

mandals

SINCE 1775

OIL & GAS

WORLD CLASS
LAY-FLAT HOSES

NORWEGIAN TECHNOLOGY

Part of the Michelin Group



www.mandals.com
Legacy Through Innovation

WHY LAY-FLAT HOSES?

Flexible lay-flat hoses offer many advantages over more rigid types of hoses or pipes, and areas of use have increased over the years. Lay-flat hoses are now the preferred solution in many fluid transfer applications in various segments.

Our hoses meet the required quality needed for the most demanding situations. Lay-flat hoses provide the flexibility and mobility to streamline efficient use and offer many positive HSE benefits.

ADVANTAGES

FAST DEPLOYMENT AND RETRIEVAL

- Long continuous lengths
- Less joints, no welding
- Light weight
- Fewer and lighter vehicles
- Deployed or retrieved from moving vehicle
- Terrain friendly – follows ground contours

ECONOMICAL STORAGE AND TRANSPORT

- “Steel on Wheel” packed on compact reels
- Long lengths with low coil volume
- Light and compact
- 40’ container holds up to 3600 m of 12” hose
- Perfect for sites with limited space
- Reduced transport costs
- Standard pick-up trucks will do
- Easy access in remote areas

EASY MAINTENANCE AND REPAIR

- Minimal maintenance even in harsh environments
- Stable diameter after use allows easy recoupling
- Quick on-site repair possible, no special tools
- Lower labour and equipment costs
- Reduced downtime
- Damaged spots fixed temporarily by pulling over a sleeve

LOW OPERATING COSTS

- Excellent flow rates
- Minimal pressure loss, low friction
- Swelling allows full pumping efficiency
- Long lengths and few joints / less manpower
- Less leaking and risk of spills

LONG SERVICE LIFE

- High resistance to abrasion and cutting
- Continuous operation at high pressures
- Durable even in the roughest environment
- No delamination
- Resistant to heat, UV-rays, ozone, many chemicals and weathering
- Resistant to hydrolysis and microbiological attack.
- Withstands settings in the ground

MANDALS LAY-FLAT HOSES

NITRILE RUBBER

Up to 6 inch (152mm) diameter

THERMOPLASTIC POLYURETHANE (TPU)

Up to 12 inch (305 mm) diameter

EXTRUSION THROUGH THE WEAVE

Gives a very strong bond between the embedded weave and the TPU or rubber cover.

ISO 9001 CERTIFICATION

Product development and quality is our strength

HISTORY

At the southern tip of Norway, Mandals was established in 1775 as a rope manufacturing company for the sailing industry.

In 1927 and in the persistence of improving the production of hoses, Mandals introduced its first "circular weaving loom". Ever since, the company has been a pioneer in the development of this technology, and with it, our premium lay-flat hoses emerged.

The "extrusion-through-the-weave" was firstly applied for nitrile rubber, but as our knowledge developed, thermoplastic polyurethane (TPU) was successfully introduced in the early 1980s giving global recognition to the company for such an achievement.

All over the world, in fields, deserts, mines and deep waters, our lay-flat hoses transport all types of liquids continuously supporting a steady operation for our customers.

Generations of experience have taught us to develop high-performance looms, super thin and strong weave-jackets and an extrusion for maximum adhesion through the weave.

The result is a lay-flat hose you can rely on for years.





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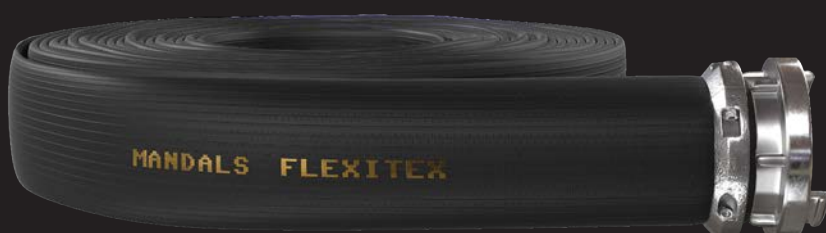
SUPERMAN HVT (TPU)



Mandals Superman HVT is designed for long life and maintenance-free service in the harshest environments. This market leading hose is tough and durable with exceptional resistance to abrasion and cutting.

The best choice for high volume water transfer

FLEXITEX (RUBBER)



Mandals Flexitex is intended for more demanding fluid transfer, f. ex. for drill water supply to onshore rigs. The design ensures minimum stretching and a very high pressure rating to wall thickness ratio. The rubber blend has excellent chemical resistance and little or no reaction to H₂S or saline content

OIL & GAS CONVENTIONAL

Mandals Lay-flat hoses can be utilized in many processes in the conventional oil & gas sector, whether onshore or offshore.

Anti static hoses are suitable as fire hoses in certain environments. They may also be used for transporting flammable liquids in case of oil spills, or simply for transporting fuel.

Lay-flat hoses help make exploration drilling in remote areas both lighter and easier, due to light weight, transportability and ease of deployment. Not to mention the fact that possible damages can be cut off in order to recouple the hose and continue the operation with minimum downtime.

Lay-flat hoses are even used as oil spill lenses and flotation devices. In the case of old and leaking pipelines a lay-flat lining may be the best solution to fix the pipe, instead of having to exchange the entire pipeline or build a completely new one.

WELLMAN (FLEXIBLE RAISING MAIN)



Wellman is a hose with exceptional tensile strength designed as a permanent alternative to traditional material in water wells where submersible pumps are used. No corrosion, no scale build up, low friction and improved flow rates make this a very cost effective solution.



SUPERMAN HVT

TPU



SUPERMAN HVT is intended for transfer of large volumes of liquid at higher than normal working pressures while at the same time being lightweight and easy to deploy.

The excellent abrasion resistance prevents the hose from being damaged when deployed in rugged terrain where other types of outer cover would be worn off quickly due to the pulsations of the flow combined with the weight of the filled hose.

DESIGN

Superman HVT is made from thermoplastic polyether based polyurethane (TPU) and extruded through our unique circular weaving jacket technology made from high tenacity filament polyester yarn, features that provide high reinforcement and stability to the hose.

FEATURES

- Lightweight and easy to deploy
- Ultimate abrasion and puncture resistance
- High diameter and extension stability
- Minimum snaking of pressurized hose

ADVANTAGE

- Full diameter recovery after pressure release
- Excellent hydrolysis and fungus resistance
- resistance to a wide range of chemicals
- Temperature range -50 to 75 ° C (pure water)
- Excellent UV, Ozone and weathering resistance
- Leak proof tested section lengths up to 200 mts.



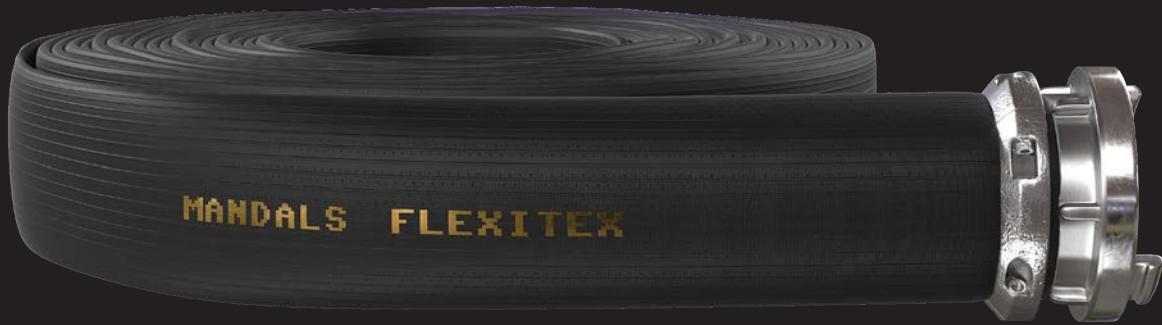
TECHNICAL DATA - SUPERMAN HVT

INNER DIAMETER		WALL THICKNESS		WEIGHT		BURST PRESSURE		TENSILE STRENGTH	
Inch	mm	Inch	mm	Lbs / ft	Kg / m	Psi	Bar	X1000 kbs	Tons
5	127,0 + 2,5	0,14	3,5	1,07	1,60	650	45	32,8	14,9
7	178,0 + 3,0	0,16	4,0	1,62	2,42	610	42	60,8	27,7
8	203,0 + 3,0	0,17	4,2	2,07	3,10	610	42	81,5	37,0
10	254,0 + 4,0	0,17	4,3	2,73	4,10	520	36	104,0	47,2
12	305,0 + 5,0	0,18	4,5	3,43	5,15	435	30	123,4	56,0



FLEXITEX

RUBBER



Flexitex is intended for more demanding fluid transfer, f ex. for drill water supply to onshore rigs. The design ensures minimum stretching and a very high pressure rating to wall thickness ratio. The rubber blend has excellent chemical resistance and little or no reaction to H₂S or saline content.

DESIGN

Made from a blend of nitrile rubber and PVC, with added UV barrier to prevent damage from UV radiation. The rubber blend is extruded through a circular woven reinforcement made from filament polyester yarn. Very strong bonding between cover and lining as well as firmly encapsulating the reinforcing polyester.

FEATURES

- Transfer large volumes of liquid at higher than normal working pressures
- Lightweight and easy to deploy
- Ultimate abrasion and puncture resistance
- High diameter and extension stability
- Minimum snaking of pressurized hose

ADVANTAGE

- Field proven hose with a long track record
- Lengths up to 200 meters



TECHNICAL DATA - FLEXITEX

INNER DIAMETER		WALL THICKNESS		WEIGHT		BURST PRESSURE		TENSILE STRENGTH	
Inch	mm	Inch	mm	Lbs / ft	Kg / m	Psi	Bar	X1000 kbs	Tons
1 1/2	38,0 + 1,6	0,09	2,2	0,21	0,31	655	60	6,4	2,9
2	51,0 + 2,0	0,09	2,2	0,27	0,41	655	45	8,4	3,8
2 1/2	65,0 + 2,0	0,09	2,2	0,36	0,54	655	45	9,3	4,2
3	76,0 + 2,0	0,10	2,5	0,49	0,73	655	45	11,5	5,2
3 1/2	90,0 + 2,0	0,11	2,7	0,67	1,00	580	40	17,6	8,0
4	102,0 + 2,5	0,11	2,7	0,74	1,10	510	35	19,4	8,8
6	150,0 + 3,0	0,13	3,4	1,3	1,8	580	40	35,5	16,1

NOTE: SAFETY FACTOR BP/WP IS 2:1 (50%). FOR ALL NON-HAZARD AND /OR INFLAMMABLE LIQUIDS.



WELLMAN

FLEXIBLE RAISING MAIN



Wellman flexible rising main is designed as a permanent alternative to traditional materials such as steel, fiberglass, PVC and polyethylene in water wells with electric submersible pumps.

ADVANTAGE

Rapid installation and retrieval of the submersible pump.

Supplied in a single length to the required pump setting, there are no flanges or joints, except at the pump and headworks. Installation options include by crane or with a vehicle allowing for rapid restoration of service in the event of routine maintenance or pump failure.

Low maintenance

All synthetic materials of construction mean that there is zero corrosion and no scale build up. The high grade polyurethane lining and cover material is resistant to hydrocarbon fuels, many chemicals, ozone and UV, abrasion and microbial attack.

Superior hydraulic performance

The textile reinforcement is designed to swell under operating conditions up to 15%. This feature gives a nominal increase in riser diameter, reducing friction loss and improving hydraulic performance. Often this can be translated into a smaller Wellman diameter than conventional rigid pipe, giving additional financial benefits.

Easy to store and transport

Wellman has a small storage footprint compared to rigid pipe, allowing transportation by smaller vehicles and requiring less manpower. Particularly useful when installation is required in remote locations with poor access.



INTERNATIONAL DRINKING WATER CERTIFICATION

UK	WRAS approval to BS6920
USA	NSF61 listed
Germany	KTW-DVGW approved
Australia	AS-NZS4020-2005 approved
Poland	PZH approved



TYPICAL APPLICATIONS INCLUDE

- Groundwater abstraction – potable and brackish
- Beach wells in R.O. Desalination plant applications
- Environmental monitoring
- Mine de-watering
- Land stabilization
- Leachate removal in landfill sites
- Offshore rig fire water and service pumps

TECHNICAL DATA - WELLMAN

Diameter		51 mm 2"	76 mm 3"	102 mm 4"	127 mm 5"	152 mm 6"
Wall thickness	mm	3.2	3.3	3.8	4.2	4.4
Weight (hose only)	kg/m	0.7	1,0	1.6	2,0	2.5
Burst pressure	bar	62	62	62	58	58
Max. working pressure	bar	31	31	31	29	29
Effective tensile strength	tonnes	6.0	11.0	18.0	22.0	28.0
Max. continuous end load	tonnes	1.7	3.0	5.5	7.2	9.0
Maximum extension under load conditions	%	+ 2				
Maximum diametric swell	%	+ 15				
Maximum pump setting	m	250	250	250	250	250
Maximum water temperature	°C	- 40 to + 50. (with intermittent use up to 80)				
Water quality						
Below 30 °C	pH	4 - 9				
Above 30 °C						

Wellman is manufactured using 'through-the-weave' technology, where the high grade polyurethane lining and cover are formed in a single process to provide a tough composite riser. The textile reinforcement is designed to support the weight of the submersible pump, the column of water, the power cable and the riser itself, with a minimum 2:1 safety factor. Additionally, torque on pump start-up is accommodated without damage to the riser. The Mandals company also manufactures the textile weaving machines used by all the major hose companies throughout the world so their understanding of textile design and technology is unparalleled.

Wellman is the main component of a complete system, which includes couplings, power cable attachment equipment, lifting clamps and wellhead rollers. All ancillary equipment can be supplied and factory-trained installation engineers are available to provide assistance and training if required.

***IT IS IMPORTANT THAT ONLY APPROVED ACCESSORIES ARE USED WITH THE WELLMAN RISER.
THE USE OF ALTERNATIVE COMPONENTS WILL COMPROMISE THE INTEGRITY OF THE COMPLETE SYSTEM.***



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WORLD CLASS LAY-FLAT HOSES

Mandals is a Norwegian company dedicated to designing and manufacturing the best lay-flat hoses on the market.

Our Premium Lay-flat hoses have been designed to operate in high demanding industries, which require precision in their applications so that they can deliver effective results and ensure the profitability of our clients' investments.

INDUSTRIES



ENERGY



AGRICULTURE



PIPE REHABILITATION



FIRE FIGHTING



POTABLE WATER



MINING



CONSTRUCTION



COMPRESSED AIR



DE-WATERING

While we have made every attempt to ensure that the information contained in this brochure is accurate, Mandals is not responsible for any errors or omissions, or for the results obtained from the use of this information. Mandals reserves the right to modify any specifications without prior notice to meet or exceed changing standards. For special diameters, features and construction characteristics please contact us at sales@mandals.com

CONTACT

sales@mandals.com
+47 38 27 24 00
Nordre Banegate 26, 4515
Mandal, Norway

www.mandals.com

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