



**Mandals Tubeman M has been specifically designed for trenchless rehabilitation of industrial pressure pipelines transporting sewage, drainwater, hydrocarbons, such as fuels, gasoline, natural gas, oil, and other non-aggressive liquids and gases. The liner is designed for medium-pressure systems.**

With Mandals Tubeman M we offer a more sustainable solution for the rehabilitation of old pipelines with minimal disruption to traffic, pedestrians, and the environment in general, with an improved CO2 footprint and HSE performance. The hose is flexible in terms of diameter variations of the original pipe, effortlessly passing through bends even at long section lengths.

### Advantages / Feature / Design

The liner can be delivered in diameter range suitable for 6" (DN150) to 14" (DN350) nominal pipe diameter.

Mandals AS supplies the liner leak-proof tested, and tape wrapped in a "U"-shape. Prior to installation a regular cleaning procedure is required of the host pipe and condition controlled by CCTV inspection.

The liner is pulled through the host pipe by using a winch and can be installed in pipes having bends up to 45° (R/D ≥ 5)<sup>1</sup>. No steaming is needed to cure the liner, only a small amount of pressure is required to break the tape. Thereafter the liner is re-coupled and connected again to the existing infrastructure and the system is ready to be put back into operation.

Mandals Tubeman M is a semi-structural, stand-alone liner which will absorb all internal pressure while in operation. The liner is manufactured using a thermoplastic polyether-based polyurethane (TPU) with excellent wear & tear properties, outstanding hydrolysis resistance and resistance against microbiological attack.

The "extrusion through the weave" production technology gives excellent bonding between cover and lining as well as firmly encapsulating the circular woven aramid yarn reinforcement – ensuring the high burst pressure performance of the liner.

Max. recommended operational temperature will depend on type of fluid. Service Lifetime will depend on several important factors such as proper and correct installation, condition of the existing pipe, type of medium pumped through the liner, temperature, etc.

### Low Pressure - Industrial Pipes

Nominal Pipe size		Tubeman M / Technical Hose Data											
		Internal Diameter		Wall Thickness		Nominal Weight		Max. Working Pressure (MWP)		Min. Burst Pressure (BP) (ISO1402)		Actual Total Tensile Strength	
Inch	DN-mm	Inch	mm	Inch	mm	lbs/ft	Kg/m	psi	bar	Psi	Bar	lbs x 1000	kg x 1000
6"	150	4.84	123.0	0.18	4.6	1.40	2.10	812	56	2030	140	100.5	45.2
		(+0.14)	(+3.5)	± 0.010	± 0.25								
8"	200	6.57	167.0	0.18	4.6	1.93	2.90	580	40	1450	100	137.9	62.1
		(+0.14)	(+3.5)	± 0.012	± 0.30								
10"	250	8.35	212.0	0.18	4.6	2.51	3.76	435	30	1088	75	172.1	77.5
		(+0.18)	(+4.5)	± 0.014	± 0.35								
12"	300	10.16	258.0	0.18	4.6	3.00	4.50	377	26	928	64	211.1	95.1
		(+0.18)	(+4.5)	± 0.014	± 0.35								
14"	350	11.70	297.0	0.18	4.6	3.47	5.20	290	20	725	50	242.4	109.2
		(+0.20)	(+5.0)	± 0.014	± 0.35								

#### Notes:

(1) The sharpest bend angle and corresponding R/D ratio of the pipeline system will impact and set the Maximum Working Pressure (MWP) recommended. A 45° bend ( R/D = 5.5) will entail a 45% reduction of recommended MWP of the rehabilitated pipeline system