



INTRODUCTION TO MANULI HYDRAULICS

FOCUS PRODUCTS

HYDRAULIC HOSES

The Manuli Hydraulics range of hydraulic hoses is divided into 3 categories based on the hose performance. These categories are:

- Global Standard - Hoses which meet the international specifications
- Hi-Grade - High performance range of hoses for demanding applications, including both isobaric and traditional families
- Premium - Hoses designed for the utmost performance and specific applications

All Manuli Hydraulics' hoses have a range of fully integrated fitting solutions available, to ensure that every hose assembly meets our exacting standards.



HYDRAULIC FITTINGS

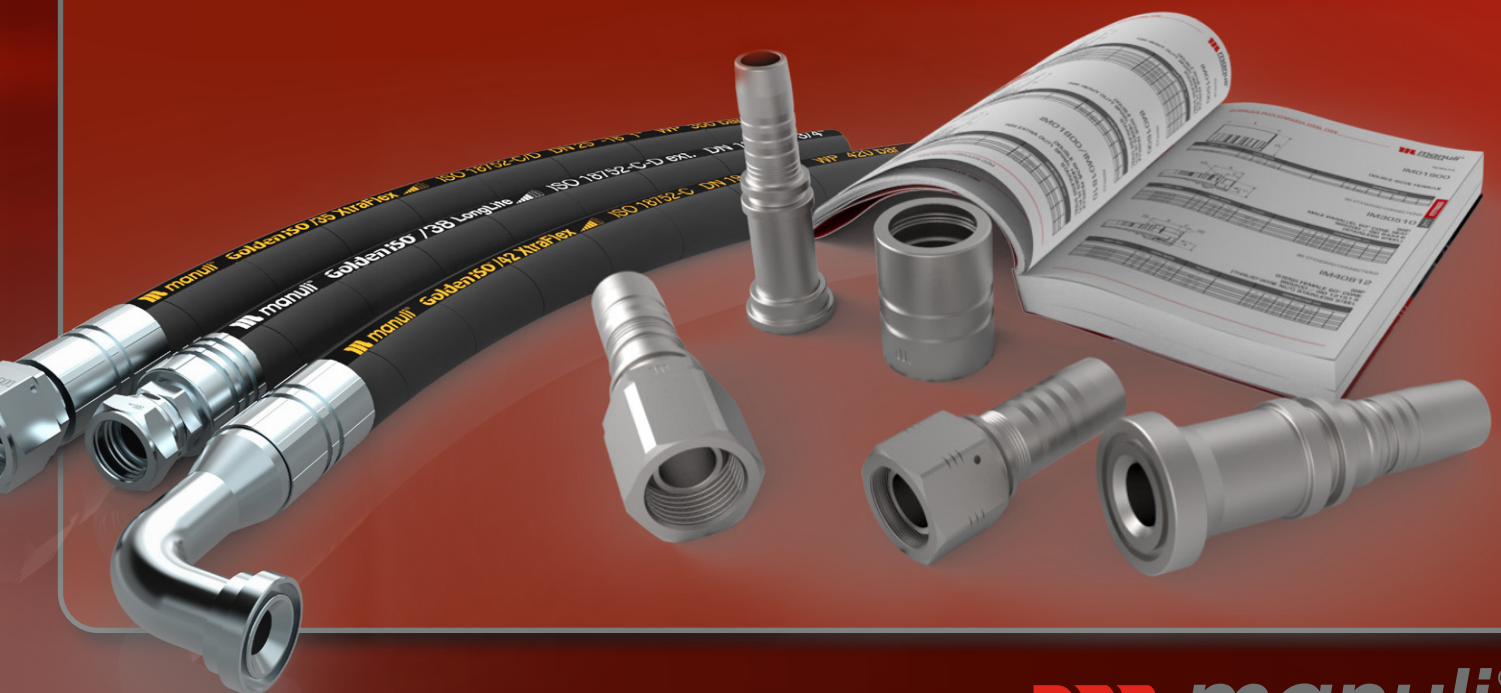
In order to allow our range of crimped fitting solutions to suit almost any application, Manuli Hydraulics also offers a huge range of termination end options. Almost every possible termination end used in hydraulic systems is available off-the-shelf, producing over 12,000 standard references across the portfolio.

Termination end types covered include:

- BSP
- Metric / DIN
- SAE
- ORFS
- NPTF
- JIC
- JIS
- Code 61 & 62 flange

Manuli Hydraulics also offers a range of OEM standard connections such as SUPERCAT and KOMATSU flanges, as well as our unique XTRAFANGE solution, which is compatible with Code 61 & 62 flanges, but which offers a more robust connection for the most extreme applications .

Manuli Hydraulics offers both two-piece and one-piece fitting solutions, as well as skive and no-skive options.



FOCUS PRODUCTS – CONT.

Q.SAFE QUICK COUPLINGS & CHECK VALVES

The Q.Safe range of quick couplings by Manuli Hydraulics is globally renowned for their superb performance, resilience and reliability. With an extremely broad spectrum of coupling types - over 1,200 references - ranging from standard ball and poppet valves to our world class flat face range, Q.Safe represents the gold standard for hydraulic quick couplings.

Every single coupling undergoes stringent visual, functional and leak inspections prior to leaving the factory, and comes with either our standard E Coat plating (500 hours to red corrosion under salt spray test according to ISO 9227 and ASTM B117) or our E Coat 1000 plating (1,000 hours to red corrosion).

In addition to our quick coupling adaptors, Manuli Hydraulics also offers our unique direct-to-hose (DHI) quick couplings which provide a reduced risk of leaks and assembly mistakes, whilst also reducing the overall cost of the hose assembly.

Manuli Hydraulics also have a range of multiconnectors which use our best-in-class flat-face quick couplings to provide quick, easy connection of multiple lines in a single operation.

We also stock a wide range of check valves in both adaptor and DHI configurations. The Manuli Hydraulics check-valves range comprises hundreds of off-the-shelf configurations, but also offers customers the flexibility to design their own check valve that suits their needs perfectly.

With over 8 billion possible configurations we are confident that we can supply exactly what you need, whatever that may be.



SMART CONNECTORS

At Manuli Hydraulics we pride ourselves on our innovative approach to tackling the everyday challenges encountered by our customers. Through a dedicated program of R&D, coupled with partnerships with some of the world's leading OEMs, we have developed the Smart Connectors range of products.

Smart connectors do exactly what the name suggests, and offer intelligent and innovative solutions to some of the most common issues encountered by hydraulic system designers in real-world applications.

The Manuli Hydraulics Smart Connectors range consists of:

- Rotofit
- Easyfit
- Fastfit
- Fastfit disconnectible
- Adjustable flanges



ASSEMBLY MACHINES



As the world's leading supplier of integrated hydraulic connector solutions, our assembly machines range has been developed with one major purpose - to ensure that every hose assembly meets the same high standard as the last. It is because of the synergy between our hoses, fittings and assembly machines that Manuli Hydraulics is able to offer a performance guarantee on hose assemblies that no other company can match.

Manuli Hydraulics' assembly machines cover the entire assembly process including:

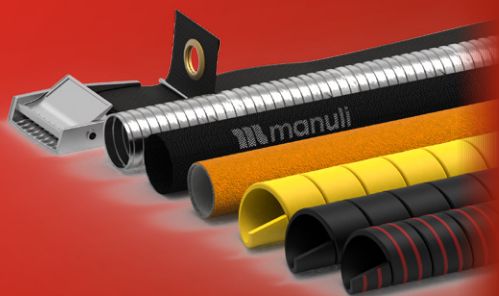
- Cutting
- Skiving
- Crimping
- Pressure testing
- Insert pushing
- Marking
- Hose cleaning

Our integrated approach has also led us to develop the Safe Crimp System (SCS), which is an automated system that ensures every crimp meets the necessary specifications and uses the most up-to-date crimping data, thereby reducing to an absolute minimum the possibility of human error.

Manuli Hydraulics also offers a range of workshop modules tailored specifically to meet the requirements of various scales of assembly operation.

From mobile maintenance vans to large volume OEM assembly workshops, the Manuli Hydraulics range of assembly machines allows everyone to achieve factory-standard assemblies regardless of the scale of their operation.

HOSE PROTECTIONS



With our extensive experience in the hydraulic fluid connectors sector, we have developed a strong, easy to install, and high-tech range of hose protections. Manuli Hydraulics' hose protections are dedicated to heavy-duty, demanding applications to prevent injury, fluid jetting, abrasion or hose bundling. Hose protections can reduce downtime and maintenance costs and our range meets all the safety requirements of International specifications such as ISO, EN and SAE.

The range consists of:

- Protection spring
- Mining protection spring
- HT protection spring
- Textile sleeve
- Fire sleeve
- Heat shrinkable sleeve
- Stainless steel armour guard
- Textile clinch strap

ENVIRONMENTS & APPLICATIONS

REFRIGERATION

The Manuli Hydraulics Refrigeration product range consists of reinforced rubber hoses, fittings, hose assemblies and kits. Each and every product is designed specifically to meet even the most restrictive requirements for:

- Mobile air conditioning systems for off-highway industrial vehicles, buses, trains, leisure vehicles and applications such as emergency vehicles.
- Mobile refrigeration systems for small-medium vans, refrigerated trucks and refrigerated shipping containers

Manuli Hydraulics also offers both standard crimped fittings as well as field-attachable fittings which allow convenient mounting and disassembly on-site.



WATER CLEANING & BLASTING

The Manuli Hydraulics water cleaning hose range is dedicated to hobby and professional water cleaning machines, with cold and hot water. Meanwhile the water blasting hose range is designed for maximum robustness and easy handling. It has a dedicated fitting solution to meet the safety and performance criteria connected with blasting applications.



MINING

Manuli Hydraulics is a world leader in the supply of staplelock, super staple-lock and flushfit adaptors, staple ball valves and hydraulic hose assemblies used in underground coal mining.

As part of an integrated mining programme, Manuli Hydraulics provides a comprehensive range of mining hoses, staple hose fittings, XXL flanges and rotary staple couplings.

All products are fully tested and approved to International standards and have been successfully used in most major mining countries.



OIL & GAS DRILLING

Manuli Hydraulics offers a dedicated range of drilling hoses and fittings, assembled at our API certified facilities in the UK and US. Our facilities are licensed to use the API monogram with an extended range of products tested to API 5L, API 7K and API 16D standards.

Our products cover the majority of drilling applications from rotary drilling and cement hoses, to grease injection and BOP hoses.

All welded fittings are fabricated by ASME Section IX certified welders and testing certificates are also available. Our quality systems are fully compliant with the latest edition of API Q1, allowing us to exercise full control over all aspects of the hose assembly, build and validation process.



CONSTRUCTION



AGRICULTURE



FORESTRY



DEMOLITION



HANDLING / LIFTING



TRANSPORT / SHIPPING



EMERGENCY HYDRAULICS



WIND TURBINES



SOCIAL RESPONSIBILITY & SUSTAINABILITY

In modern industry it is becoming increasingly obvious that it is not enough to simply offer the best products - companies must also be able to demonstrate that they are working to maximise the safety of their employees whilst minimising the environmental impact of their activities. Manuli Hydraulics doesn't just demonstrate this philosophy, we live it and hold it fundamental to the way in which we operate our facilities around the world.

HEALTH & SAFETY POLICY

We are committed to safeguarding people's health and safety on the work site. Manuli Hydraulics was the first company in the hydraulic sector to achieve the Occupational Health and Safety Assessment Series (OHSAS) certification in 2005.



OHSAS 18001 CERTIFIED PLANTS

- Manuli Hydraulics (Suzhou) – PRC, Hydraulic Hoses
- Manuli Hydraulics (Suzhou) – PRC, Hose assemblies

ENVIRONMENTAL POLICY

At Manuli Hydraulics we recognise that we have a responsibility to the environment that goes beyond legal and regulatory requirements. We are committed to ensuring that we pursue our business goals in an environmentally responsible and ethical manner by reducing our Carbon Footprint and improving our environmental performance whenever possible.



We pursue these goals on both a personal and operational level by ensuring that we foster a culture of environmental responsibility throughout our organisation.

We also adopt a sustainable development model through the engineering of products and operational methods with low impact on the environment and people's health.

Our manufacturing and assembly facilities also comply with all the requirements of the ISO 14001:2015 Environmental Management System.

ISO 14001 CERTIFIED PLANTS

- Manuli Hydraulics (Suzhou) – P.R.C., Hydraulic Hoses and Hose Assemblies
- Manuli Hydraulics Polska – Poland – HY Connectors, Refri & A/C systems
- Manuli Hydraulics UK – United Kingdom – Hose assemblies
- Manuli Hydraulics Europe – Czech Rep. – Hose assemblies
- Manuli Hydraulics Korea – Korea – Hose assemblies
- Manuli Hydraulics India – India – Hose assemblies



QUALITY POLICY

Quality is the driving force for all Group activities. MRI was the first European hydraulic components manufacturer to achieve in 1992 the ISO 9001 certification. All manufacturing plants are currently ISO 9001 certified and two companies are also certified API Q1, in UK and USA.



ISO 9001:2015 CERTIFIED PLANTS

- Manuli Hydraulics Italia – Italy, Headquarters & Innovation Center
- Manuli Hydraulics Polska – Poland, HY Connectors, Refri & A/C systems
- Manuli Hydraulics Manufacturing (Radomsko) - Poland, Hydraulic Hoses
- JLLC Manuli Hydraulics Manufacturing Bel (Orsha) – Belarus, Hydraulic Hoses
- Manuli Hydraulics UK (Halesowen) – UK, Mining and Drilling Hose assemblies & parts
- Manuli Hydraulics – France, Assembling machines
- Manuli Hydraulics (Americas) – USA, Drilling Hose assemblies & parts
- Manuli Hydraulics (Suzhou) – P.R.C., Hydraulic Hoses and Hose Assemblies
- Manuli Hydraulics Europe - Czech Rep., Hose assemblies

- Manuli Hydraulics - India, Hose assemblies
- Manuli Hydraulics Korea - S. Korea, Hose assemblies
- Manuli Otim - France, Hose assemblies
- Techmaflex - France, Assembling machines

API MONOGRAM LICENCEES:

- API Spec 5L-0963 - Manuli Hydraulics Polska – Poland
- API Spec 7K-0430 – Manuli Hydraulics UK - UK
- API Spec 7K-0485 – Manuli Hydraulics (Americas) – USA
- API Spec 7K-0309 - Manuli Hydraulics (Suzhou) – P.R.C.

API Q1 CERTIFIED PLANTS

- Manuli Hydraulics UK - UK
- Manuli Hydraulics (Americas) – USA

THIRD PARTY APPROVALS

Manuli products meet and exceed the highest industry standards as proven by the achievement of our extensive list of technical approvals issued by third party accreditation bodies.

MINING APPROVALS

- FRAS (Fire Resistant and Anti-Static Australian Dept. Mineral Resource)
- MSHA (Mine Safety and Health Administration – USA)
- Polish B Safety certification
- MA (Chinese Mining Approval)

OIL & GAS APPROVALS

- API (American Petroleum Institute) Monogram License 7K
- API (American Petroleum Institute) Monogram License 5L
- API (American Petroleum Institute) 16D Fire test
- QS mark by AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China)

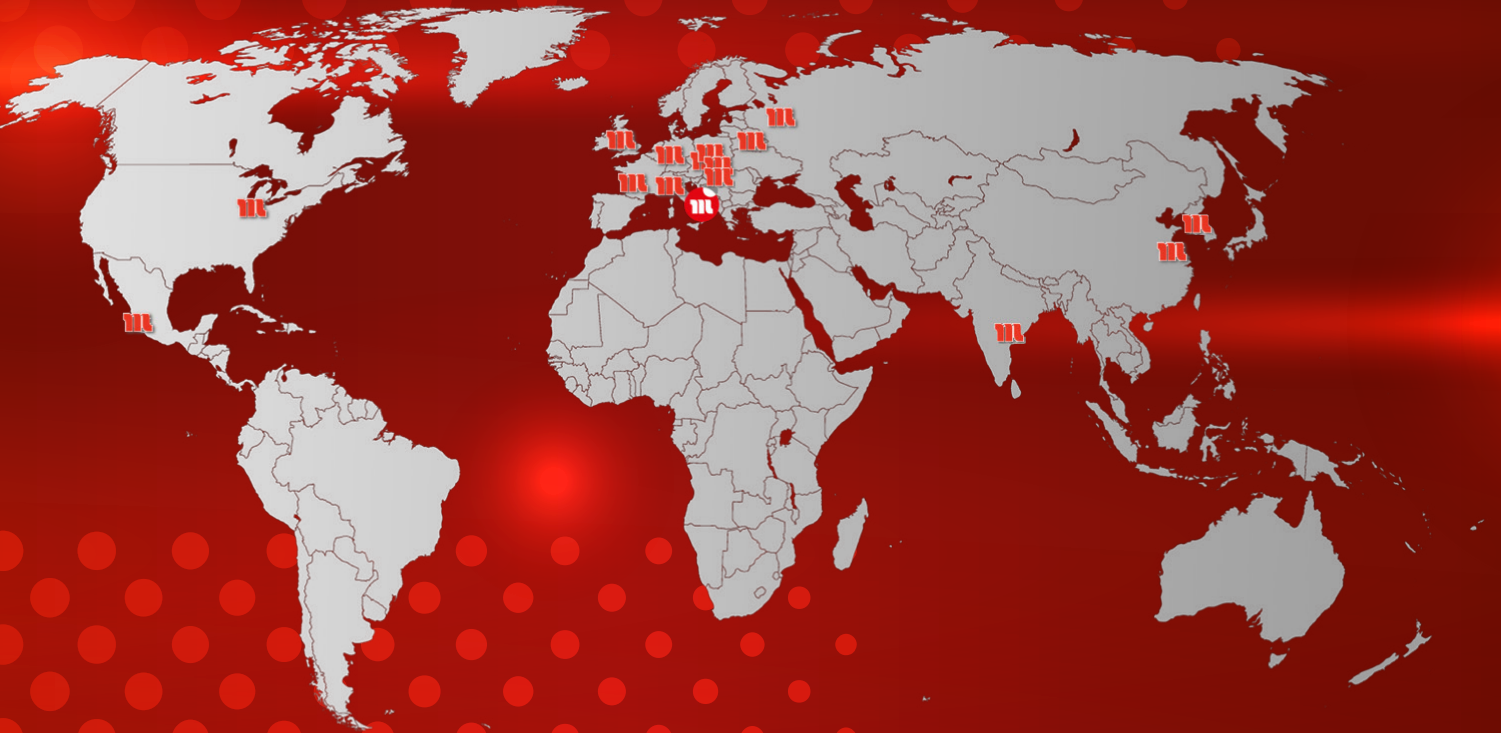
MARINE EQUIPMENT APPROVALS

- ABS (American Bureau of Shipping)
- BV (Bureau Veritas)
- DNV-GL (Det Norske Veritas – Germanischer Lloyd)
- MED (Marine Equipment Directive)
- RINA (Italian Bureau of Shipping)
- KRS (Korean Register of Shipping)
- LR (Lloyd's Register of Shipping)
- CCS (China Classification Society)
- NKK (Nippon Kaiji Kyokai)

GOVERNMENT SAFETY APPROVALS

- DB (DIN 5510-2) – German Railway
- DB (EN 45545-2) – Europe Railway (requested)
- CU-TR – Russian Fed. & CIS
- EN 81-2 – Safety of hydraulic elevators

GLOBAL PRESENCE



Manuli Hydraulics has a global footprint that allows us to provide first-class products and services to our customers regardless of their location. Our network of wholly-owned facilities supports all our sales, manufacturing, customer service and development activities as well as providing global hubs which supply a vast distributor network which covers 6 continents.

CHANNELS TO MARKET

At Manuli Hydraulics we serve a wide range of customers through three distinct channels:

WHOLESALE (WHS)

- We partner with dozens of smaller businesses around the world to provide a global supply network which services both OEM customers and aftermarket spares and replacements

OEMS (CHINA AND US)

- We directly supply both individual parts and full assemblies to many world-renowned OEMs through our Chinese and US based operation

RETAIL

- Our exclusive retail partner, Fluiconnecto, also operates a global network of HydroShops which bring Manuli products to the front line by making them available to end users directly



RESEARCH & INNOVATION

Innovation and technical competence are at the heart of everything we do, so it is unsurprising that we have heavily invested in research, development and training on a global scale with the Manuli Innovation Centres (MIC). Technological and product innovation is the result of intense research activity conducted by highly skilled international engineers at our Innovation Centres located in:

- Italy – MIC HQ
- France
- Poland
- UK
- China

Each of these facilities is equipped with advanced testing and laboratory equipment, focused on developing highly technological, integrated solutions for customers and users.

AREAS OF ACTIVITY

- Knowledge management and specialist competence in general hydraulics, underground soft rock and open pit mining, drilling and off-shore, refrigeration applications
- Rubber technology and materials development
- Advanced design methodologies
 - CAD design
 - FMEA analysis
 - FEM design
 - Benchmarking and Reverse Engineering
 - Design of Experiments
 - Simulation techniques
- Development of integrated solutions for hoses, fittings, crimping processes, quick couplings and assembly machines
- Prototyping, qualification and validation
- High-tech vibrations simulator combined with fatigue simulation test
- Technical service and application engineering
- Product management, personalized OEM solutions and distribution products
- Technical Training by our experts
- Development of eco-friendly solutions, preventing the use of banned substances

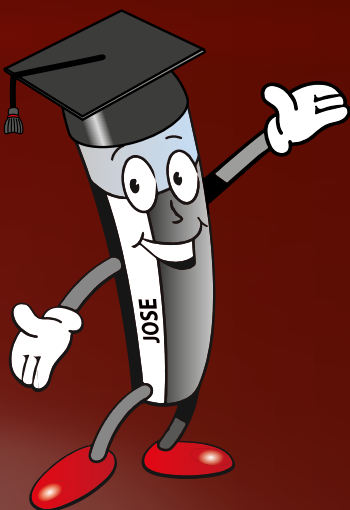
COMPETENCE & KNOWLEDGE MANAGEMENT

At MIC we believe that developing innovative products is just the starting point. Our underlying mission is to share our knowledge and expertise with our customers to allow them to use our products in the most effective way possible.

We achieve this through:

- Controlling the trends of Hydraulic Connector Technology
- Developing port-to-port (P2P) ad-hoc solutions
- Ensuring easy and effective communications
- Providing state-of-the-art training through the Manuli Technical Academy

“Manuli Hydraulics *makes* products, but *sells* solutions through competences”





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