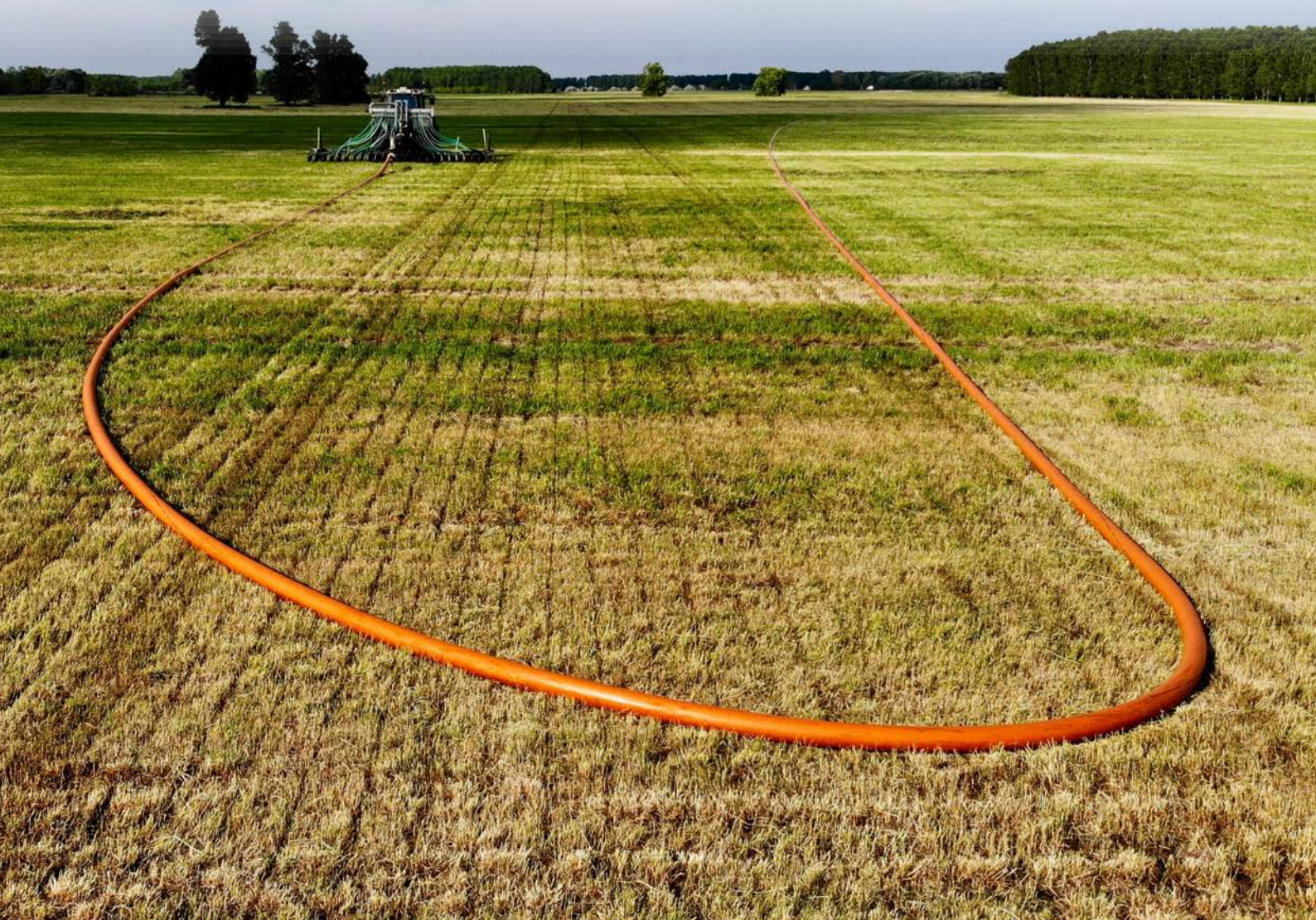


World Class Lay-Flat Hoses

Agriculture

- Drag Hose System
- Slurry Transfer
- Supply Line
- Irrigation



Contents

About Us	2
Why Mandals	3
Our Materials	3
● Rubber	
● TPU	
Our Hoses	4
Advantages of Mandals Hoses	5
Quality	5
Looms & Spares	6
Agriculture Lay-Flat Hoses	8
Drag Line - Dragman series	9
Supply & Irrigation Line	11
● Superman HVT	
● Ultraman & Ultraman HVT	
● Flexitex Series	
Abrasive Resistance	17
Tensile Strength	17
Drag Hoses vs. Slurry Tanks	18



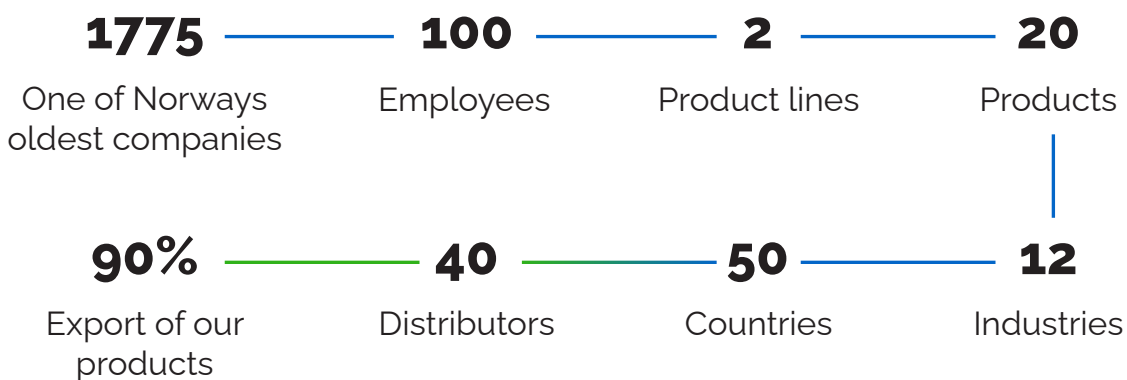
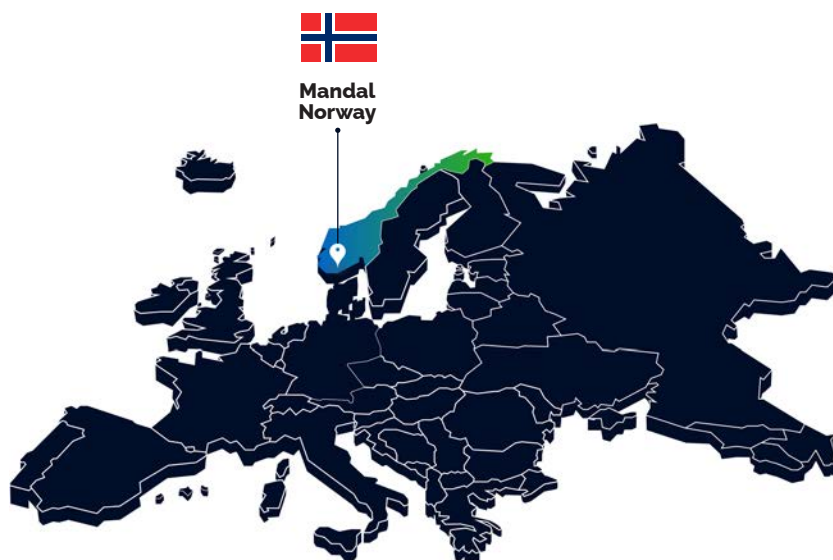
Abbreviations

AG	Agriculture
HVT	High Volume Transfer
NBR	Nitrile Rubber
TPU	Thermoplastic Polyurethane

About Us

Mandals specializes in the manufacturing of high quality lay-flat hoses, liners, and circular shuttle looms. We are based in Mandal, on the southern coast of Norway and have been in business in the same location for nearly 250 years.

We have come a long way since our establishment in 1775, and today we are one of the world's most recognized manufacturers of lay-flat hoses and looms. 90% of our products are exported and are found across the globe thanks to our long-standing partners and distributors.



Why Mandals

We strive to grow long-term, loyal partnerships. Our core values are People, Planet and Profit and we will always focus on people first. As a partner with Mandals we will do our best to put you first, aiming to offer you the best service in all aspects of the partnership. We expect active partners that will challenge, inspire, and help us grow and build business together.

We define ourselves as a trustworthy supplier with high focus on quality in the production process and products. All lay-flat hoses and looms are produced in-house, meaning that you can be assured we produce quality without compromise.

Our Materials

Rubber Hoses

Mandals rubber hoses are made from a blend of nitrile rubber and PVC, with an added UV barrier. The rubber is fully extruded through the circular woven fabric, ensuring excellent bonding between cover and lining to prevent delamination. Thanks to the interlocking between the warp yarns and the weft of the circular weave, the hose has a high lengthwise stability and a full diameter recovery after use. The abrasion and puncture resistance of Mandals rubber hose is by far superior to any regular uncovered textile hose.

Rubber Hoses



TPU Hoses

Our TPU hoses are among the most innovative lay-flat hoses in the world, which are made from extruded thermoplastic polyurethane (TPU) with excellent wear and tear properties. The TPU is extruded through the weave, which is made of high tenacity filament polyester yarns. This method gives a very strong bonding between cover and lining as well as firmly encapsulating the woven polyester yarn. The abrasion resistance of the Mandals TPU hoses is among the highest available, and our TPU hoses also have excellent resistance against the most commonly used chemicals, UV radiation, hydrolysis, and fungus degradation.

Thermoplastic Polyurethane (TPU) Hoses



Our Hoses

Dragman Series

TPU Drag Line



Superman HVT

TPU Supply Line



Ultraman & Ultraman HVT

A Multipurpose TPU Transfer Hose



Flexitex Series

Rubber Supply Line



Advantages of Mandals Hoses

Quick deployment and retrieval, combined with **excellent flow rates** and long lifetime, **reduces operation cost**

High abrasion resistance and tensile strength

Excellent mechanical adhesion between the layers provides the best quality hose with a long lifetime

Highly flexible hoses = Kink resistant and minimal pressure loss



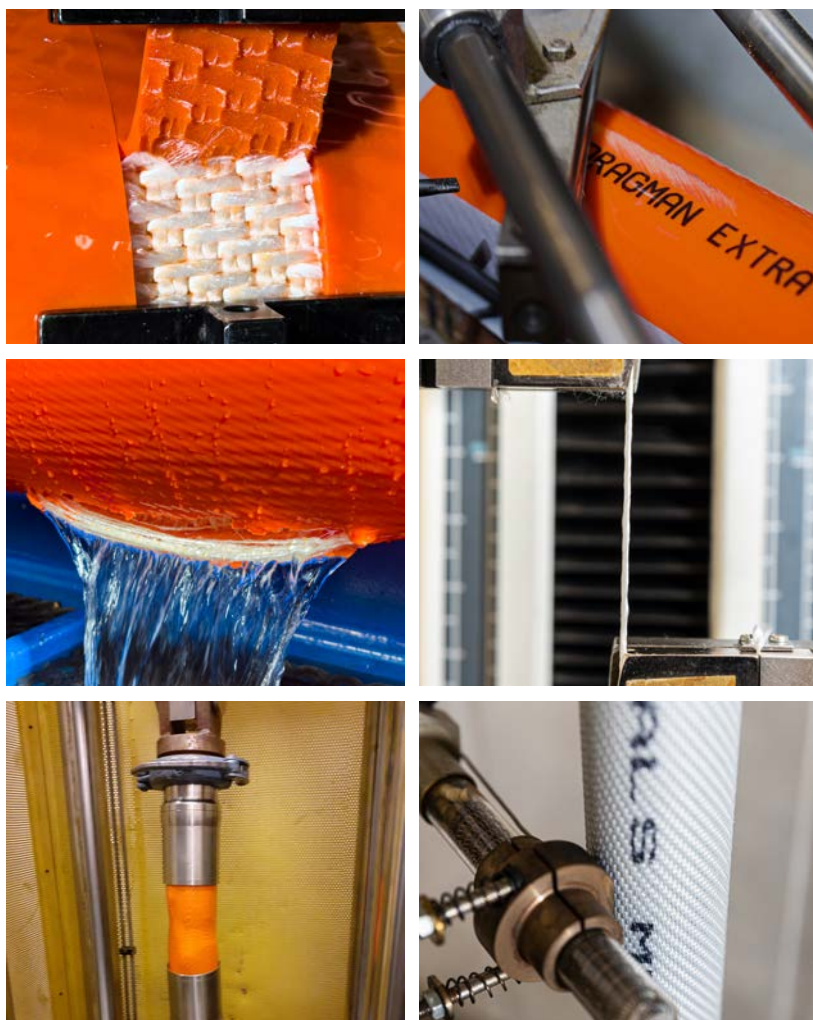
Quality

One of the values we live by is **“Legacy Through Innovation”**, meaning that we will always work to further develop our products, our production processes and the way we do business with our partners. We are following the trends in the market and continuously working to develop new products and solutions for our customers' unique challenges.

Raw materials and finished products are tested and documented according to international standards.

Examples:

ISO 4671 - methods of measurement
ISO 1402 - hydrostatic testing
ISO 8033 - adhesion
BS 6391 - abrasion
NS 4016 - heat resistance



Long lasting hoses for demanding use require **durability** and **wear resistance**

Resistant to most industrial chemicals, ozone and UV-rays

Durable even in the **roughest environments**

Small logistical footprint required for transport and storage

Unique weave design that is specially developed for each hose

Easy to handle - less heavy lifting

Looms & Spares

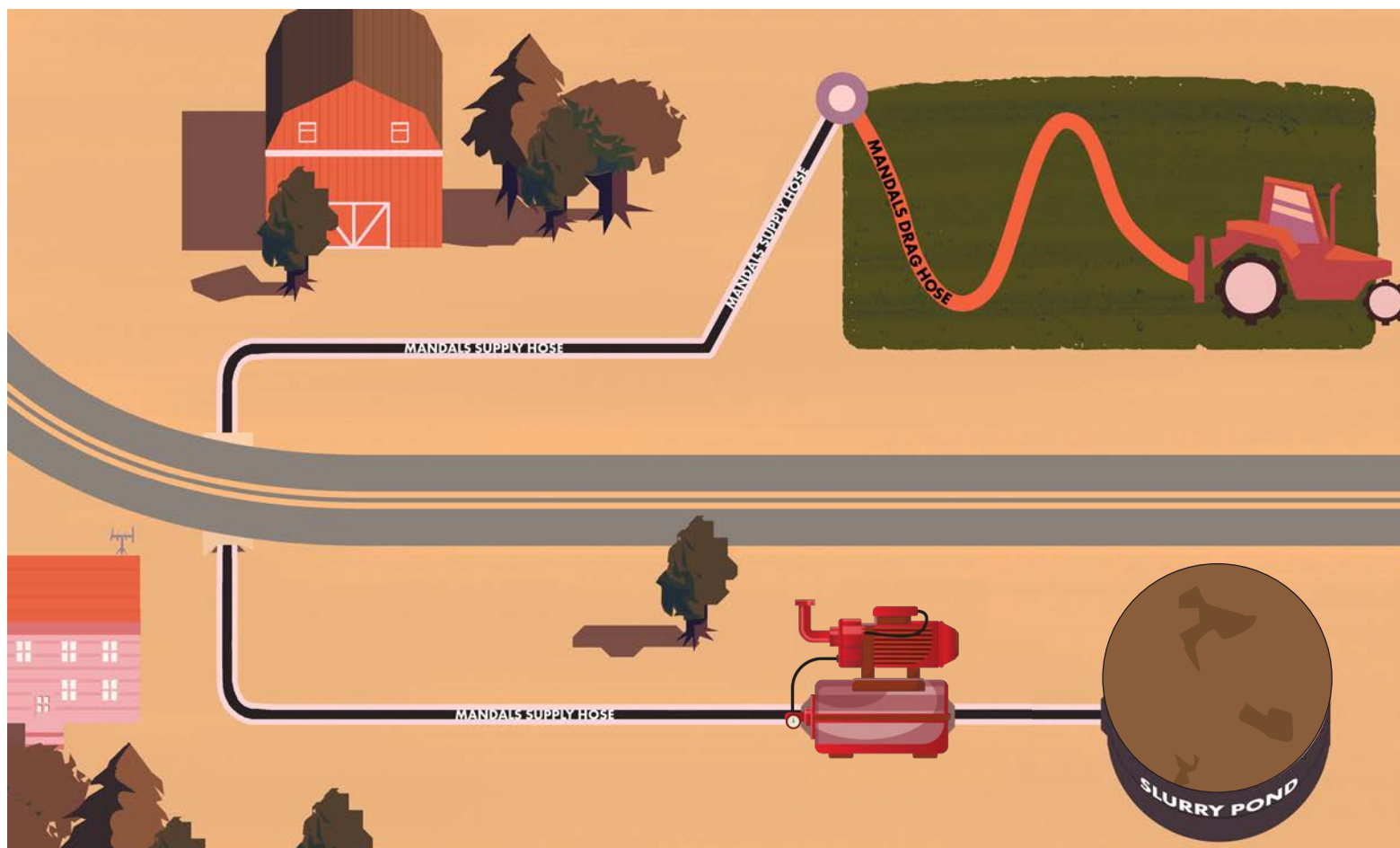
We pioneered the lay-flat hose a century ago and developed our first circular loom in 1935. Today you can find our machines in over 30 countries, some of which have been in service for over 50 years. Our machines continue to define the standard for quality and reliability in circular looms.



Scan the QR code If you would like to know more about our looms



Agriculture Lay-Flat Hoses



Umbilical Drag Hose System

Dragman Standard has a medium thickness of TPU. This gives good abrasive resistance and long service life on a soil not too abrasive and rough. Very high tensile strength and low kink radius.

Dragman Extra has significantly more weave and TPU thickness compared to Dragman Standard. The hose also has a higher tensile strength and extra strong adhesion. Big diameter expansion means lower pressure loss. Intended for larger fields and large diameters. This gives a hose with added strength and resistance to wear and tear.

Dragman Premium is designed to handle smaller fields effectively, with a superior kink resistance on sharper turns. It has higher TPU thickness and adhesion than Dragman Extra, giving an optimal resistance to wear and tear even on rougher surfaces.

Dragman Extra Performance has increased TPU cover thickness compared to Dragman Extra, optimal for larger fields and rockier soils. This gives a hose with added strength and resistance to wear and tear.

Mandals Superman HVT is a hose intended for large volume transfer under high pressure and is widely used as supply hoses for large agricultural systems.

Mandals Ultraman is a multipurpose transfer hose, which is suitable as a feeder hose or even as a drag hose in smaller umbilical systems.

Mandals Flexitex Standard is a general purpose hose for use in agricultural systems.

Mandals Flexitex Extra is a more reinforced fluid transfer hose for agricultural systems, but may also serve as a drag hose in smaller umbilical systems.

Page **9**



Dragman (series)

Page **11**



Superman HVT

Page **13**



Ultraman (series)

Page **15**



Flexitex (series)



Drag Line

Dragman Series

TPU Hoses

Our Dragman hoses are high quality flexible lay-flat hoses designed for especially rough use with umbilical drag systems for distribution of slurry and manure in agricultural fields. Hoses are connected between slurry reservoirs (lagoons), where the drag hoses are used closest to the tow tractor. Between the lagoon and the edge of the field, the slurry/manure is transferred using supply line hoses.



Best grade TPU



Easy to deploy and store



Flexible and light weight



High diameter and expansion stability



High abrasion and kink resistance

Key Features

- Designed for umbilical drag systems used for distribution of slurry and manure in agricultural fields.
- Engineered with excellent tensile strength and abrasion properties.
- Circular woven with high tenacity polyester yarns.
- Operating temperature from -50°C to $+65^{\circ}\text{C}$ (-58°F to $+149^{\circ}\text{F}$).

Advantages

- Available in long lengths up to 700 meters.
- Enhanced abrasion resistance.
- High diameter stability when depressurized for easy re-coupling.
- Low kink radius.
- High puncture resistance.
- Excellent UV and weathering resistance.

Thermoplastic polyether
polyurethane



Engineered with excellent
tensile strength and
abrasion properties

Extruded through
a circular woven
jacket

Dragman Standard

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
3 1/2	90 + 2	0.14	3.4	0.70	1.05	650	45	28.7	13.0
4	102 + 2.5	0.14	3.6	0.91	1.35	610	42	32.9	14.9
4 1/2	114 + 2.5	0.14	3.6	1.01	1.50	520	36	37.5	17.9
5	127 + 2.5	0.14	3.6	1.11	1.65	460	32	43.9	19.9
5 1/2	140 + 3.0	0.15	3.8	1.29	1.92	435	30	48.3	21.8
6	152 + 3.0	0.15	3.8	1.41	2.10	405	28	56.4	25.5

Dragman Extra

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
4	102 + 2.5	0.16	4.0	1.07	1.60	535	37	37.5	17.9
4 1/2	114 + 2.5	0.17	4.2	1.16	1.73	450	31	43.9	19.9
5	127 + 2.5	0.17	4.2	1.31	1.95	435	30	48.3	21.8
5 1/2	140 + 3.0	0.17	4.2	1.44	2.15	435	30	56.4	25.5
6	152 + 3.0	0.17	4.4	1.54	2.30	435	30	60.4	27.3
7	178 + 3.0	0.17	4.4	1.84	2.75	580	40	81.2	36.8
7 1/4	183 + 3.0	0.17	4.4	1.84	2.75	580	40	81.2	36.8

Dragman Premium

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
4	102 + 2.5	0.17	4.2	1.14	1.70	535	37	34.0	15.4
4 1/2	114 + 2.5	0.17	4.2	1.14	1.70	535	37	34.0	15.4
5	127 + 2.5	0.17	4.3	1.31	1.95	465	32	37.8	17.1

Dragman Extra Performance

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
5	127 + 2.5	0.19	4.8	1.48	2.20	435	30	48.3	21.8
5 1/2	140 + 3.0	0.19	4.9	1.65	2.45	435	30	56.4	25.5
6	152 + 3.0	0.20	5.0	1.85	2.75	435	30	60.4	27.3
6 1/2	165 + 3.0	0.20	5.1	2.30	3.40	580	40	81.2	36.8
7	178 + 3.0	0.21	5.3	2.35	3.50	580	40	81.2	36.8
7 1/4	183 + 3.0	0.21	5.3	2.38	3.55	580	40	81.2	36.8



Superman HVT

TPU Hoses

This premium lay-flat hose has been designed for long life and maintenance-free service in the harshest environments. The best choice for transfer of large volumes under high pressure, and is widely used as supply hoses for large agricultural systems.



Easy to deploy and store



High abrasion and kink resistance



Long lifetime and maintenance free



Minimum snaking of pressurized hose



Designed to operate in the harshest environments

Key Features

- Transfer large volumes of liquid quickly.
- Lightweight and easy to deploy.
- Excellent abrasion and puncture resistance.
- High diameter and extension stability.
- Minimum "snaking" of pressurized hose.
- Operating temperature from -50°C to +75 °C (-58°F to +167°F) for pure water.

Advantages

- Full diameter recovery after pressure release.
- Excellent hydrolysis and fungus resistance.
- Diameter and extension stability.
- Resistance to a wide range of chemicals.
- Excellent UV, ozone and weathering resistance.

State of the art "through the weave" extrusion technology



Excellent adhesion between cover/lining and the weave

Full diameter recovery after pressure release

Superman HVT

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
5	127 + 2.5	0.14	3.5	1.07	1.60	650	45	34.8	15.8
6	152 + 3.0	0.15	3.7	1.34	2.00	650	45	44.0	21.0
7	178 + 3.0	0.16	4.0	1.61	2.40	650	45	70.0	31.8
8	203 + 3.0	0.17	4.2	2.15	3.20	610	42	81.5	37.0
10	254 + 5.0	0.17	4.3	2.73	4.10	520	36	101.2	46.0
12	305 + 5.0	0.18	4.5	3.38	5.05	450	31	120.0	54.5



Supply & Irrigation Line

Ultraman & Ultraman HVT

TPU Hoses

Ultraman is a multi purpose transfer hose suitable for both irrigation and as a feeder hose, or even as a drag hose in smaller umbilical systems. Longer lengths available for some diameters.



Multipurpose hose



High abrasion and kink resistance



As light as a NBR rubber hose - best in class



Best grade TPU



High diameter and expansion stability

Key Features

- Special weave design – no kinking at low pressure pumping.
- Light TPU Hose.
- Five times as abrasive resistant vs nitrile rubber.
- Operating temperature from -50°C to +75 °C (-58°F to +167°F) for pure water.

Advantages

- Resistance to a wide range of chemicals.
- Excellent UV, ozone and weathering resistance.
- Excellent adhesion between cover/lining and the weave.
- Some diameters can be produced in lengths above 200 meters.

State of the art "through the weave" extrusion technology



Excellent adhesion between cover/lining and the weave

Full diameter recovery after pressure release

Ultraman

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
2 1/2	65.0 + 2.0	0.11	2.8	0.44	0.66	810	56	14.3	6.5
3	76.0 + 2.0	0.11	2.8	0.54	0.84	780	54	17.4	7.9
3 1/2	90.0 + 2.0	0.11	2.9	0.66	0.98	620	43	20.0	9.1
4	102.0 + 2.5	0.13	3.2	0.80	1.20	610	42	22.2	10.1
4 1/2	114.0 + 2.5	0.13	3.2	0.93	1.39	535	37	23.8	10.8
5	127.0 + 2.5	0.13	3.2	1.02	1.52	505	35	26.4	12.0
6	152.0 + 3.0	0.13	3.2	1.16	1.73	435	30	32.8	14.9
7	178.0 + 3.0	0.13	3.2	1.37	2.05	390	27	37.6	17.1

Ultraman HVT

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
8	203 + 3.0	0.16	3.9	1.82	2.7	610	42	81.5	37.0
10	254 + 5.0	0.16	4.0	2.35	3.5	520	36	101.0	46.0
12	305 + 5.0	0.17	4.2	2.83	4.2	450	31	120.0	54.5

Supply & Irrigation Line

Flexitex Series

Rubber Hoses

Flexitex series is a heavy yet flexible reinforced fluid transfer hose for your irrigation system. This premium lay-flat hose is made from a blend of nitrile rubber and PVC, with added UV barrier to prevent damage from UV radiation.



High degree of nitrile rubber.



Long lifetime with proper usage and storage



High burst pressure

Key Features

- Used as feeder hose for any type of water transfer application.
- General purpose, water discharge rubber hose.
- Adapts well to the terrain and can be routed around obstacles.
- The hose is also used as a light weight wash down or transfer hose for water based and non polar liquids in construction and general industry.
- Operating temperature from -50°C to + 75 °C (-58°F to +167°F) for pure water.

Advantages

- Resistance to a wide range of chemicals.
- Excellent UV, ozone and weathering resistance.
- Excellent adhesion between cover/lining and the weave.
- Some diameters can be produced in lengths above 200 meters.

The rubber blend is extruded through a circular woven reinforcement made from filament polyester yarn



Made from a blend of nitrile rubber and PVC, with added UV barrier to prevent damage from UV radiation

Excellent bonding between cover and lining as well as firmly encapsulating the reinforcing polyester

Flexitex Standard

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
1 1/2	38.0 + 1.6	0.09	2.3	0.21	0.33	940	65	6.4	2.9
2	51.0 + 2.0	0.09	2.2	0.29	0.43	670	46	8.4	3.8
2 1/2	65.0 + 2.0	0.09	2.2	0.36	0.53	670	46	9.3	4.2
3	76.0 + 2.0	0.10	2.5	0.49	0.73	670	46	11.5	5.2
3 1/2	90.0 + 2.0	0.11	2.7	0.67	1.00	610	42	17.6	8.0
4	102.0 + 2.5	0.11	2.7	0.74	1.10	535	37	19.4	8.8
6	150.0 + 3.0	0.13	3.2	1.19	1.78	535	37	35.5	16.1

Flexitex Extra

Inner Diameter		Wall Thickness		Weight		Burst Pressure		Tensile Strength	
inch	mm	inch	mm	lbs / ft	kg / m	psi	bar	X1000 lbs	Tons
3	76 + 2.0	0.12	3.1	0.64	0.95	720	50	20.1	9.1
3 1/2	90 + 2.5	0.13	3.3	0.79	1.18	640	44	22.3	10.1
4	102 + 2.5	0.13	3.2	0.80	1.20	610	42	25.1	11.4
4 1/2	114 + 3.0	0.13	3.2	0.96	1.43	510	35	27.6	12.5
5	127 + 4.0	0.13	3.4	1.13	1.68	440	30	30.2	13.7
6	151 + 4.0	0.15	3.8	1.41	2.10	610	42	237.5	17.0

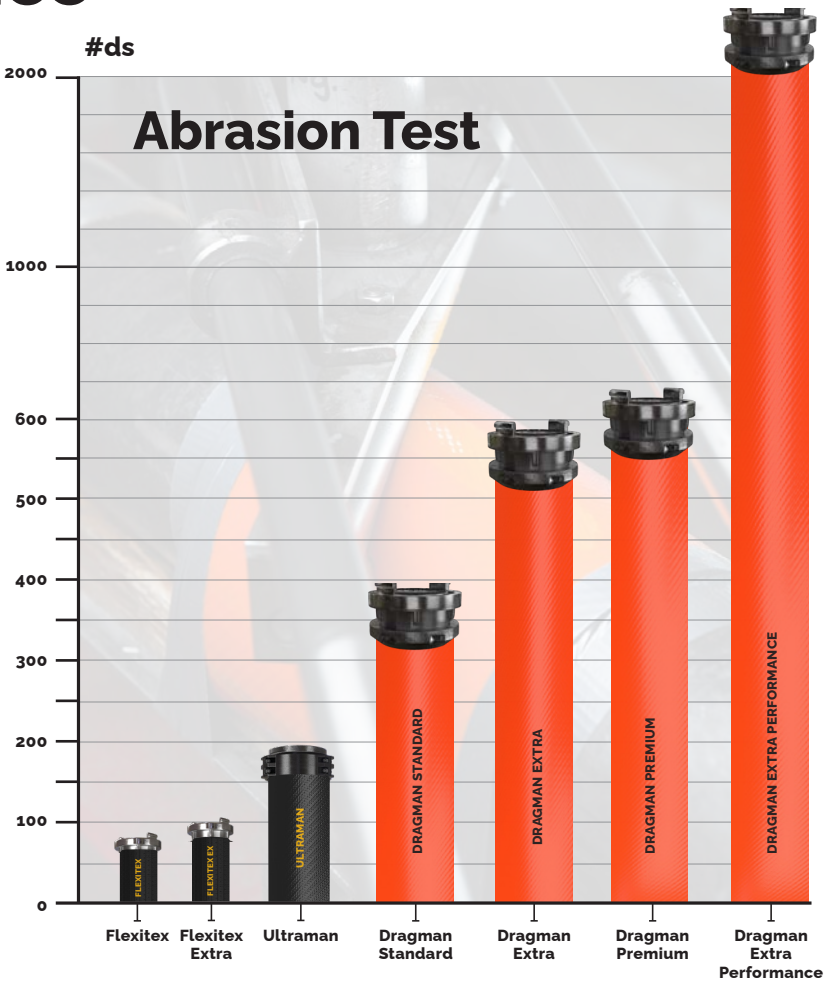
Abrasive Resistance

Abrasive resistance is a measurement that indicates how well a hose can handle wear and tear. The TPU or rubber quality, along with the thickness of the layer will be the main factors that determine a hose score on this metric.

Abrasion tests are performed with a piece of sand-paper mounted on a mechanical arm. The mechanical arm is dragged back and forth over the hose until the weave is exposed. A counter registers the amount of double strokes (#ds) each hose can handle.

Mandals performs measurements at the thinnest area of the hose and have also added an extra load to the test arm compared to BS 6391 test requirements.

Mandals does regular benchmark testing to compare Mandals' products to the rest of the market, and our hoses consistently delivery high scores on this metric. This is due to the high quality materials we use in our products.



Tensile Strength

Flexitex Standard



inch	X1000 lbs	Tons
4"	19.4	8.8

Flexitex Extra



inch	X1000 lbs	Tons
4"	25.1	11.4

Ultraman



inch	X1000 lbs	Tons
4"	22.2	10.1

Dragman Standard



inch	X1000 lbs	Tons
5"	43.9	19.9

Dragman Extra



inch	X1000 lbs	Tons
5"	48.3	21.8

Dragman Premium



inch	X1000 lbs	Tons
5"	37.8	17.1

Dragman Extra Performance



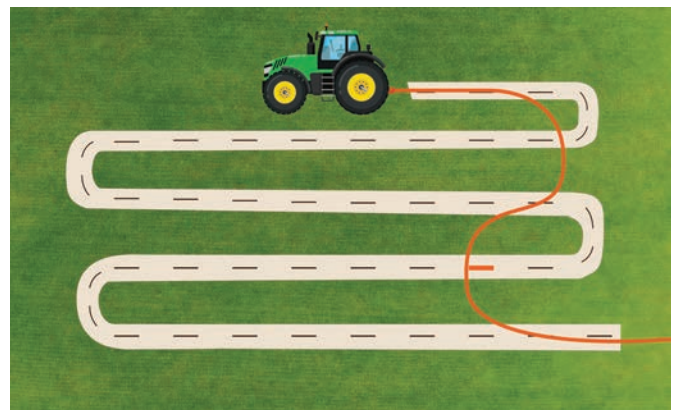
inch	X1000 lbs	Tons
5"	48.3	21.80

Drag Hoses vs. Slurry Tanks



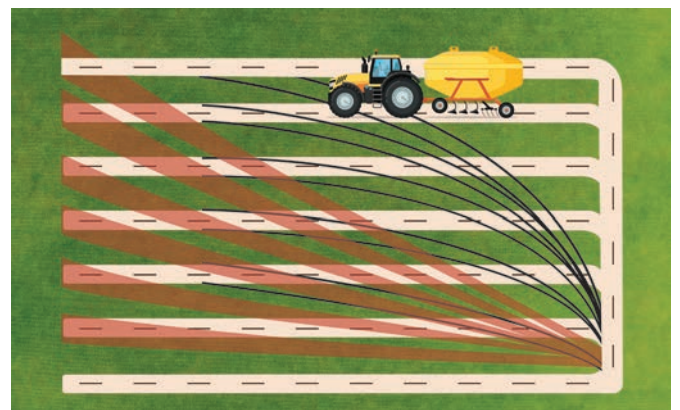
Drag Hose System

- No soil compression.
- Lighter equipment.
- Immediate volume - no down time.
- Continuous flow - no refill.
- Flexible supply line from lagoon / pit.
- No occupancy of surroundings (public roads).
- Flexible hose dimensions available.
- Easy deployment and retrieval.
- Manure spreading also possible in soft or wet soil.



Using a drag hose system, the purpose can be accomplished with a single pass with lower weight on the field.

Slurry Tank System



A visualization of the way a tractor with a slurry tank travels on a field. A tractor with a tank can reach a total weight of 40 tons, compressing the soil leading to lower yields. Fuel consumption and roadway driving are also important factors.

World Class Lay-Flat Hoses

Agriculture

Let us contact you

By scanning the QR code below, you will be able to fill in your information and choose the products you would like to learn more about. One of our sales managers will get in touch with you shortly to help you with your challenges and suggest appropriate solutions for your needs.



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