

MARINE LOADING ARMS FOR LNG

ENGINEERED
FOR GENERATIONS

KANON
LOADING EQUIPMENT



**REALISED IN
PARTNERSHIP**





TOGETHER WE ARE KANON

As a family business specialising in the design, manufacture and installation of loading and unloading systems for marine, road and rail tankers, we employ our passion for loading systems to build relationships and add value to our customers operation. You can count on us for reliability, transparency and a long-term and sincere partnership.

Based in the Netherlands, we are a true Dutch company at heart. The no-nonsense culture suits us. You will see this reflected in our approach. Together, we work hard to achieve the most effective loading result for your situation. Your goals are ours, we reach them together.

We operate on a worldwide basis via a well-trained network of carefully selected agents and associate companies, so there is always a contact near you that understands local requirements. Providing you with the best, durable solution for your application

takes precedent. Our loading systems are in use for the widest range of liquids and gases, from cryogenic to high temperature applications, including the most hazardous or corrosive fluids.

Wondering whether we have a solution for your application? We supply equipment directly to customers and through EPC contractors in all areas of the processing industry including chemical, petrochemical, storage terminals, pharmaceutical, healthcare, food and beverage.

COMMITTED
TO EXCEL

MAKING EFFECTIVE LOADING A PRIORITY

Looking for a partner with an excellent reputation for developing a comprehensive standard and custom made loading systems?

Through years of experience and knowhow we are 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 and durable performance, are the basics for the design of KANON equipment.

Your loading systems are developed by the KANON team of dedicated and experienced engineers, so you can be sure that the latest technology and guidelines are incorporated. A highly skilled service department provides

you with excellent worldwide service. Experienced VCA qualified service engineers are at your disposal to service, maintain and overhaul your loading equipment. You can benefit from their cross-discipline skills in hydraulics, pneumatics, mechanics and electronics, basically your one-stop shop. We uphold the highest quality standards and strongly believe in taking ownership when it comes to your loading results. Providing you with the best and most effective loading solutions is our priority.



THE CRYOGENIC INDUSTRY

The field of cryogenic applications is quite different compared to that of the traditionally ambient products. Loading sequences are more complicated and take longer. The equipment is given the opportunity to cool down slowly prior to the loading sequence and the other way around after the loading sequence.

Working with temperatures of up to -170 degrees Celsius requires due care. A safe working environment is essential and protection for operating personnel needs to be implemented, for example by adding insulation on the accessible parts.

While all swivel joints for different applications are applied with grease, the swivel joints for cryogenic have to be constantly purged during loading, due to the fact that there is no grease in the swivel joints because it does not last in cryogenic circumstances.





KANON LNG MARINE LOADING ARMS

Our cryogenic solution is unique in its kind. It boasts a separate supporting structure bearing the loads of wind, a possible earthquake as well as the construction itself. The product carrying part is integrated in the supporting structure, thus the pipe can shrink and expand to accommodate the temperature differences that occur in cryogenic applications.

The strongest link

Contrary to other loading arms in the market, the rotating parts on a Kanon Loading arm are conceivably the strongest feature of the arm. Designed to be stronger than the piping and they are a robust link when subjected to structural loads and prevent leakage.

Efficient, high quality parts are inherent in our design ethic. We do not compromise when it comes to safety and efficiency for your loading operation: Our swivel joints are designed by our highly qualified R & D professionals and fully tested in line with the latest OCIMF guideline. Well known in

the market, they offer excellent leakage prevention, machined ball races. On top of that, the swivels and flanges are subjected to less force because of the stable construction of the loading arm, making sure your loading solution is utmost reliable.

Operator favourite

Kanon marine loading arms boast an easy, straightforward operation, well appreciated by operators in the field. Able to be single person operated, they offer manual or hydraulic control options, depending on the loading operation requirements. Since the balance of the arm is set for a lifetime, no field adjustments are necessary, saving you valuable operating time.

Engineered for generations

An excellent handling of structural loads, symmetric and elegant design, fewer yet higher quality parts: Kanon Loading arms are engineered for a long life-time in the field and offer you a wealth of loading possibilities as well as great loading efficiency.

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



RELIABLE LNG BUNKERING SOLUTION

Our Bunker Boom has been developed from existing, field proven hydrocarbon systems, applied for many years in leading ports such as Rotterdam, Amsterdam, Antwerp and Hamburg and is now successfully in action for LNG bunkering in both North-European and Asian ports.

More and more ships are adapting their engines and changing their running energy to LNG.

- LNG provides less Co2 emissions and is therefore a part of environmental shipping regulations
- LNG pricing is more cost-effective and stable than conventional fuels
- LNG fuel supply / logistics from source to bunker spot provides more possibilities

Kanon Loading Equipment and van Wijk-Werkendam, adapted an existing bunkering system to meet current and future LNG bunkering demands, the Bunker Boom. The technology of this solution allows for a much larger connection range than the

conventional fully rigid marine loading arms. It provides fast connections possibilities to low and high receiving ship's manifolds, combining the rigidity of hydraulically driven hard piping with the flexibility of hoses at the ships interface side, making connection possible to almost all receiving ships. The Bunker Boom will save manpower and improve ease of use.

What differs from the older fuel oil and diesel bunkering facilities is the fact that for LNG, an Emergency Release System (ERS/ERC) is an absolute requirement. This system, comprising of two valves that are closing and then separating from each other, serves as a 'drybreak' system preventing uncontrolled spillage in case connected ships accidentally move too far away from each other.



NO DEDICATED
WHARF
NECESSARY



FUTURE FORWARD LNG BUNKERING

The major advantages of our bunkering solution, mounted on a bunkering vessel:

Minimizing docking time

The bunkering vessel is used for parallel berthing to allow simultaneous bunkering of receiving vessels with their commercial loading and offloading activities, thus minimizing docking time.

Flexibility and operational range

To ensure a good variety of connection possibilities the boom provides maximum flexibility and a very wide operational range, as the position of bunker connections on commercial vessels are not standardized as oil and LPG/LNG carriers may be (ref. OCIMF). Bunker connections can be found in various places, sometimes only reachable via a hatch in the hull of the ship. The

Bunker Boom can reach all different locations and compensate for important height differences between the bunker vessel and the receiving vessel.

Bi-directional

The same bunker arm can be used to fill the bunker vessel from storage tank on shore.

Safety

The Emergency Release drybreak system of the Bunker Boom prevents uncontrolled spillage in ship2ship bunkering in case the ships accidentally move too far away from each other.

Indifferent Manifold positions

Fast connection possibilities to low and high receiving ship's manifolds.



BUNKERING IN LESS TIME

One of the most interesting advantages of a bunker boom for LNG, is the possibility to proceed with LNG bunkering without interruption of the receiving vessel's normal activities, as proven in Stockholm for the Viking Grace: for example, a passenger cruise ship can moor at its standard wharf at the harbour, off-load its passengers while bunkering (refueling) at the same time. No need for it to wait and to sail on to a dedicated LNG bunkering jetty.

This is a non-negligible time/money saving. For normal marine diesel applications, it is already a standard.

Safety being of the essence, the Bunker Boom is executed with an automated Emergency Release System to allow safe disconnection in case either ship would drift away from each other or in case of any other emergency.

This safety system is SIL 2 classified.

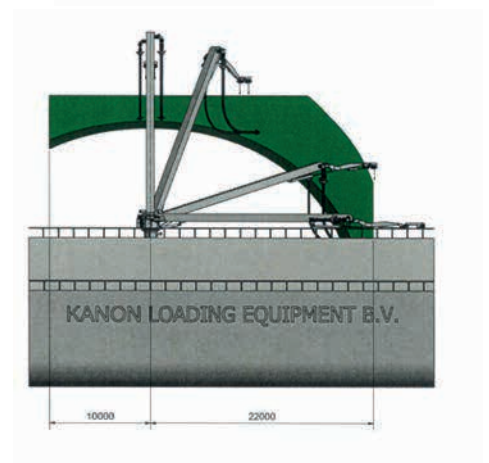
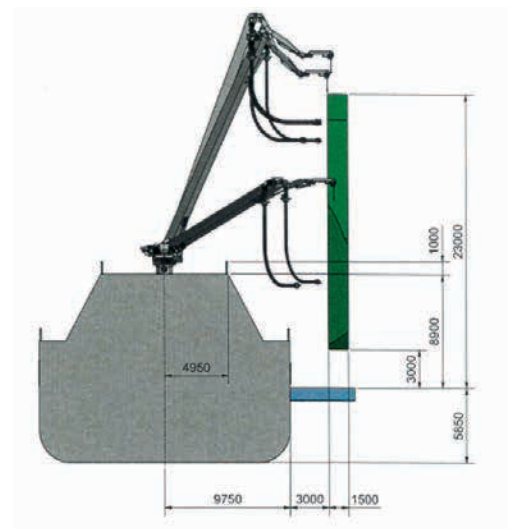
BUNKERING WITHOUT INTERRUPTION OF THE RECEIVING VESSEL'S NORMAL ACTIVITIES





The Bunker Boom' technology allows for a connection range much larger than the conventional LNG transfer system.

Fast connection is possible to low and high receiving ship's manifolds combining the rigidity of hard piping, hydraulically driven with the flexibility of hoses at the ships interface side. Making connection possible to all receiving ships. it will save manpower and improve ease of use.



MAKING CONNECTIONS POSSIBLE TO ALL RECEIVING SHIPS



SAFETY FIRST

ERC's: one on the liquid line, the other on the vapour line: They ensure safe release in case either ship would drift away further than the maximum hose length. The system is SIL 2 and provided with a 2oo3 voting principle for ESD2

THE DRY BREAK EMERGENCY RELEASE COUPLER IS HYDRAULICALLY ACTIVATED AND TESTED AT THE LNG OPERATING TEMPERATURE



EXTRA FEATURES

- VACUUM INSULATED PIPING
- FREE CHOICE ERC
- VARIOUS HOISTING AIDS
- PURGING

BUNKERING PARTNERSHIP

Kanon Loading Equipment B.V.

Founded in 1978, Kanon Loading Equipment B.V. develops high-quality custom loading arms for Marine, Rail and Road liquid transfer systems. We are a family business from the Netherlands, which is reflected in our values. Reliability and transparency are key for us and we work passionately in a long-term partnership with our customers.

The Dutch no-nonsense culture fits us well. We work hard to get the best results for our clients. Our products are engineered to last. We build low maintenance loading arms with an active life-span of up to 30 years, which makes our clients investment worthwhile.

KANON operates on a worldwide 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 has supplied equipment directly to customers in all areas of the processing industry including chemical, petrochemical, storage terminals, pharmaceutical, healthcare and more.

Van Wijk - Werkendam

Officially founded in 1959 Van Wijk B.V. is a no-nonsense mechanical engineering company specialized in customization for the maritime industry. Van Wijk is a leading producer and ship repair company for inland vessels and a renowned partner in Western-Europe. In addition to repairs, Van Wijk supplies large ship parts for inland shipping. The products designed, produced, placed and repaired at Van Wijk include: bow thrusters, hydraulic car and bunker cranes, hydraulic installations, winches, spud poles, wheel houses and wheelhouse lifts. We also deliver ship parts to maritime companies for sea vessels or offshore industry.

We have a spacious production facility, own ground and a large quay in the maritime hotspot Werkendam. Innovation and technical solutions for our happy and loyal customers let us grow and we have long standing relationships with our clients, personnel and suppliers. Keywords for Van Wijk are service, innovation and quality.




LNG MARINE LOADING ARM



The **LNG MARINE LOADING ARM** is developed to support shrinking and expanding occurrences in cryogenic applications. The state of the art material and the distinctive support frame design accommodates the warming up and cooling down process. Traditionally LNG arms are designed with cables and wheels: we improved the LNG marine loading arm design and integrated our rigid pantograph, an absolute operator's favourite since the balance does not need to be adjusted ever in the field.

FEATURES

- RIGID PANTOGRAPH
- SUPPORT CONSTRUCTION
- INTEGRATED BEARING
- CRYOGENIC ERS INSTALLED IN ABOUT 100 PLANTS AROUND THE WORLD



YOU ARE WELCOME TO
VISIT OUR FACILITIES ANY
TIME! A SHORT IMPRESSION
OF OUR GLOBAL CAPACITY

PRODUCTION FACILITIES

Our production facilities in The Netherlands and Malaysia provide extensive capacity to uphold our priority to supply you with qualitative, safe and effective loading arms. Experienced and certified personnel make sure your loading arms are manufactured and tested according to the highest quality guidelines.

Head Office

Our Head Office is the Kanon nerve centre. The dedicated Kanon Team works in partnership with you to provide you with the most effective loading arms in the business.

Biddinghuizen, The Netherlands

Our facility in The Netherlands has a testing capacity of up to 13 loading arms. The facility houses all necessary top quality welding, testing and other manufacturing equipment and a highly qualified staff.

Kuantan, Malaysia

To cater to clients all over the world, a second and large, 30,000 m² production capacity is situated in Asia. Our Malaysian office is in close proximity to the production facility. They make sure production is up to the highest standards and liaise with our head office on a daily basis.

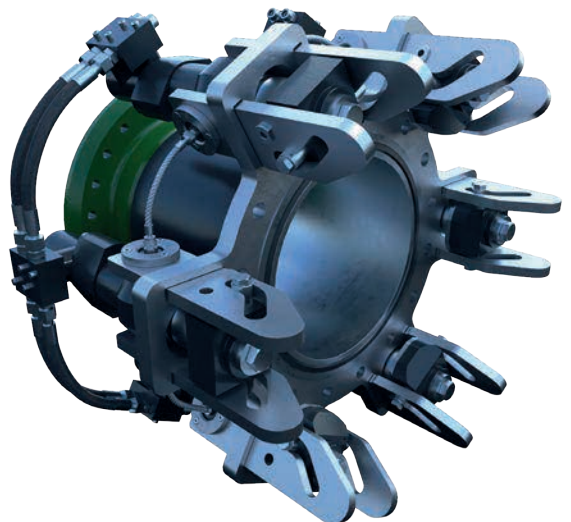
STATE OF THE ART LOADING ARM ACCESSORIES

Explore some of the accessories we offer to complement your Kanon Marine Loading Arm. Our offers are accompanied by comprehensive advice on all our accessory options, catered to your particular situation.

HYDRAULIC QC/DC

Hydraulic quick couplers offer the possibility of connecting the marine loading arm to the ship's manifold by means of a single push button, from a remote distance. They are known in the market as very robust and straight forward connectors.

- CENTRING GUIDE IN ORDER TO EASE ACTUAL MANIFOLD CONNECTION
- MANUAL RELEASE AT ALL TIMES



- BALL VALVES
- APPLIED IN OVER 235 PROJECTS WORLDWIDE
- ULTRA LIGHT DESIGN

EMERGENCY RELEASE COUPLER

The ERC is part of our range of Emergency Safety Systems (ESS). Designed to provide best possible safety in fluid loading/unloading when using Marine Loading Arms. An 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.



ROBUST, SAFE & STRAIGHT- FORWARD

SWIVEL JOINTS

Our LNG loading arms are equipped with swivel joints rigorously tested to meet ISO 16904 standards. Undergoing 400,000 revolutions under cryogenic conditions, at maximum load, simulating five years operation at a typical LNG terminal. Achieved without the need to replace a single seal, ensuring exceptional reliability and durability and meeting the highest industry standards.

- HIGH TAILORED BALL RACES ENSURING LIGHT OPERATION
- LARGE-DIAMETER BEARING BALLS ENSURING THE ABILITY TO HANDLE HIGH LOADS
- PRODUCT SEAL REPLACEMENT WITHOUT NEED FOR BALL REMOVAL
- LOW MAINTENANCE
- SWIVEL NITROGEN PURGE LINE ENSURES MOIST FREE BALL RACES
- FUNCTION CONTROL DEVICE ENSURES TIMELY AND PRECISE LEAKAGE MONITORING, PREVENTING DAMAGE

A CLOSER LOOK AT SOME KANON LOADING ARM FEATURES

COUNTERWEIGHT

Double rotating counterweight, in order to keep both inboard & outboard sections aligned and in perfect balance.



PARALLEL

The parallel is the rigid link between the outboard section and the counterweights, a big advantage of the rigid structure is that the balance is set once in the factory and does not need to be adjusted in its entire lifetime.

7 REASONS TO BUY KANON

1

**PRACTICALLY ZERO
MAINTENANCE**

**DESIGNED
FOR ALL
APPLICATIONS**


2

3

**GUARANTEED
LOW COST OF
OWNERSHIP**

4

**RIGID
PANTOGRAPH,
PROVIDING
LIFETIME
BALANCE**



**UNIQUE SWIVEL
JOINT DESIGN
RESULTING
IN MAXIMUM
UPTIME**

5

**LIGHT AND
ERGONOMIC
DESIGN**

6

7

**UNPARRALLELED
ENGAGEMENT**

V.L.: 20T

CONTROL SYSTEMS

A straightforward, safe and effective operation of your loading arms takes precedent in our control system design. We make sure you are in full control, with systems that suit your particular situation.



ELECTRIC - HYDRAULIC CONTROL SYSTEM

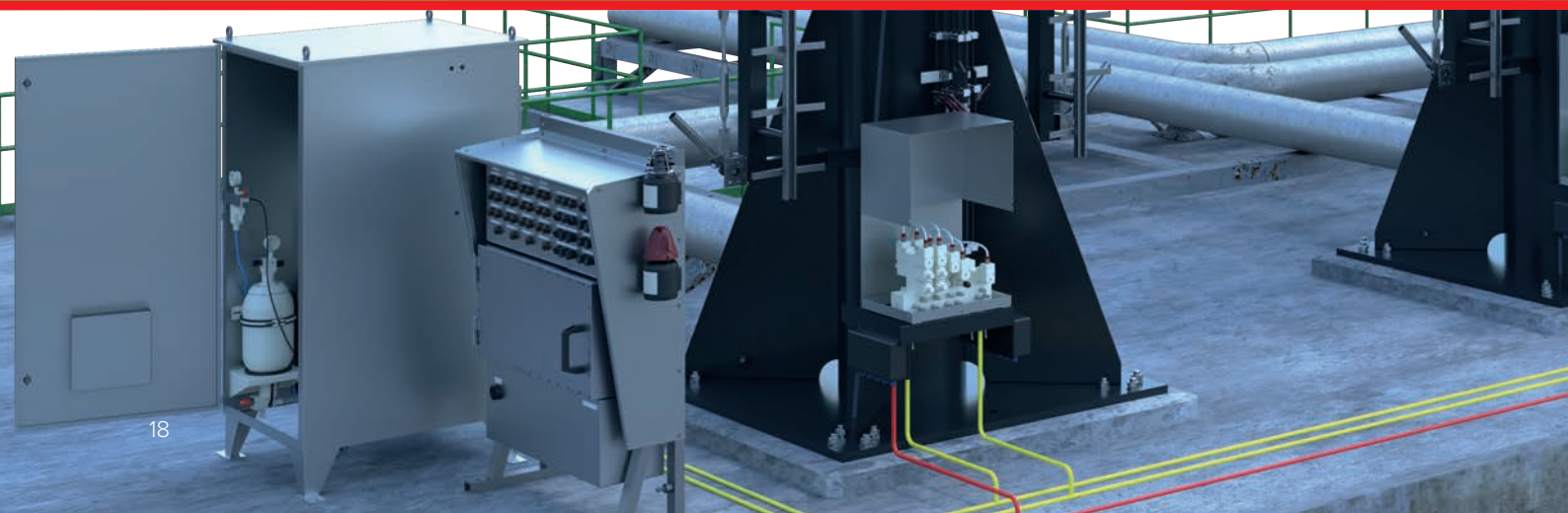
Our loading arms are typically operated hydraulically and controlled by means of a control cabinet provided with a P(rogrammable) L(ogic) C(ontroller).

Together with our partners (for 30 over years) Stahl / Electromach & Vydraulics we keep things simple, up to date and in accordance with the latest standards.

Important features

- In-house manufacturing Exd, Exe and Exp cabinets.
- Complete product portfolio of Stahl
- In-house engineering/CAD/software/ Production/FAT.
- Certified Functional Safety Engineers (TUV)
- Control systems are certified in accordance with local laws; ATEC, IECEx, ETL, Kosha/ KGS, PESO, INMETRO, CCC
- Project specific design specifications
- Optimised solutions for the specific situation
- Combined Exde housings for easy installation field cables
- PLC based control systems such as Allen-Bradley, Siemens, HIMA etc.
- Easy communication to DCS trough; Ethernet TCP/IP, Modbus RTU, Profinet, Fibre Optic, etc
- Automatic start/stop of the pumps in the hydraulic power pack
- Multiple operating possibilities; Local control panel, Pendant and Radio
- Customised I/O
- Safety Integrated Loops

No big hydraulic powerpack is required due to customised cylinders that prevent oil displacement.





HAZARDOUS AREA

Important features

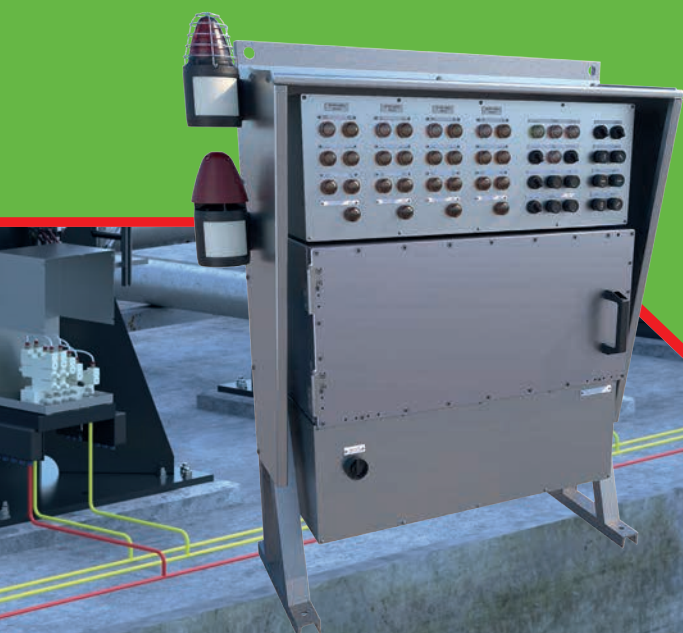
- Galvanised steel frame;
- Compact design;
- IP66;
- Exd housing made of copper free aluminium (special marine grade) or stainless steel;
- Stainless steel 316L control & terminal housing for easy maintenance and installation (field cables);
- Multi certified zone 1 solution for use worldwide (ATEX, IECEx, cETLus, PESO, KOSHA...)



NON-HAZARDOUS AREA

Important features

- Rittal VX25 based panel;
- Easy access and maintenance due to installation in safe area;
- With front access only or with front and rear access;
- Flexible design with possibility of combining multiple enclosures into one panel.
- Compact design;
- IP66;
- Stainless steel 316L control housing for easy maintenance and installation (field cables);
- Stainless steel station;
- Stainless steel protection cover;
- Multi certified zone 1 solution for use worldwide (ATEX, IECEx, ETL, PESO, KOSHA...)



AFTER-SALES

Our fully equipped after sales department that understand your needs, is ready and standby to service your loading arms at any time, offering the following services:

- Installation
- Commissioning
- Supervision
- Annual Inspection
- Survey
- Maintenance, Repair & Modification
- Training on the job for operators and maintenance personnel
- Overhaul

WE WILL BOOST
YOUR LOADING
ARM UPTIME
AND REDUCE
YOUR COST OF
OWNERSHIP





Experience

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.

Annual Inspection

Kanon's inspection program ensures the performance of your equipment and includes preventive maintenance. Regular inspection will result in a lower cost of ownership and also safeguard the operator, the environment as well as your loading equipment.

Kanon subsequently issues a dedicated inspection report for each individual loading arm.



**SCC certified – managing
your risk is our priority**

GLOBAL PRESENCE

WITH OVER 2500 MARINE LOADING ARMS INSTALLED WORLDWIDE

ALGERIA
ARGENTINA
AUSTRALIA
BAHAMAS
BAHREIN
BELGIUM
BULGARIA
CANADA
CHILE
CHINA
COLOMBIA
CROATIA
CUBA
CYPRUS
DENMARK
EGYPT

ESTONIA
FINLAND
FRANCE
GERMANY
GHANA
GREECE
INDIA
INDONESIA
IRAQ
ITALY
JAPAN
JORDAN
KOREA
LATVIA
LITHUANIA
MALAYSIA
MEXICO

MOROCCO
MOZAMBIQUE
MYANMAR
NETHERLANDS ANTILLES
NETHERLANDS
NEW ZEALAND
NORWAY
OMAN
PAKISTAN
PANAMA
PERU
PHILIPPINES
POLAND
PORTUGAL
QATAR
ROMANIA
RUSSIA

SAINT LUCIA
SAUDI ARABIA
SINGAPORE
SOUTH AFRICA
SPAIN
SRI LANKA
ST. EUSTATIUS
SWEDEN
TAIWAN
THAILAND
TURKEY
UKRAINE
UNITED ARAB EMIRATES
UNITED KINGDOM
UNITED STATES
VENEZUELA
VIETNAM



**CONNECT WITH
LOADING EXCELLENCE**

YOU CAN RELY ON OUR LOADING ARMS

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