



Choosing the right winch for the job can be a daunting task, often requiring careful consideration of winching theory. Arbil staff can make the process an easier one by providing experience and technical know-how to ensure that you receive the most appropriate equipment for your application.

Winching solutions incorporate winches in either manual or powered versions ranging from lightweight portable units through to high capacity units that combine a heavy duty line pull with impressive pull speeds. Hydraulic Tirfors® allow multiple operation from a single power source.

Winching accessories further enhance the capacity and versatility of each winch.

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Tirfor® Lifting and Pulling Machines

Tirfor® Winches – Manual

- Versatile – can be used for lifting, pulling or tensioning in any direction and at any angle
- Portable units with excellent strength-weight ratios
- Unlimited pulling length and or lifting height
- Lifting and winching capacities can be increased by the use of multi-sheave blocks



Lifting Cap (Kg)	Pulling Cap (Kg)	Machines			Wire Ropes				
		Fleet Code	Rope Travel Per Stroke (mm)	Machine Weight (Kg)	Fleet Code	Rope Diameter (mm)	Rope Weight (Kg)		
							10m Rope	20m Rope	30m Rope
800	1200	TM 08	40	6.6	TR 08	8.2	3.5	7	10.5
1600	2500	TM 16	42	18	TR 16	11.3	6.25	12.5	18.75
3000	5000	TM 30	23	27	TR 30	16.3	13	26	39

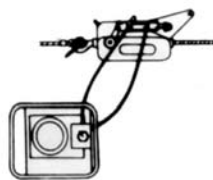


Tirfor® Winches – Powered

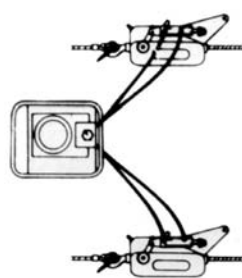
When the winching task is over a long distance, or becomes labour intensive and slow through the use of multi-sheave blocks, then the use of hydraulically operated Tirfors® should be considered; in particular, where precise control is needed simultaneously over more than one unit.

- Each unit is powered by a self-reciprocating hydraulic ram
- Power packs are available either electrically or petrol driven
- Labour efficient
- Simultaneous multi-unit operation
- Portable and lightweight
- Excellent strength to weight ratio
- High speed power packs

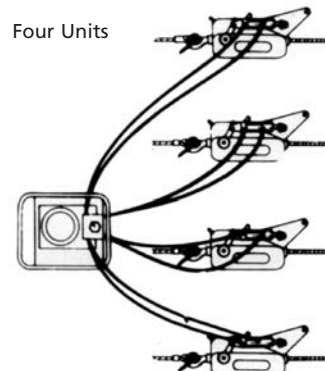
Single Unit



Two Units



Four Units



Fleet Code	Cap per Machine (Kg)	Rope Travel Speed – Metres per Minute			Weight per Machine (Kg)
		Single Machine	2 Machines	4 Machines	
TM 16 H	1600	-	1.5	0.75	28
TM 32 H	3200	0.95	0.47	0.24	54



Hydraulic supply options for 1,2 or 4 winch units, available with either standard or high speed power packs. See table for details.



Winching Theory

Calculation of Pulling Effort Required

Winching requirements are usually quite different from those of lifting, since in general, the necessary pulling effort required of any given winch represents only a proportion of the actual weight of the load. The effort required will depend upon 2 basic factors:

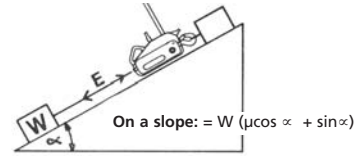
- The coefficient of friction between the load and the ground and
- the angle of the slope, if any

For example, a winch capable of exerting a pulling force of 1 tonne might be capable of pulling only 2 tonnes of dead weight on a concrete floor, but of pulling up to 50 tonnes of good rolling stock, such is the difference in the two coefficients of friction.

Furthermore, the greater the angle of slope the greater the effort required.

- A further factor is the number of layers of rope on the winch the more layers of rope the lower is the winch's pulling capacity

Horizontally: $E = \mu W$

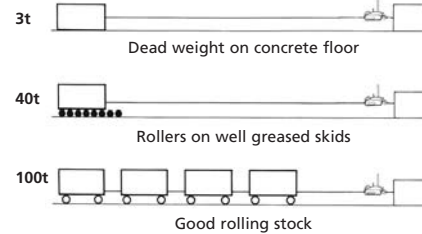


Where E is the effort required to pull a load lying on the ground
 W is the weight of the load
 μ is the friction between load and ground which depends upon the area of contact of the load with the ground and the nature of the ground (presence of wheels, rollers, sand, mud, concrete etc.)
 α is the angle of the slope

The value of μ , the coefficient of friction, must be known or estimated.

- Typical values are:
- steel on steel 0.4-0.6
 - wood on stone 0.4
 - continuously lubricated surface 0.15
 - leather on metal 0.6
 - iron on stone 0.3-0.7
 - load on wheels 0.02-0.05

Approximate loads which have been moved by a 1600kg TIRFOR under tests



Increases in Lifting and Pulling Power

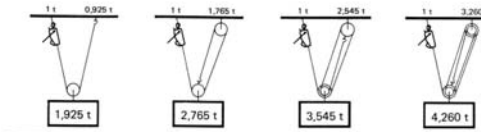
In many applications an increase in the lifting and pulling power of a winch is required.

The simplest method of achieving this is through the use of sheave blocks and most commonly, the snatch block, so called because its hinged fitting allows quick insertion of the rope, i.e. it "snatches" the rope.

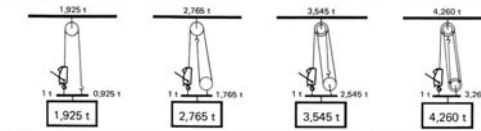
At best, a single snatch block will effectively double the lifting and pulling power of the winch and by reeving further, with the use of multi-sheave blocks, even greater increases can be achieved.

It should be noted that the use of snatch blocks or multi-sheave blocks will reduce the speed at which the load moves. In such circumstances, powered winches are often chosen to increase speed.

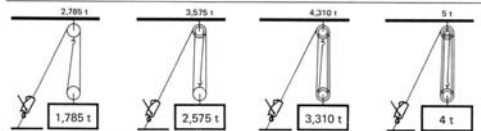
CASE 1
 1.1) Lifting-machine anchored above load



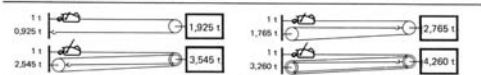
CASE 2
 1.2) Lifting-machine anchored to load



CASE 3
 1.3) Lifting-machine anchored at ground level



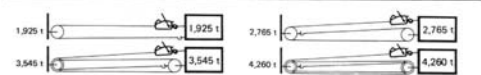
CASE 4
 2.1) Pulling-Case No. 1



CASE 5
 2.2) Pulling-Case No. 2



CASE 6
 2.3) Pulling-machine attached to load



Power Operated Winches

Powered Winches

For longer lengths, higher capacity and faster winching, we have a comprehensive range of electric and air powered winches ranging from 1,000lbs through to 20,000lbs capacity.

Our technical team would be happy to assist you in specifying the most suitable winch for your particular application, however, there are some useful hints.

Selecting the Correct Electric/Air Winch

When selecting a winch it is important to note that line pull and line speed vary according to how much wire rope is on the drum.

The first wrap, or first layer of rope on the drum, delivers the slowest speed, but the maximum line pull. Conversely, a full drum delivers the maximum line speed with the minimum line pull.



Selection Guide

To determine the correct winch for your application the following questions should be answered.

- What is the required line pull?
- What is the required line speed?
- What is the required wire rope length?
- Will the winch be used for lifting and lowering or for pulling applications only?
- How will the winch be anchored?
- Are any additional accessories required to increase the capacity or versatility of the winch?

Electric Winches

- 415v/3 Phase 50 cycle
- Failsafe brake
- Rope speeds indicated are at mid drum rating

Fleet Code	Line Pull (lbs)	Model	Speed M/min	Rope Cap (M)	Rope Dia (mm)	Weight (Kg)
EW 224	2240	Construction Winch	10	95	10	650
EW 448	6720	Construction Winch	12	167	16	500
EW 672	6720	Construction Winch	12	100	16	1000



For our full range of single and multi-sheave blocks please refer to pages 21-22



Air Winches

- Line pull from 1,000lbs to 20,000lbs
- Speeds of up to 38m/min
- Automatic and manual brake options
- Rope lengths up to 435 metres

Fleet Code	Line Pull (lbs)	Model	Brake Type	Speed M/min	Rope Cap (M)	Rope Dia (mm)	Weight (Kg)
AW 020M(S)	2000	Ingersoll Rand	Manual	34	200	10	222
AW 020M(L)	2000	Ingersoll Rand	Manual	34	440	10	255
AW 015M	3300	Liftair	Automatic	18	80	10	72
AW 040M(S)	4000	Ingersoll Rand	Manual	38	210	13	386
AW 040M(L)	4000	Ingersoll Rand	Manual	38	435	13	426
AW 065A	6500	Globe	Automatic	10	300	16	690



The volume of air required varies for each winch. Our technical staff will advise you of CFM (Cubic Feet per minute) ratings. Rope speeds are given at mid-drum rating



Wire Rope Sheave Blocks

Snatch Blocks for Wire Rope – Standard Duty



- Increase lifting or pulling capacity. Please refer to page 19 for technical information and application charts
- Can be utilised to alter the direction of pull
- Standard Duty Snatch Blocks are available with a choice of head fittings: swivel safety hook or shackle – Please specify

i Please note that when using sheave blocks, winch travel speeds will be reduced in direct proportion to the number of sheaves. In such circumstances, powered winches are often chosen to increase speed

Fleet Code	Cap (t)	Rope Dia Speed (mm)	Sheave Dia (mm)
LWB 200	2	7 - 9	76
LWB 400	4	10 - 12	115
LWB 800	8	20 - 22	152
LWB 800	8	20 - 22	203



Snatch Blocks for Wire Rope – Heavy Duty

For greater capacities and diameters of steel wire rope the Heavy Duty Snatch Block is a well designed and recognised piece of equipment.

Traditionally fitted with a swivel oval eye head fitting, this style of block is also available with a sling hook and catch.



- Increase lifting or pulling capacity. Please refer to page 19 for technical information and application charts
- Can be utilised to alter the direction of pull
- Heavy Duty Snatch Blocks are available with a choice of head fittings: swivel eye or sling hook and catch – Please specify

i Please note that when using sheave blocks, winch travel speeds will be reduced in direct proportion to the number of sheaves. In such circumstances, powered winches are often chosen to increase speed

Fleet Code	Cap (t)	Rope Dia Speed (mm)	Sheave Dia (mm)	Weight (Kg)
SB 011	1.5	11	150	6.7
SB 021	2	20	200	13
SB 031	3	20	250	22
SB 051	5	24	300	43
SB 101	10	28	350	43
SB 151	15	32	400	68
SB 201	20	32	450	75
SB 251	25	35	500	86



Wire Rope Sheave Blocks

Multi-Sheave Wire Rope Blocks

Available in two sheave, three sheave and four sheave options, our range of multi-sheave wire rope blocks handle rope diameters from 12mm through to 35mm diameter.



The majority of our fleet are fitted with swivel hook and catch, however swivel oval eye options are also available, please ask our technical team for further details.



It is important to note that when rope blocks are used, the load imposed upon the supporting structure is increased by the amount of hoisting effort. Care must therefore be taken to ensure that the supporting structure, together with any other connectors, shackles etc, are of adequate strength

Sheave Dia (mm)	Rope Dia (mm)	Two Sheave		
		Fleet Code	Cap (t)	Weight (Kg)
150	12	MB 032	3	14
200	14	MB 052	4.5	24
250	20	MB 062	6	52
300	24	MB 102	10	101
350	28	MB 202	20	165
400	32	MB 302	30	205
450	35	MB 402	40	258

Sheave Dia (mm)	Rope Dia (mm)	Three Sheave		
		Fleet Code	Cap (t)	Weight (Kg)
150	12	MB 053	4.5	19
200	14	MB 073	6.5	31
250	20	MB 093	9	68
300	24	MB 153	15	125
350	28	MB 303	30	205
400	32	MB 453	45	260
450	35	MB 603	60	310

Sheave Dia (mm)	Rope Dia (mm)	Four Sheave		
		Fleet Code	Cap (t)	Weight (Kg)
150	12	MB 064	6	25
200	14	MB 094	9	43
250	20	MB 124	12	92
300	24	MB 204	20	175
350	28	MB 404	40	295
400	32	MB 604	60	392
450	35	MB 804	80	510



Cable Handling

Cable Reel Jacks - Standard

i Please note that the side hooks are only rated at 50% of the top hook capacity

Working in pairs, our mechanically operated cable reel jacks have 3 hook positions per jack, one top position and two side positions.



Fleet Code	Capacity per Pair		Stroke (mm)	Top Hook Height (mm)	Reel Dia Range (mm)	Spindle Dia		Weight Per Pair (Kg)
	Side Hooks	Top Hooks				Side Hooks (mm)	Top Hooks (mm)	
CJ 05	5t	10t	254	533	508 - 1524	50	63	26.7



Cable Reel Jacks – Hydraulic Extra Large Diameter

Fleet Code	Cap (t)	Reel Dia Range (mm)	Overall Height (mm)	Hydraulic Lift (mm)	Weight Per Pair (Kg)
CJX 03	3	600 - 1800	1450	125	90
CJX 06	6	760 - 2700	1700	140	150
CJX 10	10	900 - 3350	1970	147	200



Cable Roller/Skid

Cable Roller

A simple to use system that protects cables and aids positioning.

Corner Roller

Designed to be used in pairs, these rollers can be used vertically or on their side to guide cables around corners.



Cable Roller (CAB 150)



Corner Roller (CORN 150)

Fleet Code	Dimensions (mm)	Weight (Kg)	Max Cable Dia (mm)
CAB 150	590 x 225 x 195	4.5	150
CORN 150	610 x 310 x 330	18.2 (each)	150



Cable Winches and Accessories

Cable Pulling Winches

A versatile and portable 110v winch for a variety of cable pulling jobs twin pulling capacities.

- Dual speed
- Forward and reverse mode
- Overload protection system

Fleet Code	Capacity (t)		Pull Speed (m per min)		Weight (Kg)
	Small Drum	Large Drum	Small Drum	Large Drum	
CPW01	1.5	2.5	2.5	4.0	79



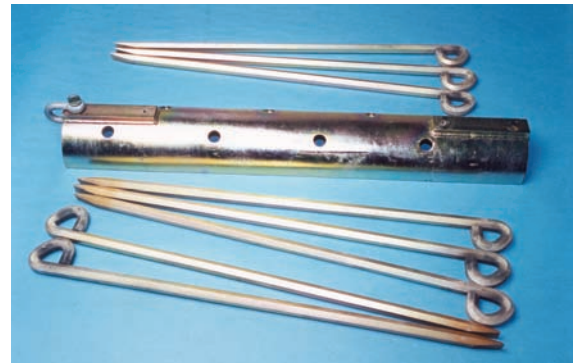
Ground Anchor (Auger Type)

Straightforward and easy to use temporary auger type anchor, that provides a secure fixing point for use with the vast majority of Tirfor® type portable winches. Please ask our technical department for further advice.



Fleet Code

GA 01



Horizontal ground anchor

For use where near horizontal loads are being applied. Incorporating anchor, plate and eight fixing pins to provide secure anchoring for winches.

- SWL 3000Kg

Fleet Code

HGA 01

