WINTECH™ ...”A Winch For Every Application”

Railcar Pulling Detail

WINCH SIZING
As a general guide to sizing the right winch for the job, the following detail may be of help:

LOAD
Calculate the total weight of all the loaded railcars to be moved simultaneously. For example, if four loaded railcars, each weighing 85 tons are to be moved together, the total load will be four times 85 tons, for a combined weight of 340 tons.

ROLLING RESISTANCE UNDER IDEAL CONDITIONS
Resistance to rolling is influenced by the wheel journals, type of lubrication used and the ambient temperature. Assuming the railcars are to be moved along a straight, level and well-maintained track, select the running line pull for the lowest anticipated temperature, using Table 1.
Example: If the lowest anticipated temperature is 32°F, the required running line pull from Table 1 will be 15 lbs/ton. Multiply the total weight of the railcars — 340 tons — by 15 lbs/ton and the total running line pull becomes 5100 lbs.

TABLE 1

Temperature	More Than 32°F	Less Than 32°F	Less Than 0°F	Less Than –20°F
Running Line Pull (lbs/ton)	12	15	20	25

TRACK GRADIENT
For each one percent gradient — a rise of one foot for every 100 feet of track — the running line pull must be increased by 20 lbs/ton.
Example: If the track has a 1.5% grade, the additional running line pull is 20, multiplied by 1.5, or 30 lbs/ton. The new running line pull is the original 15 lbs/ton plus the 30 lbs/ton adjustment for grade or 45 lbs/ton. The new running line pull is now calculated by multiplying 45 lbs/ton by the 350 tons of railcars for a total of 15,300 lbs.

DIAGRAM 1

TRACK CURVATURE
To overcome the effects of wheels binding against rails on curved sections of track, running line pull must be increased.
Track curvature is expressed in terms of radius or degree of curvature. When this information is not available, the chordal factor can be easily measured. Simply stretch a 50-foot tape along the inside of the curve and measure the distance ‘A’ in Diagram 1. Select the appropriate additional running line pull from Table 2 using either radius, degrees of curvature or chordal factor. (Interpolation for a measure of curvature is not shown.)

TABLE 2

Radius (ft)	Degree of Curvature (degrees)	Chordal Factor A (Inches)	Additional Running Line Pull (lbs/ton)
1146	5	3.50	3.75
573	10	6.50	7.50
383	15	9.75	11.25
288	20	13.00	15.00
231	25	16.50	18.75
193	30	20.00	22.50
166	35	23.50	26.25
146	40	27.00	30.00

Example: Chordal factor A was found to be 6.5 inches. The additional running line pull from Table 2 is 7.50 lbs/ton. Now the running line pull has increased from 45 lbs/ton to 52.5 lbs/ton. Again, multiplied by the 340 tons of railcars, the total running line pull is 17,850 lbs.

TRACK CONDITIONS
If track conditions are substandard — soft ballast, uneven or deteriorating ties or debris on the track — additional running line pull will be needed. Since the condition of substandard track can vary considerably, Jeamar recommends that line pull be measured with a dynamometer.

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