


HAND WINCH SELECTION GUIDE FOR LIFTING OPERATIONS

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1.1 Winch Use

Careful consideration should be given to the winch selection process.

Safety should be a primary concern and questions such as which winch features are required for the application, what will be the experience level of the user, and what harsh environmental conditions will exist should all be answered.

If the lifting operation is frequent, arduous or would be particularly labour intensive then a power operated winch could be a safer or more cost effective solution.


A decorative graphic consisting of several parallel white lines of varying lengths and orientations, located in the bottom right corner of the slide.

1.2 Winch use

The experience or skill of the intended user is important. Particularly so, if the equipment will frequently be used by inexperienced operators unfamiliar with the safe use of the winch. Ensure users have instructions for a use.

Lifting winches have either self-locking brake or are worm gear. These do not have a free-wheel rope pay-out facility, which is common on boat pulling or hauling winches.

This means the winch operating handle has to be used for raising or lowering with or without a payload.




1.3 Winch use

If the winch is likely to be used in a harsh environment, including salt water, a potential for damage or abuse of the winch this should be accommodated for,

Guards should be fitted to protect the winch from damage or abuse.

Some models have a removable operating handle, which is particularly useful to prevent unauthorised use.

Where there is a likelihood of little or no periodic maintenance, then this should be factored into the winch selection.



1.4 Winch use

ATEX approved hand winches are available where explosion protection is a requirement.



For heavy duty applications a larger size winch should always be selected (See section 3. on winch load capacity).



1.5 Winch use

How the winch is to be mounted is important. It should offer a good working position which allows uninterrupted operation of the handle. This is especially important if the mounting position rotates and the operator is liable to injury from proximity to obstacles.

Fixing options include:

Base or column mounted →



← side mounted



wall mounted →



2.1 Winch Types

Lifting winches are either a spur gear type with a self-locking brake.



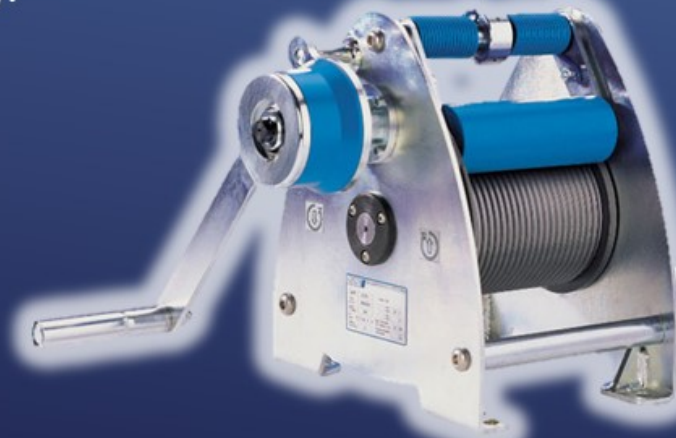
Or worm gear type winches, which have a larger gear reduction and although slower offers a more effective brake.



Both types do not have a free-wheel rope pay-out facility common on boat pulling winches. This means the operating handle has to be used for raising or lowering with or without payload.

2.2 Winch Types

For applications where the load would be suspended in public places special winches are available with a double-acting safety retaining spring which reliably holds the load in every position. Plus a grooved drum and spring loading rope pressure drum for improved one layer rope coiling.

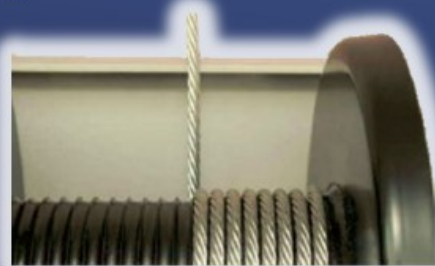


2.3 Winch Types

For applications where the winch is required to have multiple ropes, compartments can be provided with additional rope anchor.



Where precision winding is required grooved drum options are available.



2.4 Winch Types

For winching applications with occasional heavy duty or high lifting requirements, an option of a hand winch which can be power driven with a maximum 400 rpm drill motor may be considered



2.5 Winch Types

Some winch models have a removable handle, which is particularly useful to prevent unauthorised use. In some options the handle can be adjusted in length for use in confined spaces




On this model the handle can be used on either side for left or right handed operation



3. 1 Winch Load Capacity

The first important consideration is that the weight of the load you want to lift is not the same as the winch manufacturer's line pull rating.


This rating is a combination of the mechanical capacity of the winch and the tensile strength of the line on the drum. This rating is not to be considered the safe working load for the winch.



3.2 Winch Load Capacity

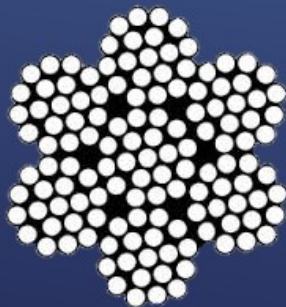
Unless otherwise indicated, rated capacity is based on the first layer of winch cable (the one closest to the drum). Typically, winches have capacity for up to around 6 layers and that the first layer has the “lowest” gear ratio and the most pull.

The load capacity of the top or last cable layer is typically around 30% to 50% less than the first layer. Where multi-layer capacity is unknown then we suggest as a rule-of-thumb, always purchase a winch of twice the capacity of the maximum load being lifted.



3.3 Winch Load Capacity

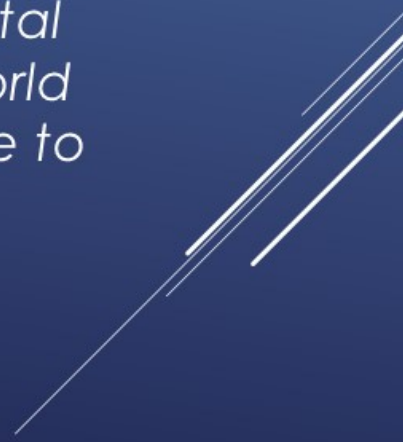
By choosing a larger capacity winch you will also ensure that the recommended cable (wire rope) size for the winch has a least 5:1 factor of safety for the load being lifted when using recommended standard 1770 tensile grade 7 x 19 steel wire rope.



4. 1 Winch Drum Capacity

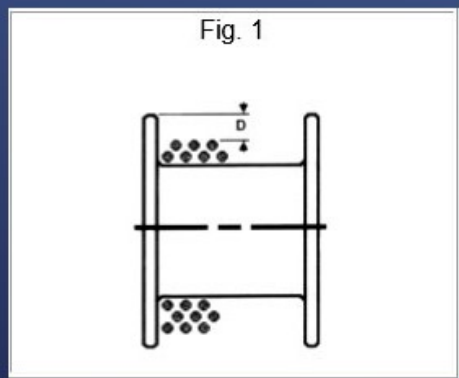
Where the total cable (wire rope) capacity for the drum is given this will be the length of wire rope that can be tightly and evenly wound onto a drum, dead wraps are included.

As a recommendation, the actual length of working rope should equal to 80% of total working drum capacity. This is a real world estimate of what can be expected due to less than perfect winding practices.



4. 2 Winch Drum Capacity

For practical purposes some space from the top layer of the cable (wire rope) to the outside of the drum flange should be maintained ("D" in fig. 1). This margin is to prevent the cable (wire rope) from inadvertently coming off the drum during use.



Note: The one exception to this is Full Drum Storage. When the winch is not being used to move a load, the wire rope may be spooled to the top of the flange.

5.1 Winch Cable Attachment

To facilitate a tidy connection of the plain end of the cable (Wire rope) to the winch, we recommend that the cable end is fused and tapered.


The load must never be held just on the cable (Wire rope) anchor point. This is typically a hole in the drum with a grub screw or clamps on the outside of the drum flange.

The first few wraps of the cable around the drum (commonly known as the "dead wraps") provide a simple and secure method of anchoring the wire rope to the drum.

5.2 Winch Cable Attachment

This (anchoring) of the winch cable (Wire rope) is accomplished by the friction (of the dead wraps) tightening against the drum barrel, as a load is applied. As the load increases so does the anchoring effect.

Smooth cable (Wire rope) spooling can be affected by the initial wrap of the cable on the drum. With a plain cylindrical core the first wrap follows an imperfect helical path and the wrap jump at the end of the first wrap is difficult to control.



5.3 Winch Cable Attachment

When installing the first wrap, time should be spent on making the wrap as perfect as possible.

A space between each wrap of approximately 8-10% of the cable diameter is ideal for achieving smooth spooling. The first layer wraps should not be touching each other.

It is critical that the recommended number of, at least, five dead wraps remain on the drum at all times in order for the load to be held. As hand winches are usually compact in size, it is unlikely that the first layer will figure in the actual lifting operation

5.4 Winch Cable Attachment

For the load end of the cable, Wire rope clips (Bull dog grips) should not be used as these are not suitable for lifting applications. Swaged terminations with a thimble eye should always be used.

These require hydraulic presses for proper installation and do not readily lend themselves to re-application in the field under most circumstances.

Load attachments should be either a rated lifting hook with fixed or swivel eye fitted with a safety catch or a rated lifting shackle.

For applications where the shackle is to be permanently attached to the load, a bolt and nut pin shackle is recommended.

6. 1 Winch Positioning

The winch should be positioned directly in line with the load to be lifted.

Where the winch cannot be positioned in direct line with the load being lifted, one or more rope pulleys should be positioned to divert the rope.



For temporary applications snatch blocks can be used where a suitable suspension point can be utilised.

6. 2 Winch Positioning

For permanent installation a variety of base / ceiling or wall / side mounted pulleys are available, some with twin pulleys.

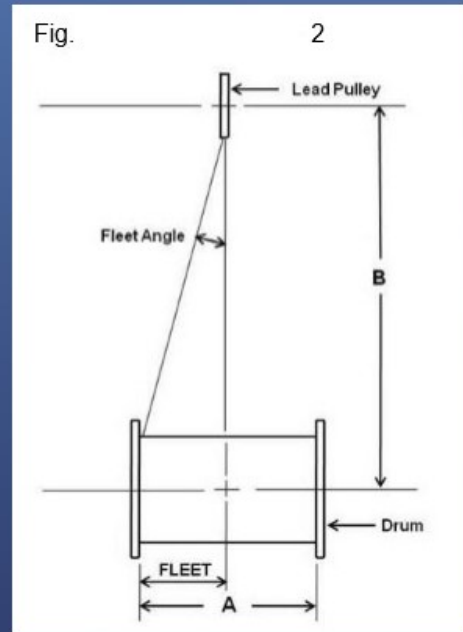


When positioning the lead pulley (The one closest to the winch) the fleet angle should be factored in.
(See 6. 3)

6.3 Winch Positioning

The fleet angle (fig. 2) should be between 1.5 and 2.0 degrees for smooth spooling.

In practice this means that for every cm of $\frac{1}{2}$ drum width A, the lead pulley distance B, should be at least 14 to 19 cm away to prevent the cable from jumping the pulley.



7. Contact Details

For further assistance in selecting the right winch and rope for your application, please don't hesitate in contacting our sales team:

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