260** and **MLA272** consist of a symmetric construction. Full balance of these loading arms is provided by means of a rigid pantograph link, which connects the outboard arm to the rotating counterweight. Special care has been given to the rotating pivots of the pantograph bar both in design and in material selection thus assuring smooth operation with minimum maintenance.

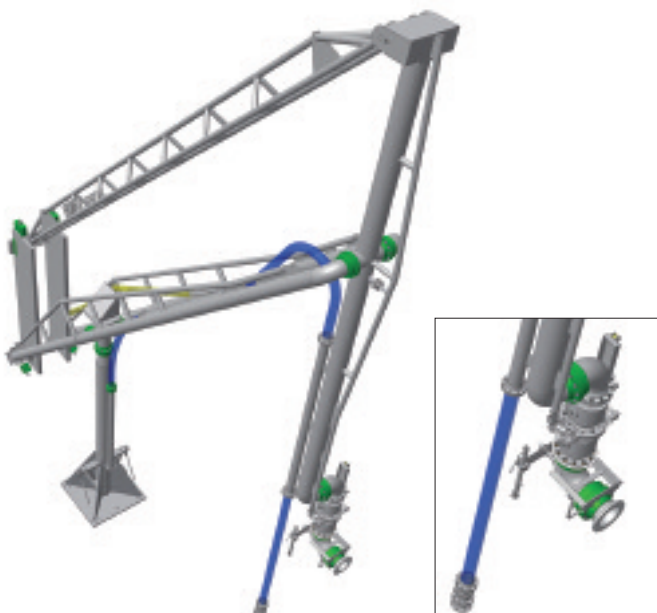
MLA272



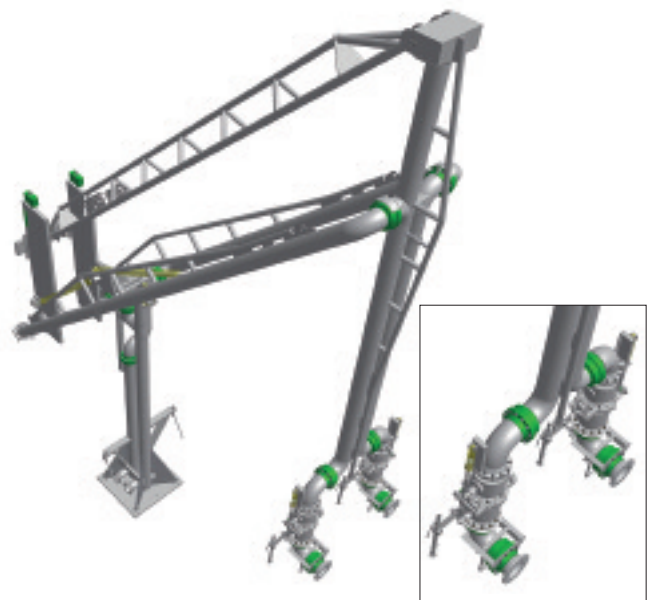
MLA260 Double Inboard



MLA260 Double Inboard, with rigid vapour line as part of the construction

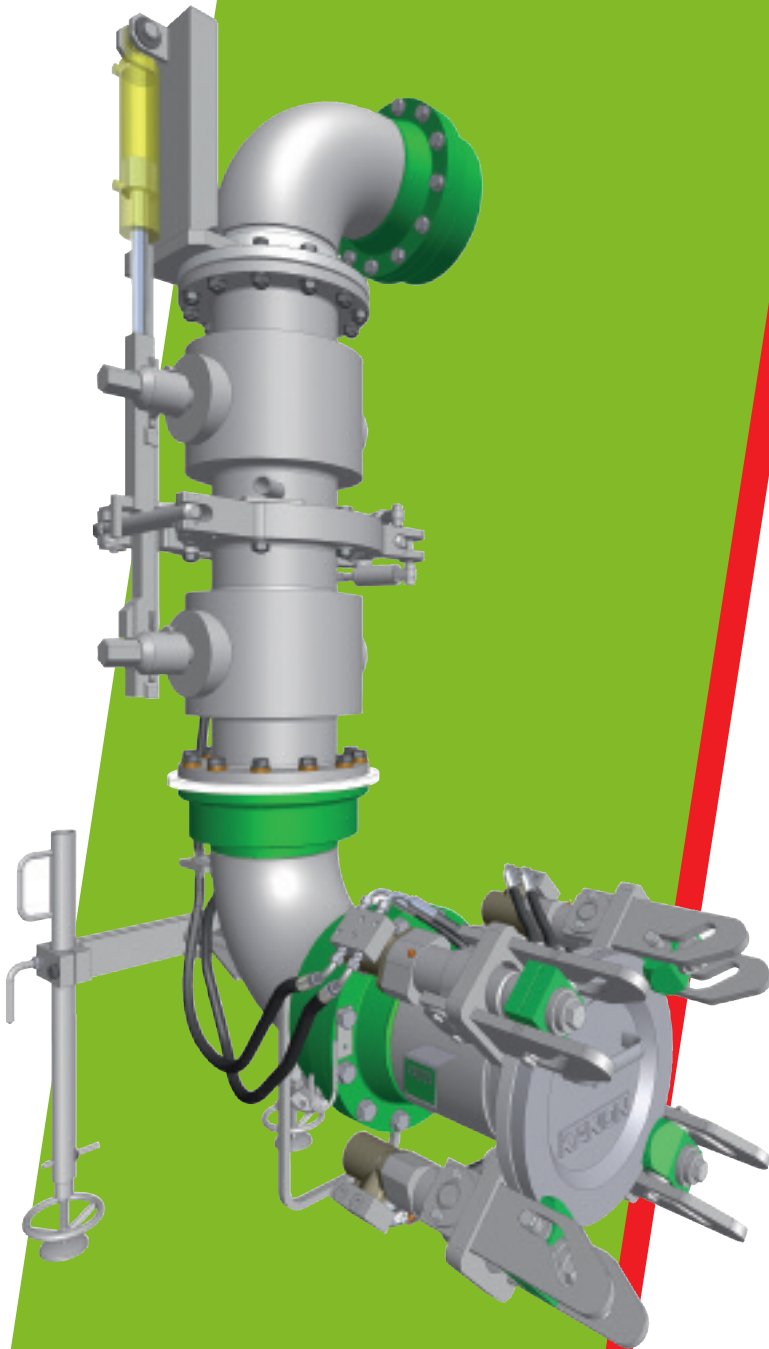


MLA260 Double Inboard, with vapour line piggy back mounted



MLA260 Double Inboard multi product

THE AVAILABLE OPTIONS SAY EVERYTHING ABOUT OUR EXPERIENCE



Operation:

KANON Marine Loading Arms can be operated either manually or hydraulically, depending on product pipe size, physical dimensions and fitted accessories.

Hydraulic operation requires 2 drives for inboard and outboard arm movement and 1 drive for slewing (rotation) movement.

Operation of the hydraulic loading arm can be effected by means of:

- Levers directly mounted to the valve block adjacent to the loading arm stand post – (manual hydraulic operation)
- By pushbuttons on either the operators console or on the remote control pendant box/wireless set – (electric hydraulic operation).

All KANON hydraulic and electrical control systems are inherently safe. The hydraulic circuit includes over-pressure relief valves adjusted to 190 bar maximum (system pressure maximum 210 bar). Specific details of hydraulic controls are provided in separate bulletins.

Accessories:

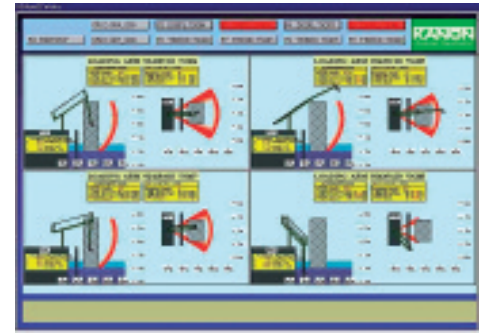
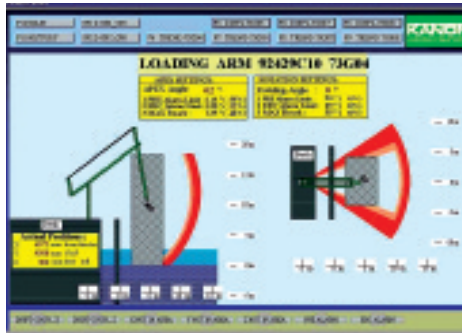
Depending on customers needs, the following options can be offered:

- Vapour return line, piggy back style
- Vapour return line as part of the construction
- Drain, purge, flush, product recovery and pigging systems
- Quick connect/disconnect coupling
- Vacuum breaker
- Shut-off valve
- In-situ replacement of swivel joint product seals (standard provision)
- Isolation flange
- Centralised 'Tell-Tale' leakage indicators for all swivel joints
- Adjustable support jack
- Electrical heating/tracing
- Steam or hot oil tracing/jacketing
- Thermal insulation
- Access ladders and maintenance platforms

KANON Hydraulic QCDC/Multi-Size Hydraulic QCDC Patent Pending

KANON offers both manual and hydraulic Quick Connect/Disconnect Couplings. The hydraulic version is of a simple and robust design, capable of capturing the mating flange even when the distance between the coupling face and the flange is in excess of 50 mm.

An adapter can be fitted to the coupling to enable it to be used with mating flanges that are one or even two sizes smaller than the size of the coupling



• SCADA Position monitoring system available for one or several Marine Loading Arms.



Emergency Release Coupling (ERC)

The KANON ERC is part of the KANON range of Emergency Safety Systems (ESS), designed to provide best possible safety in fluid loading/unloading when using Marine Loading Arms. The ERC provides a fully automatic, safe and spillage free disconnection of the Loading Arm from the ship should the limits of the safe working envelope of the Arm be exceeded. The ERC features a simple single cylinder design that provides a high level of intrinsic safety, field-proven in many Marine Loading Arm applications. KANON Emergency Safety Systems, and specifically the ERC, are known as 'workhorses' in the fluid transfer industry providing powerful performance with little or no maintenance.



MAKING THE RIGHT CHOICE



When deciding upon a conceptual design for road and rail tanker loading stations some basic principles need to be considered. Top and Bottom loading each have their own advantages, which can benefit the installation when correctly applied.

Features and benefits of both Top and Bottom loading arms are provided in later sections detailing these products more fully.

In general terms, however, the basic design data needed for a loading station includes the following, all of which may not be applicable in every case.

Design data may include:

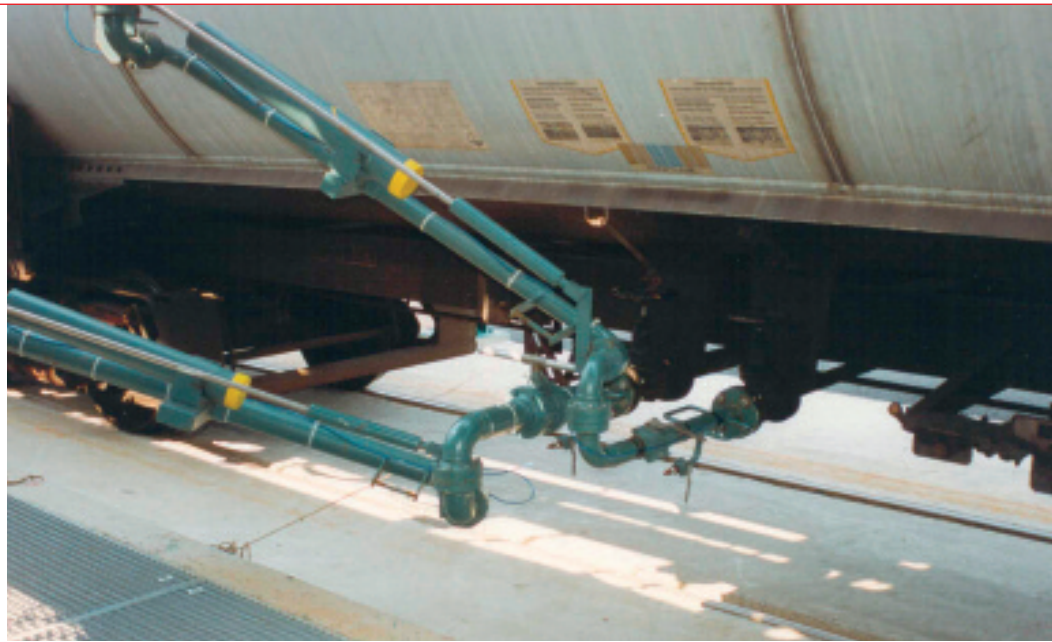
- Type of fluid; temperature, pressure
- Viscosity in normal/abnormal condition
- Capacity in m³ or tonnes/hour
- Multi-product loading
- Number of different fluid media at one loading station
- Number of loading arms filling simultaneously at one tanker
- Required level of operator safety
- Environmental requirements; i.e. vapour return or recovery overspill protection
- Integration with metering or weighbridge facilities.

The following is applicable irrespective of whether top or bottom loading, or even a combination of both is specified.

A common requirements for all fluid transfer systems is that contact with man and environment should be avoided. This demands no leakages, non-spill connect/disconnect, self draining systems, lockable stored position, etc.

Hundreds of user friendly and easy to operate KANON loading systems are in use today in highly demanding applications.

This brochure provides the tools to enable the correct solution to be selected.



BALANCING

Loading arms should be balanced such that minimum weight is borne by the operator irrespective of the position of the arm. Balancing starts with the loading arm design; forces working on one end of the arm are to be compensated for by traditional counterweight, or more advanced spring balancing, at the other.

The maintenance free balance cylinder is designed for applications which demand less space and can be combined with hydraulic or pneumatic operation.

KANON spring cylinders with multiple compression spring packages, can be adjusted to meet changes in operating conditions. Compared with conventional designs, KANON adjustable spring cylinders excel in terms of safety and long life.

BASIC CHARACTERISTICS

- Sizes diameters:** 1", 2", 3", 4" and 6".
- Materials:** carbon steel, stainless, duplex, low temperature steel, Hasteloy, titanium and other special alloys, and with or without linings of rubber, PTFE- or other materials.
- Temperature range:** -200° C +300° C.
- Pressure range:** maximum 120 bar.
- Balancing:** counterweight or spring cylinder.
- Seals:** PTFE, viton, buna-N, perbunan and others on request.

MAIN CUSTOMER GROUPS

- Chemical
- Petrochemical
- Food and beverage
- Healthcare, Toiletries and Pharmaceuticals.
- Storage terminals
- Engineering contractors.

TYPICAL PRODUCTS BY INDUSTRY SECTOR

Chemical

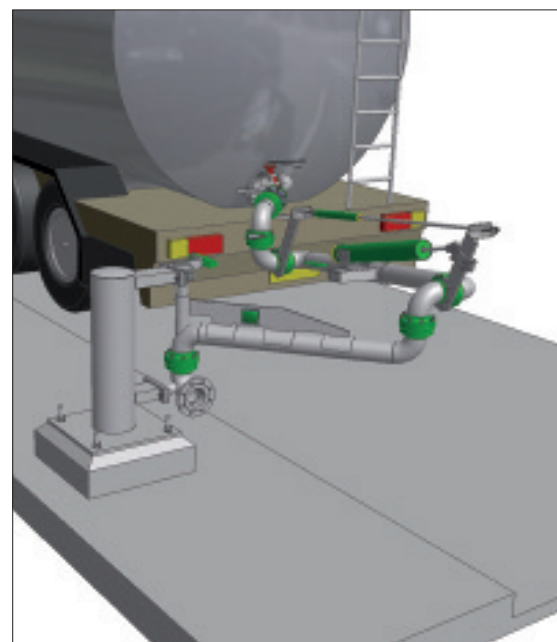
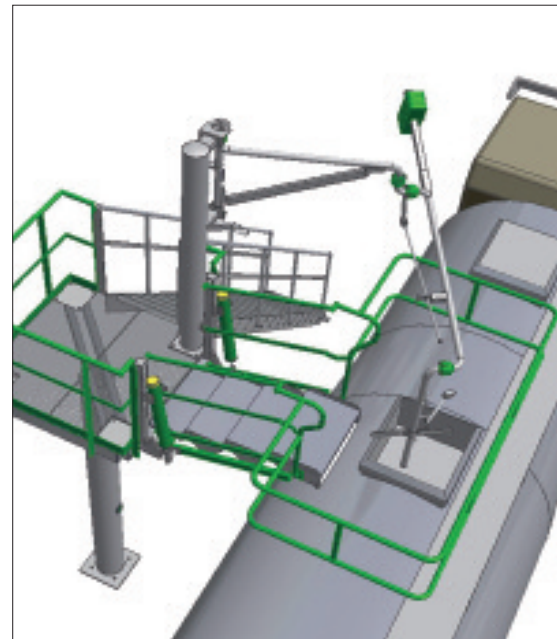
- Phosphoric, sulphuric, nitric, hydrochloric acids.
- HF, HBr, vinyl chloride, MDI.
- Caustic soda.
- Ammonia.
- Cryogenic applications such as Nitrogen (-196° C), Oxygen (-183° C), Ethylene (-104° C).

Petrochemical

- All hydrocarbons
- Crude oil
- LPG, butane propane etc.
- Bitumen
- Sulphur
- Phenol

Food

- Vegetable oils, fruit juices, chocolate, sauces, soups, raw materials.



TOP LOADING ARMS



KANON top loading arms are specially designed to suit both open filling of a wide range of products across all industry sectors or closed filling of the type of highly aggressive liquids associated with the chemical and petrochemical industries.

Loading arms can be manufactured for every application, and following years of experience, KANON have developed, and continue to develop, widely accepted solutions for filling tankers.

The three basic top loading styles are:

- 1) Single Top Loading Arm
- 2) Single Top Loading Arm with vapour return or pressure line
- 3) Single Top Loading Arm for vapour return.

Top loading arms can be provided with various useful accessories (as shown later in this brochure) including:

- Top level detection: (bubble pipe sensing or electronic)
- Pressdown cylinder to prevent the arm lifting
- Drop pipe deflector
- Telescopic drop pipe (preventing foaming or electrostatic build up).

Where required, top loading arms can be provided with heat-tracing, jacketing and insulation.

1) Single Top Loading Arm

Usually equipped with four swivel joints, and with or without a cone, the standard loading arm offers great flexibility and covers the complete range of manhole sizes as found on most tankers. For closed filling applications additional swivel joints can be included in the drop pipe to ensure stress free connections.



TLA341

2) Single Top Loading Arm with vapour return line, cone, press unit and toplevel control

Semi-closed loading incorporating a cone in combination with a vapour line, either hard piped to form a double top loading arm, or flexible and piggy-back mounted on a single product arm is the more typical design. This solution offers effective vapour return whilst maintaining flexibility for the tanker fleet.

Alternatively, fully closed loading using secure flanges, or specific couplings, provides a true 'closed loop'. However, mating connections are required on both the loading arm and tanker top dictating the need for a dedicated tanker fleet.



TLA343

Closed loop system also offers the possibility of unloading by pressure, through the drop pipe of the product arm whilst pressurizing the tank via the 'vapour line' of the loading arm.



TLA340

BOTTOM LOADING ARMS



The advantage of Bottom Loading Arms is that these can be operated at ground level without need for loading platforms.

When using a single bottom loading arm, the vapour is usually vented through an opening at the top of the tank. Preferably, this should be capable of being opened from ground level thereby preventing the need for the operator to access the top of the truck. This loading procedure, using a single bottom loading arm, is widely used and is referred to as an 'open loop' product transfer.

Increasingly, however, a combination of two bottom loading arms are used simultaneously to provide 'closed loop' product transfer. In this configuration, the product is filled through one Bottom loading arm whilst the vapour is recovered through a second usually having a smaller diameter than the product arm. This technique is necessary for low density liquids (such as butane and propane) and fluids with toxic or explosive vapours. The closed loop operation prevents product escaping into the atmosphere and offers the best possible operator safety whilst minimising environmental pollution.

Bottom unloading with a single loading arm can be achieved using a tanker surge pump or even more simply by gravity. The latter method may require a low-height bottom loading station with special compact-design swivels designed to prevent 'air pockets' in the product line.

As with top loading arms, double bottom loading arms with suitable couplings can be used for pressurized unloading using the vapour arm to pressurize the tanker.

With all bottom unloading methods practically all product is evacuated from the tanker.

Bottom loading arms are also particularly suitable for use with electro static sensitive fluids.

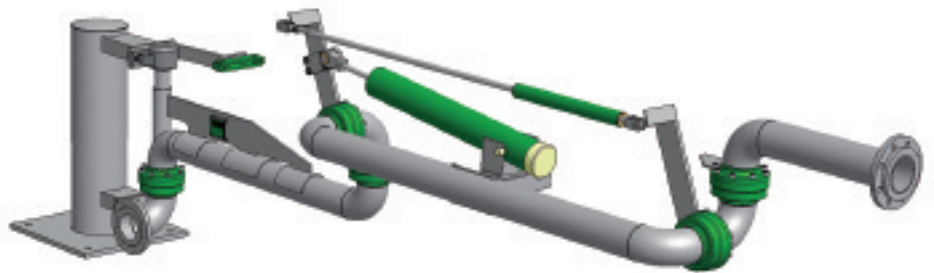
As with the Top loading arms, the use of KANON balance cylinders ensures that Bottom loading arms can be manoeuvred through all positions with minimal effort.

Horizontal Balancing System

In addition to the overall balancing of the Bottom loading arms, KANON's optional horizontal balancing system keeps the outboard pipe horizontal in every connecting position.

Compared with systems incorporating conventional gas struts, this unique parallelogram design provides true balancing of all forces, especially when the arm is fitted with heavy valves or couplings.

KANON's ergonomic design eliminates hard physical work for the operator, reducing the connection to a light duty, one man operation.

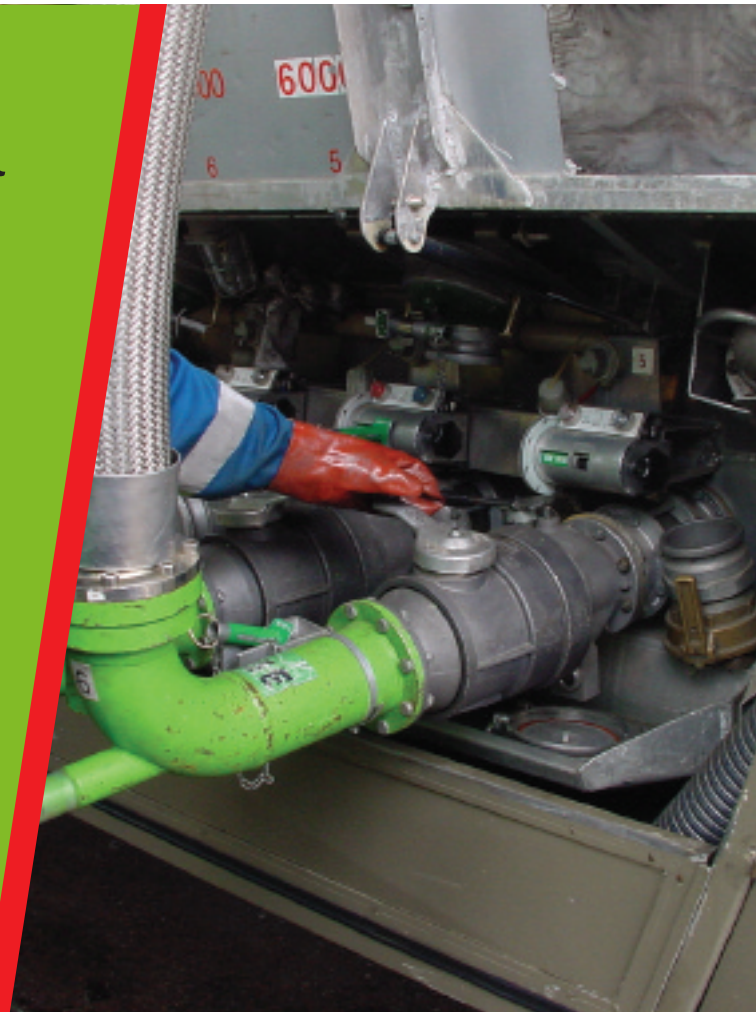


BLA145



BLA144/145

KANON CROSS-OVER BOTTOM LOADING



KANON cross-over bottom loading arms allow simultaneous connecting and filling of up to seven product lines with vapour return.

Latterly, KANON has developed an innovative new design which minimises maintenance inspection and stock holding costs.

All of KANON's experience and know-how is incorporated in the cross-over bottom loading system which conforms to A.P.I. standards, and provides increased safety and ease of operation.

Features and benefits

- Safeguarding environmental legislation
- All swivel joints are designed for easy maintenance without dismantling the complete loading arm
- Offers an extended operating area, not limited to a single radius, by using well balanced double articulated horizontal booms (no push and pull)
- Universal hose length reduces maintenance and stock holding costs
- Compact design, can be retrospectively fitted in almost every existing application
- It is possible to operate on both sides of the station simultaneously without having to dismantle the loading station
- Light and easy manoeuvring (no push and pull)
- Leak proof design
- 6" flanged heavy duty base swivel joint ensures easier servicing, safer loading and longer working life
- The swivel incorporates special shaped double bearings featuring KANON's four contact point races, resulting in a higher load capacity for longer and safer loading
- Long life lubrication
- Full spring cylinder balancing method designed for safer operating

Construction details

KANON Cross-Over bottom loading arms for filling road tankers are provided with double articulated boom arms. The inner arm is flanged onto the 6" heavy duty swivel joint.

This swivel joint is the base swivel joint designed to carry all the loads created by the weight of the arm.

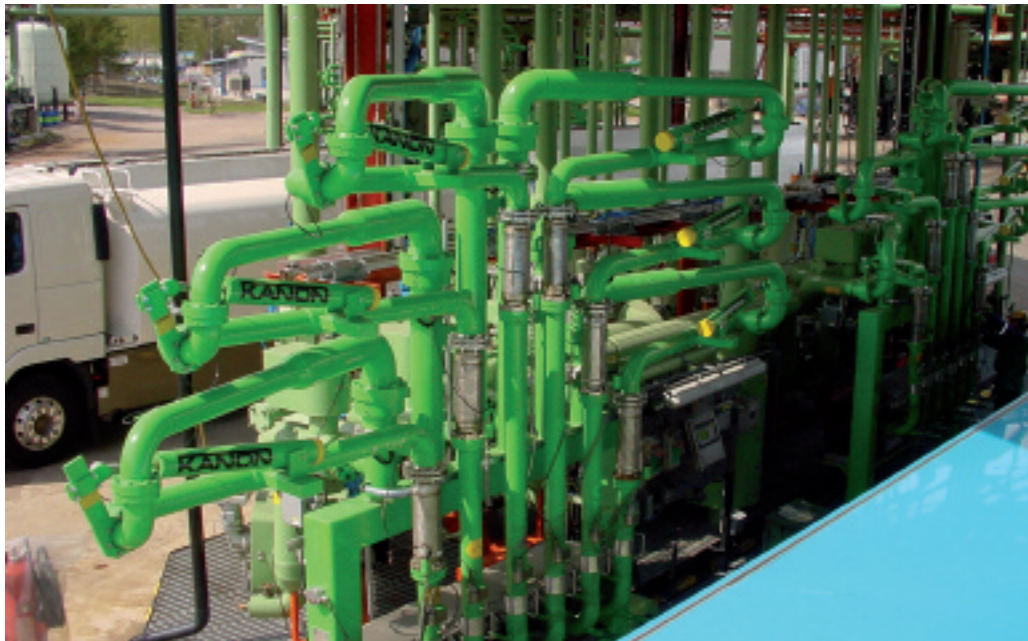
The outer arm is perfectly balanced by use of the KANON adjustable spring balance cylinders which feature multiple compression spring packages, and which can be adjusted to meet changes in operating conditions.

Compared with conventional designs, KANON adjustable spring cylinders excel in terms of safety and long life.

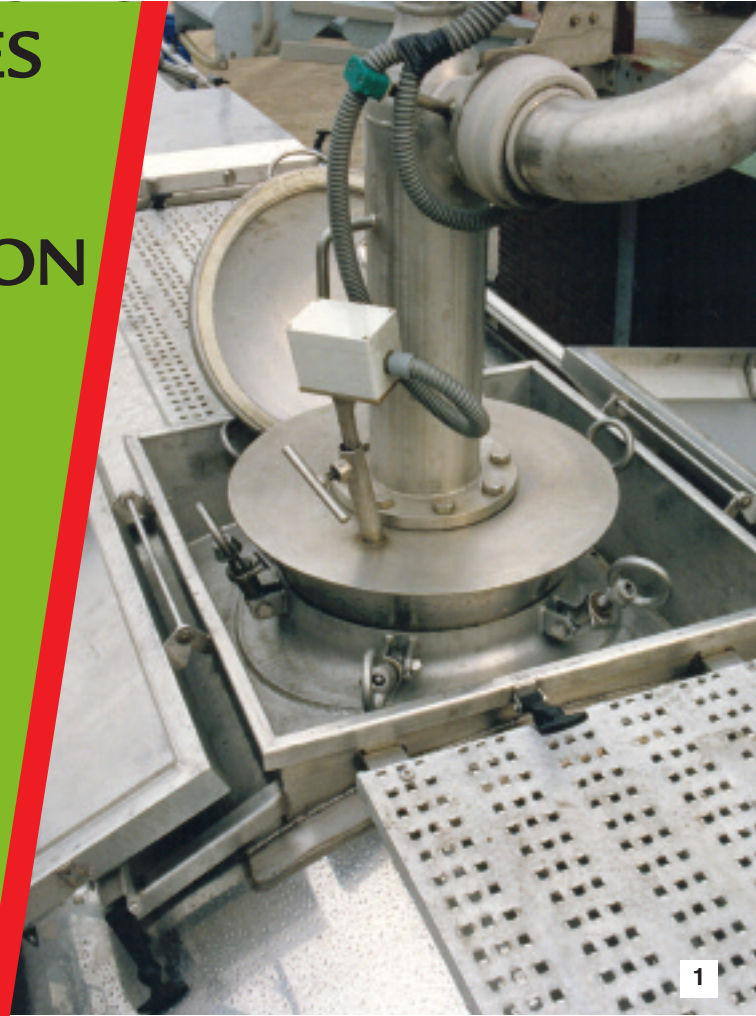
Top view parked position

As standard, KANON Cross-Over bottom loading arms are provided with a spring clip for retaining arms in the parked position.

With this provision the loading arms are parked in such a way that the loading island is clear of trip hazards and the potential for damage to be caused to the arms as a result of vehicle impact is minimised.



ACCESSORIES AND CONSTRUCTION DETAILS



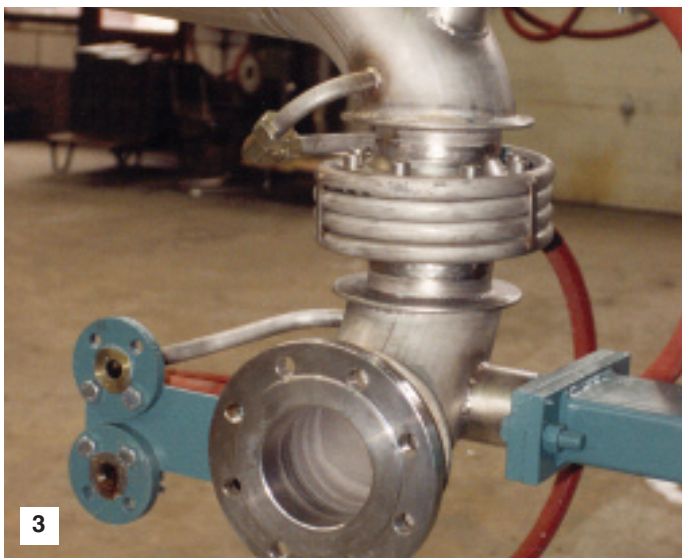
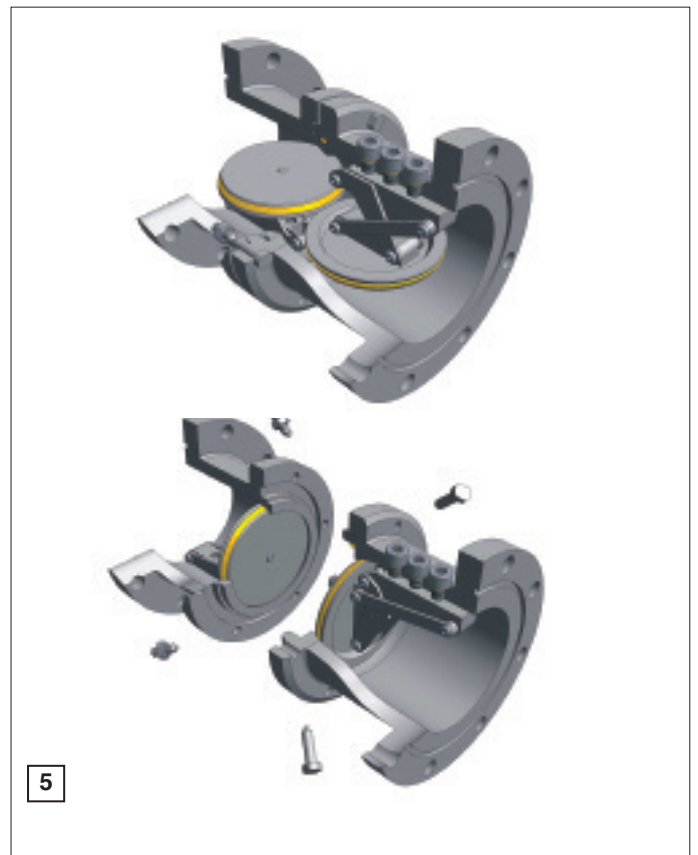
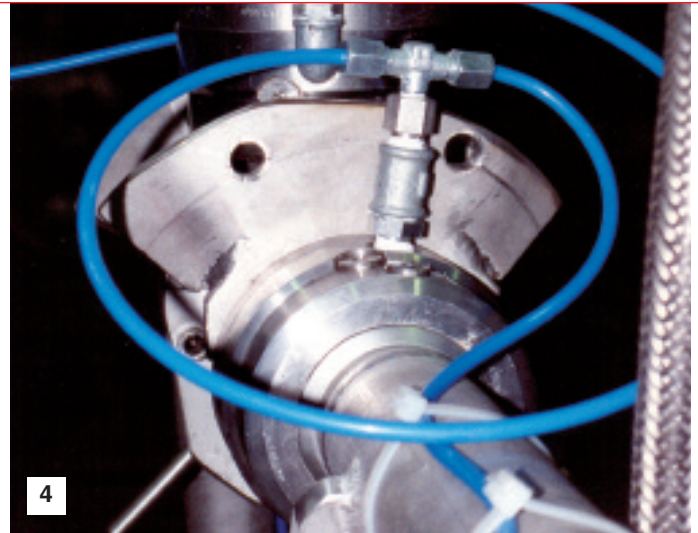
As a result of dedicated workmanship, KANON solutions excel in both quality and design

- 1 Cone with adjustable toplevel control
- 2 6" Cleancon coupler
- 3 Steam jacketing detail
- 4 Purge lines on swivel joint for product detection (for use with toxic fluids and gases)
- 5 Safety Break Valve sectional view
- 6 Safety Break Valve

Cleancon coupler 2

Many tanker loading bays in the food industries are upgrading their loading cycles and rates. Therefore, loading facilities are required, that can cope with higher flow rates. This factor, coupled to the increasingly stringent regulations of H.A.C.C.P., end-users and suppliers and a desire to reduce product contamination to a minimum, has lead to the development of the "KANON Cleancon", a 6" coupler for liquid and high viscosity products.

The KANON Cleancon Coupler is successfully in service in an increasing number of tanker loading bays across the world, providing significant benefits in the field of increased flow rates and reduced product contamination.



KANON FOLDING STAIRS AND PLATFORMS

**SMS**

KANON Folding Stairs provide safe and efficient means of access between a loading platform and road or rail tankers.

- The spring balanced design ensures easy operation by a single operator
- Handrails fitted as standard
- Automatic adjustment to tanker height
- Built to latest safety standards

Optional Accessories:

- Safety Cages available standard sizes of 1400mm deep x 1400mm wide and 1400mm deep x 2800mm wide but can also be manufactured up to 12000mm wide
- Safety wings on both sides of the stair to close the opening between rack and vehicle
- Pneumatic or hydraulic operation
- Position switches
- Wheeled Trolley mount designed to traverse the full width of a platform
- Key interlock system

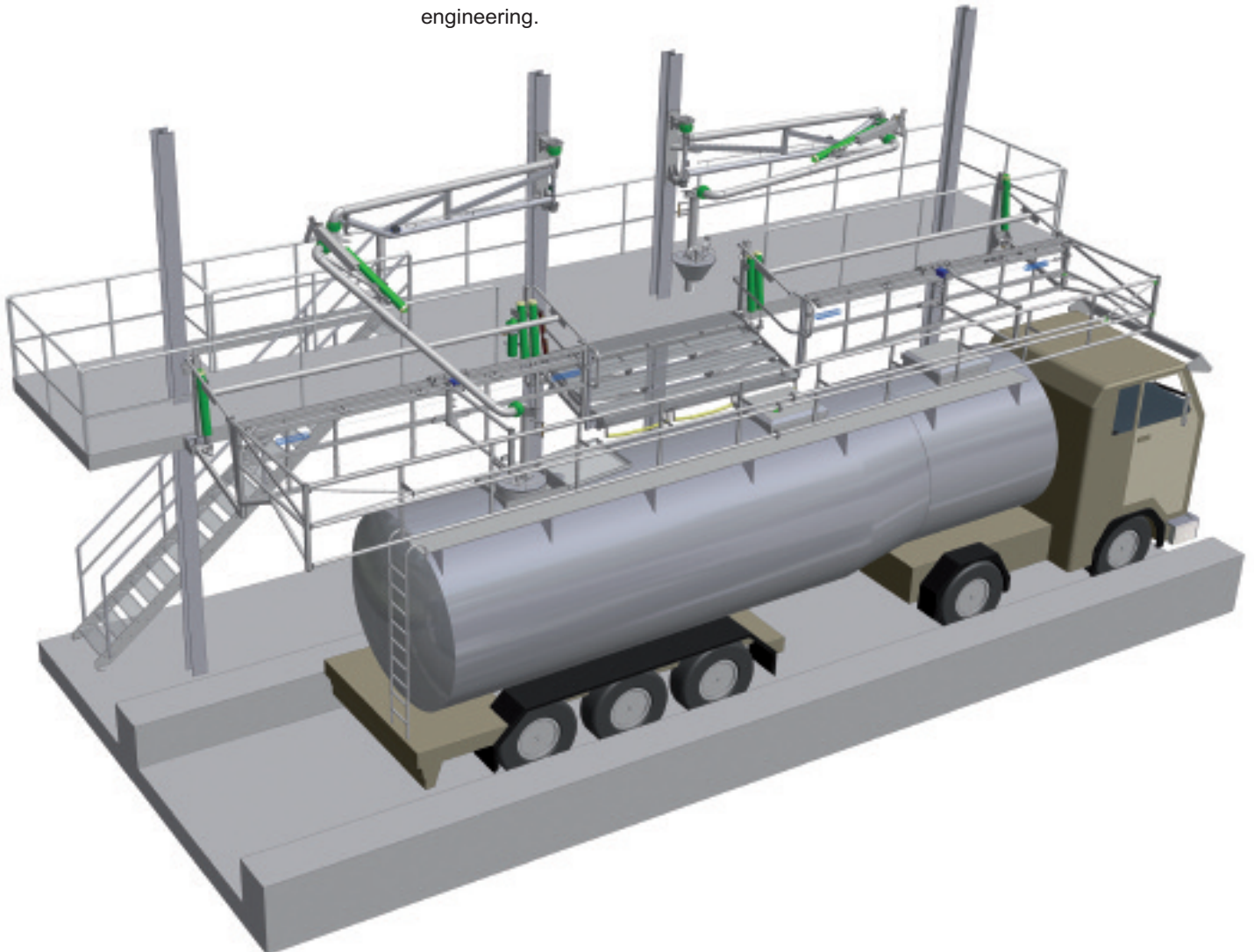
Characteristics of KANON folding stairs

- 3, 4, 5 and 6 step models, FS1250, FS1650, FS2050, FS2450
- Vertical locking device
- Non-slip self levelling steps
- Partly movable second step to prevent trapped feet
- Fully balanced cylinder with integral safe design
- Rubber bumper on last step to prevent tanker damage and static discharge
- Handrails free from sharp edges and installed on nylon bearings
- Heavy duty construction
- Main bearings water and dust tight, maintenance free
- All other rotating joints are made of non-corrosive materials i.e. nylon and stainless steel (no metal to metal contacts, no use of split pins).



KANON's Loading Platforms are used worldwide to achieve safe and easy top access of road and rail tankers from ground level. The Loading Platforms, combined with loading equipment, offer a complete solution without need for separate engineering.

Safety Moveable Stairs (SMS) can be applied in case the rail or road tanker is positioned on a dedicated spot. The SMS provides the possibility to access almost any side of the road or rail tanker or container.



**THERE IS
SO MUCH MORE
TO TELL ABOUT
OUR LOADING
SYSTEMS...**



YOUR PARTNER IN HIGH QUALITY LOADING AND SAFETY SYSTEMS

KANON is a company specialising in loading technology employing experts involved in a continuing programme of development using the very latest techniques and ideas.

KANON has worldwide representation via agents, distributors and a network of associated companies. For further information and to obtain a quotation for your requirements, please contact us either directly at our office in Holland or via our associated companies, details of which are shown below.

General programme

- Marine loading arms
- Telescopic arms
- Swivel joints
- Jumper assemblies
- Floating suctions
- Top and bottom loading arms
- Grounding devices for road tankers rail tankers and ships
- Batch systems, including fluid meters
- Field service
- Folding stairs
- Vapour recovery systems
- Platforms
- Training

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