Steel Cord Reinforcement Range

Commercial applications

Dynamic risers and jumpers - In 1988, Manuli supplied its first commercial application of the long-length elastomeric hose. Manuli provided two dynamic risers for the SBM/Atlantic Drilling Birch Field. For riser or jumper applications, Manuli manufactures their standard long-length hose with additional fabric reinforcing plies over one end (riser) or the full length (jumper). The fabric reinforcement adds axial and bending stiffness to the hose allowing it to better distribute dynamic loading along the length of the hose. Manuli manufactures the long-length hose (also termed "bonded flexible pipe") in 4-, 6-, and 8-inch inside diameters for commercial applications

Flowline - Because it is lightweight, collapsible and kinkable, the Manuli long-length hose is well-suited for flowline applications. The Manuli hose can be deployed using standard workboats and marine equipment and can fully recover from inadvertent twists or kinks during installation or retrieval. The strength and durability of the Manuli long-length hose has been proven through numerous third-party test programs which measured its performance and engineering properties. Additionally, Manuli is maintaining its commitment to the petroleum industry through participation in the JIP for API Specification 17k which will apply to bonded flexible pipe.

Manuli provides turn-key engineered hose systems for customers around the world

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Long length

elastomeric hoses

manuli® RUBBER INDUSTRIES

Long length

Military applications

Bonded elastomeric conduit for dynamic riser, jumper, flowline, and military fuel transfer applications

Offshore petroleum distribution system: Manuli pioneered the continuous length elastomeric hose in 6-inch inside diameter for the United States Military Offshore Petroleum Distribution System (OPDS). The hose has a nitrile-based liner, for conveying finished fuels (up to 50% aromatic content) and crude oil, is continuously reinforced with steel wire plies, and has an abrasion resistant cover. The hose carcass is lightweight, collapsible, and kinkable. Under the initial OPDS contract, Manuli supplied over 37 miles of 6-inch hose. Manuli manufactures the 6-inch diameter hose in 305-meter sections to allow truck transportation on reels.

British MOD rapid system deployment pipeline system Manuli extended their continuous length hose capability to 8-inch inside diameter for the British Ministry of Defence Rapid Deployment Pipeline System. The 8-inch hose is similar in properties and construction to the 6-inch and is manufactured in 200-meter lengths for transportation purposes. Like the OPDS, the Rapid Deployment Pipeline System is a ship-to-shore fuel transfer system for supplying land-based troops in military operations. As such, the Manuli conduit must be durable and reliable. In addition to hose, Manuli supplied shipboard and beach-head equipment for deploying, retrieving, and operating the RDPS and OPDS.

Long Length conduit

Quality & Environmental Policies

Certifications

Manuli Rubber Industries was the first european manufacturer to achieve the ISO 9001 certification in 1992 and the "Vision 2000" in 2002.
The company also achieved the ISO 14001 certification in may 2004. This certification refers to organization systems aimed at reducing the environmental impact of industrial activity.
During 2005, Manuli Rubber Industries achieved the UNI EN OHSAS 18001 certification, confirming the group attention to the accupational health and safety management system.

A rigid quality control is carried out during the manufacturing and test our product in order to offer to our Client a high performance level of hoses and equipment.

ISO 9001, 14001 and 18001 Certificates

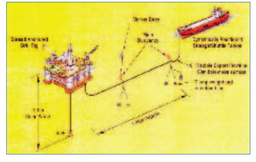
Product certifications

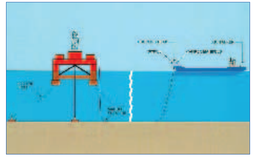
Thanks to our policy the O&M Division of MRI is continuously receiving several letters of commendation for off-shore applications.
Our attention to detail results in a consistent production of hoses and equipment which exceeds the requirements of international standards.

Advantages of Manuli Conduit hose versus Flexible Pipe

- **LIGHTWEIGHT HOSE CONSTRUCTION**
  Minimum handling equipment required in the field compared to Flexible Pipe.
- **LOWER MINIMUM BEND RADIUS**
  MBR for Manuli Conduit: < 4*ID. MBR for Flexible Pipe = 12*ID.
- **KINK RECOVERABLE HOSE**
  The bending radius of the Flexible Pipe is limited by the inter locking layers. When this limit is exceeded the Flexible Pipe is irreversibly damaged. The Manuli design recovers its original shape without any damage or permanent deformation.
- **EASILY REPAIRABLE**
  Flexible Pipe is rarely repairable in the field and needs skilled technicians. Manuli Conduit may be rapidly repaired in the field with specially designed fittings.
- **EASY TO DEPLOY AND RETRIEVE**
  Only qualified and trained personnel should handle Flexible Pipe while the Manuli Conduit forgives mistreatments or mistakes during deployment/retrieval.
- **FLOAT AND SINK**
  The Manuli Conduit Floats in empty condition and sinks when full of water or oil.
- **LOW COST IMPACT**
  Significant cost savings compared to Flexible Pipe.
- **RAPIDLY INSTALLABLE**
  The Manuli Conduit is rapidly installable also in severe sea condition.
- **HIGH ELASTICITY**
  When a tensile load is applied to the Manuli Conduit all the layers elongate and neck down together and then rebound uniformly when the load is removed.

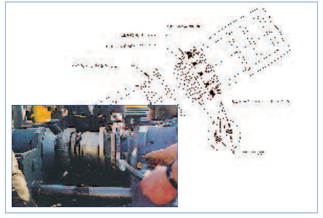
Sample applications

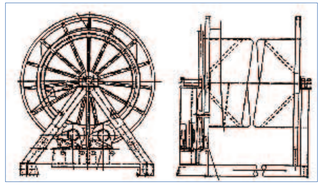




Engineering

Manuli offers turn-key engineered systems to combine all the hose related components for your offshore project. On past projects we have supplied shipboard equipment such as deployment and retrieval reels, turning and overboarding apparatus, pig launching and catching equipment, and hose clamping tables. Manuli has also supplied beach termination equipment for pig handling and flow control, specialized hose end equipment like low-profile fittings, repair couplings, and riser clamps. Our technical staff provides static and dynamic analysis of hose systems (using Visual OrcaFlex®), thermal and fluid flow estimation, finite element stress analysis, and other technical support to help clients integrate the Manuli long-length hose into their overall project system. Our experienced engineers and technicians are also available for both field support and operations planning and evaluation.





Technical data

4" x 6 WIRE PLY JUMPER, CONDUIT & RISER HOSE

Characteristic		4" H1991-6ply JUMPER	4" H1992-6ply CONDUIT	4" H1993-6ply RISER	
				Reinforced	Standard
Internal Diameter	(mm)	101.6	101.6	101.6	
Outside Diameter	(mm)	159.5	151.4	159.5	151.4
Weight in Air Empty	(kg/m)	24.6	21.1	24.6	21.1
Weight in Seawater Empty	(kg/m)	4.2	2.7	4.2	2.7
Weight in Seawater Full of Oil - SG = 0.85	(kg/m)	11.1	9.6	11.1	9.6
Weight in Seawater Full of Seawater	(kg/m)	12.5	11.0	12.5	11.0
Working Pressure	(bar)	80	80	80	
Burst Pressure	(bar)	400	400	400	
Test Pressure	(bar)	120	120	120	
Axial Load at Break	(tonnes)	30	30	30	
Axial Stiffness at Working Pressure	(tonnes)	100	50	100	50
Bend Stiffness Range varies with pressure & bend radius	(kg-m²)	25-65	25-65	25-65	
Torsional Stiffness Range varies with pressure & twist angle	(tonne-m²)	20-35	20-35	20-35	
Maximum Fluid Temperature	(°C)	+92	+92	+92	
Minimum Environmental Temperature	(°C)	-29	-29	-29	
Maximum Flow Velocity	(m/s)	21	21	21	

6" x 6 WIRE PLY JUMPER, CONDUIT & RISER HOSE

Characteristic		6" H1991-6ply JUMPER	6" H1992-6ply CONDUIT	6" H1993-6ply RISER	
				Reinforced	Standard
Internal Diameter	(mm)	152.4	152.4	152.4	
Outside Diameter	(mm)	211.0	202.2	211.0	202.2
Weight in Air Empty	(kg/m)	28.6	27.5	28.6	27.5
Weight in Seawater Empty	(kg/m)	-7.2	-5.4	-7.2	-5.4
Weight in Seawater Full of Oil - SG = 0.85	(kg/m)	8.3	10.1	8.3	10.1
Weight in Seawater Full of Seawater	(kg/m)	11.4	13.3	11.4	13.3
Working Pressure	(bar)	55	55	55	
Burst Pressure	(bar)	290	290	290	
Test Pressure	(bar)	83	83	83	
Axial Load at Break	(tonnes)	50	50	50	
Axial Stiffness at Working Pressure	(tonnes)	118	58	118	58
Bend Stiffness Range varies with pressure & bend radius	(kg-m²)	50-150	50-150	50-150	
Torsional Stiffness Range varies with pressure & twist angle	(tonne-m²)	40-65	40-65	40-65	
Maximum Fluid Temperature	(°C)	+92	+92	+92	
Minimum Environmental Temperature	(°C)	-29	-29	-29	
Maximum Flow Velocity	(m/s)	21	21	21	

8" x 6 WIRE PLY JUMPER, CONDUIT & RISER HOSE

Characteristic		8" H1991-6ply JUMPER	8" H1992-6ply CONDUIT	8" H1993-6ply RISER	
				Reinforced	Standard
Internal Diameter	(mm)	203.2	203.2	203.2	
Outside Diameter	(mm)	267.8	255.0	267.8	255.0
Weight in Air Empty	(kg/m)	45.4	39.3	45.4	39.3
Weight in Seawater Empty	(kg/m)	-12.3	-13.1	-12.3	-13.1
Weight in Seawater Full of Oil - SG = 0.85	(kg/m)	15.2	14.5	15.2	14.2
Weight in Seawater Full of Seawater	(kg/m)	20.9	20.2	20.9	20.2
Working Pressure	(bar)	55	55	55	
Burst Pressure	(bar)	250	250	250	
Test Pressure	(bar)	83	83	83	
Axial Load at Break	(tonnes)	70	70	70	
Axial Stiffness at Working Pressure	(tonnes)	158	77	158	77
Bend Stiffness Range varies with pressure & bend radius	(kg-m²)	200-250	200-250	200-250	
Torsional Stiffness Range varies with pressure & twist angle	(tonne-m²)	45-90	45-90	45-90	
Maximum Fluid Temperature	(°C)	+92	+92	+92	
Minimum Environmental Temperature	(°C)	-29	-29	-29	
Maximum Flow Velocity	(m/s)	21	21	21	

The Manuli H1993 Reinforced Riser is a conduit section with one end reinforced for approximately 30 m.
The reinforced section has the properties of the H1991 Jumper.

On request hoses for special applications can be manufactured.

OIL & MARINE

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