ANDROMEDA

Plaited and Woven Division

Brochure # 083 - 04
Superflex Recovery Strops

SUPERFLEX RECOVERY STROPS

Basic recovery strop made in a range of sizes with “A” & “B” strop thimbles. The “B” thimble is designed for engagement onto the ripper of a bulldozer. The “A” thimble fits into the towing clevis of dump trucks. Both “A” & “B” thimbles will accept bow shackles for connecting to alternative devices.

Four ply recovery strop with connecting link, 300 tonne BS.
This design enables the production of very short slings

High Elastic Modulus (low stretch) Steel Slings for Mine Rescue and Machine Towing

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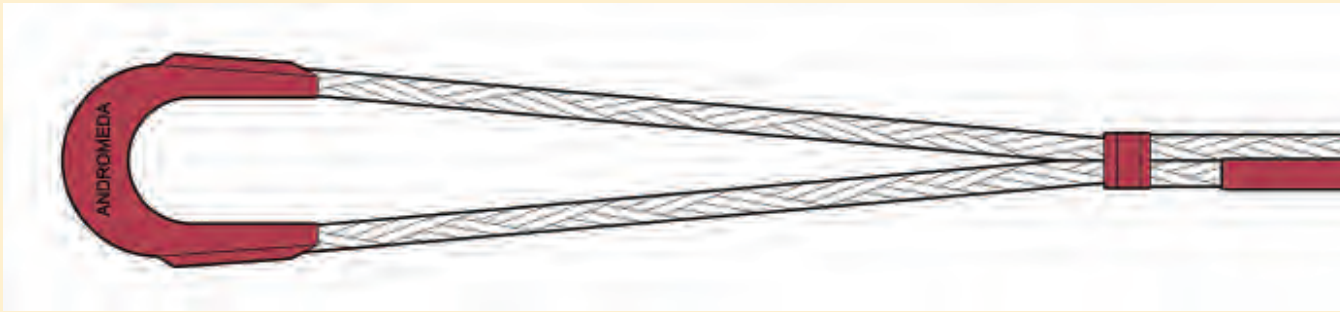
ANDROMEDA RECOVERY STROPS -

Recovering bogged vehicles

STROP SIZE (breaking strength in tonnes)	This table represents an approximate guide to the weight of vehicle (GVM in tonnes) that these strops will recover under varying conditions. The figures have been calculated for wheeled vehicles of 4 x 2 or 6 x 4 axle configurations. The estimates are based on a Factor of Safety of two – that is the load applied to the strop is half of its breaking strength.		
	Level # 1 incapacity (slippery surface)	**Level # 2** incapacity (medium bogged)	**Level # 3** incapacity (severely bogged)
68	140	70	45
100	200	100	70
150	300	150	100
200	400	200	140
300	600	300	200

EXPLANATION of incapacities used above:

Level # 1 –slippery surface, vehicle unable to move under its own tractive capability because of wet, slippery surface conditions, but not sinking into the ground much . (*Calcs from applied force = 25% GVM)*
Level # 2 - medium bogged – drive wheels have sunk into the ground about one third of a wheel diameter *(calcs from applied force = 50% of GVM)*
Level # 3 – seriously bogged – drive wheels have lost all traction and the axle assembly is resting on the ground. *(calcs from applied force = 66% of GVM)*



The "B' thimble'is a hardened Nickel Chrome Moly steel that can be directly engaged with the ripper for fast rigging in the field without damage to the cable.

Superflex plaited steel cable ––high strength, high elastic modulus with great flexibility makes these strops easy to handle and safer to use, with less stored energy under load.

Special strop thimbles are not rigidly fixed into the cables, thus enabling equalisation of the load for multi-ply slings

Some special notes about Andromeda Recovery Strops

The figures quoted in this technical sheet represent applied loads equal to half of the UTS of the strops. Before failure they will pull twice the loads indicated. However, if it should be necessary to exceed these figures, care should be exercised to minimise the chances of injury should a failure occur.

These figures represent acceptable loadings for Superflex Recovery Strops when used in hauling applications, using a Factor of Safety of two. They do not represent any Safe Working Load for lifting purposes, which usually requires a Factor of Safety of five.

Recovering heavy vehicles suffering Level # 3 incapacity requires special care.This is because the application of large forces to the chassis of the vehicle can cause damage to the axles, suspension and drive train, especially if the vehicle is loaded.

A general note about the selection of Recovery slings: The figures presented in this Technical Sheet are meant to help dispel some of the common misconceptions that exist regarding the forces needed to tow heavy vehicles. This reasoned and calculated guide should help in the selection of the appropriate size of Strop

GUIDE FOR FIELD USE

Towing up inclined roadways or ramps

STROP SIZE (breaking strength in tonnes)	**This table** shows the recommended GVM to be towed up ramps of various inclines with each size of strop. The estimates are based on a Factor of Safety of two – that is the load applied to the strop is half of its breaking strength. (see calculation formula below) The rolling resistance component is estimated at 15% of GVM.*				
	Gradient 1 in 10 Incline 6 deg	Gradient 1 in 6 Incline 9.5 deg	Gradient 1 in 5 Incline 11 deg	Gradient 1 in 4 Incline 14 deg	Gradient 1 in 3 Incline 18 deg
68	273	173	144	118	92
100	407	258	215	178	138
150	610	386	322	264	206
200	813	515	429	351	275
300	1220	772	644	527	412

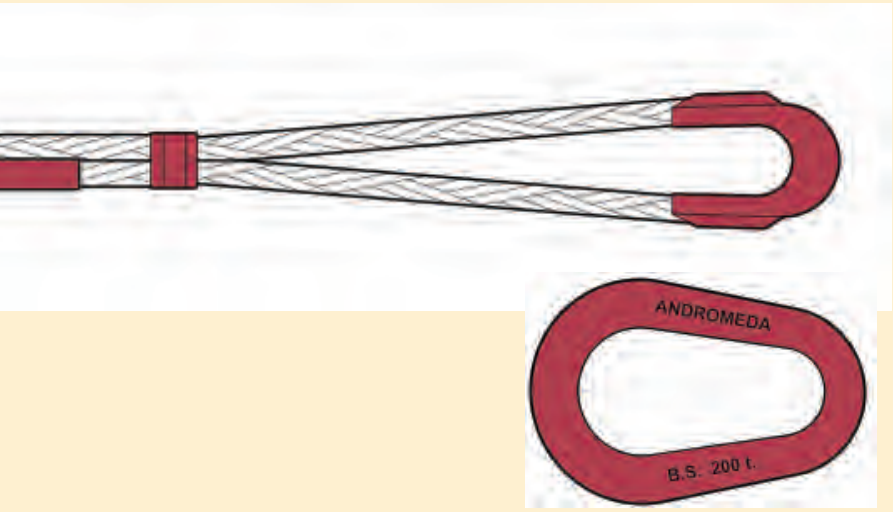
*This resistance figure allows for unsealed roadways. For compact or sealed roadways it could be reduced by half.

CALCULATION FORMULA used to compute above figures - for ramp incline of Q (degrees)

$$\frac{\text{BS of strop}}{\text{Sine Q}} \times 0.5\ (\text{F of S}) \times 0.85\ (\text{rolling resistance allowance}) = \text{the GVM}$$

Example calculation: What weight of vehicle (GVM) can be towed up a 1 in 5 ramp with a 100 tonne BS strop, using half of its UTS ?

$$\frac{100}{\text{Sine } 11} = \frac{100}{0.1908} \times 0.5 \times 0.85 = 214.6 \text{ tonnes}$$



"A" thimble -designed to engage directly into clevis and pin on haul truck, will also accept alloy steel shackle of appropriate size

The keeper plates can be cut to enable reuse of the thimbles if the cables need to be replaced

Cast alloy steel links are also available, these are heat treated to 1000 MPa and are thinner than the cast thimble, as well as providing useful articulation when attaching the strops to a haul truck clevis or hook.

ANDROMEDA RECOVERY STROPS

PHYSICAL SPECIFICATIONS —breaking strengths, cable sizes, number of plies and masses for various sizes and lengths of complete assemblies.

Strop size	Superflex cable size	Number of plies	Mass of strop assembly kg				Kg/metre for other lengths	Pin dia and mass of alloy bow shackle
			6m	10m	15m	20m		
68	Six -5	2	38	58	75	96	4	38 mm 6 kg
100	Eight-0	2	56	80	111	141	6	51 mm 14 kg
150	Ten-0	2	108	146	195	243	10	57 mm 19 kg
200	Eight-0	4	100	140	210	271	12	63 mm 26 kg
300	Ten-0	4	205	282	378	474	20	70 mm 38 kg

VERY SHORT STROPS can now be made, lengths down to 1.0 m in some sizes. These can be very useful as extension cables attached to high vehicles to facilitate the hooking up process.

ANDROMEDA RECOVERY STROPS

Dimensions and masses of cast alloy steel Strop Thimbles:

Standard Strop Thimble (known as "A" type)							Wide Strop Thimble (known as "B" type)						
Strop size (BS)	P	W	J	S	T	Mass	Strop size (BS)	P	W	J	S	T	Mass
68	75	145	200	50	40	3 kgs	**68**	140	200	320	65	40	7 kgs
100	115	200	270	70	60	6	**100**	195	300	400	100	60	13
150	125	260	305	90	70	8	**150**	210	350	500	105	70	18
200	115	200	270	70	95	9	**200**	195	300	400	100	95	26
300	125	270	305	90	115	13	**300**	230	360	530	135	115	39

Dimensions and masses of cast alloy steel links for Recovery Strops:

Nominal size UTS (tonnes	Inside diameters		Outside diameters		Internal length	External length	Thickness	Estimated UTS (tonnes)	Mass (kgs)
	Small end	Large end	Small end	Large end					
68	56	92	118	154	220	287	23	140	7
100	64	110	134	180	250	328	30	200	10
150	80	130	162	212	300	392	38	300	12
200	80	130	162	212	300	392	50	400	14
300	100	130	200	230	350	455	60	600	22

These links are intended for connecting the Andromeda Recovery Strop into a pin connecting system. The pin in the clevis of the mining truck will usually pass through the smaller end of the cast link.

NOTES: Even simple products like these Recovery Strops can be improved, so we always welcome any feedback on their performance. This product is an improved version of our original Recovery Strop of 1990. As such they were the first slings specifically designed to engage the ripper of a bulldozer without being damaged. This capability and their great flexibility saves a lot of time when recovering heavy vehicles.

The most important points about Andromeda Recovery Strops –

- Provides strong yet flexible cable for rescuing heavy vehicles
- Especially designed to engage directly onto the ripper of a bulldozer without damage
- Flexible and easy to handle and store away after use
- Breaking strength figure is cast into the thimble for easy identification of the size
- Special thimbles can be reused on case of cable damage
- The thimbles are not rigidly attached to the cables, thus enabling multiple plies of cable to equalise their loads and attain maximum strength
- Superflex cable has a high elastic modulus, and so stores less energy than comparable fibre slings, which have a lower modulus (more stretch)

Why they are called "strops"- *because they are made with endless bands of cable, they resemble the old marine strop used around wood blocks in ship's tackle.*
Websters – strop: band of leather, rope or iron around a pulley block