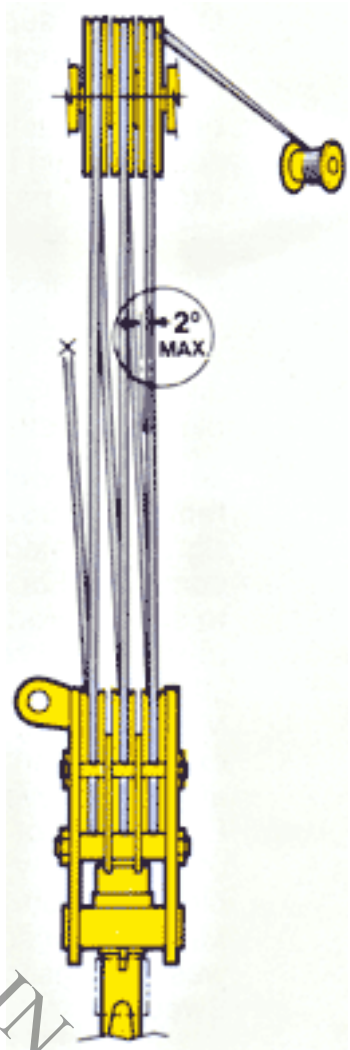
**Chemical Analysis (Chemical Test)** The process used to identify the percentage of various elements which make up a given metal. Today's most commonly used alloy is steel, the simplest compound of which is iron with 1% or less of carbon. Most steel, however, contains alloying elements such as chromium, manganese, nickel, tungsten, vanadium, and others.




**Flame Hardening** A high heat/quick cool process used to harden that portion of the sheave groove which supports the wire rope. Grooves flame hardened to a minimum Rockwell "C" 35 are standard on all sheave sizes 16 inches O.D. and larger. (Prices on smaller sheaves available upon application.)

**Fleet Angle** The degree to which a rope varies from true center (0°) in passing from drum to sheave or from one sheave to another. Too great a fleet angle will cause the line to wind unevenly on the winch drum. Too small a fleet angle will cause the line to "pile up." In sheave-to-sheave applications such as those utilizing upper an lower blocks, the fleet angle will be increased: a)when there is more space between the sheaves of one block than those of the other; b)when the two blocks are drawn in close proximity to one another.

To minimize rope and equipment wear, the following generally accepted fleet angle limits should be observed:

Sheave-to-Sheave:
2° maximum
Sheave-to-Smooth Drum:
1/2° minimum to 2° maximum
Sheave-to-Grooved Drum:
1/2° minimum to 1-1/2° maximum

**Hook Housing** Often referred to as "Trunnion" and "Cross Head." The so-called Hook Housing Pin is actually not a "pin" at all, but an integral part of the housing. On most Johnson Manufacturing products, it is the Hook Housing that allows the hook to swing as well as swivel.

**Mechanical Properties (Mechanical Test)** Those properties of a material which reveal its reaction to an applied force, and thereby, its applicability to a given task. Considered, for example, are the modulus of elasticity, tensile strength, elongation, hardness and fatigue limit.

**Outside Diameter (O.D.)** The diameter of a circular object as measured from its outermost edges.

**Overhaul** The amount of downfall weight sufficient to overcome sheave bearing friction, winch-to-boom-tip line weight and other counter-fall factors inherent in the crane system.

**Pitch Diameter (P.D.)** A true measure of the bend of the rope around the sheave, and represented by the distance between the center of the rope on one side of the sheave and the center of the rope on the other. P.D. differs from Tread Diameter (T.D.) which takes its measurement from the deepest point of the sheave groove. Formula: P.D. = T.D. + Nominal Rope Size.

**Proof Load** This factor refers to the average load to which a product may be subjected before visible deformation occurs. Also, to the load applied in performance of a Proof Test.

**Proof Test** A tensile strength test applied solely for the purpose of detecting defects in materials, product design or assembly.
(Johnson Manufacturing offers Proof Test capabilities for any products it manufactures. Prices available upon request.)

**Safe Working Limit** Sometimes referred to as "SWL," "Working Load," "Working Load Limit," " and "Rated Load Value." Indicates the maximum load to which a product should be subjected. The term applies only to static loads held firmly in direct tension. It does not include torsional, binding, offset, or shock load factors.

**Shock Load** A significantly increased load factor caused by the sudden shift, jerk, or impacting of the load.

**Short Ton** The avoirdupois weight on which Johnson Manufacturing product capacities are based. Commonly used throughout the U.S. and Canada, the term implies a weight of 2,000 pounds and differs from "long ton,"which amounts to 2,240 pounds.

**Tread Diameter (T.D.)** Measurement from the deepest point of the sheave groove on one side of sheave to deepest point of sheave groove on other side.

**Ultimate Load** Indicates the point at which the product fails, or will no longer support the load.

**Yield Point** The point between proof load and ultimate at which permanent deformation occurs. Note that this deformation may or may not be visible.

# Metric Equivalents

**Nomina**
**Wire Ro**
**Size**

| Short Tons | Metric Tons | Short Tons | Metric Tons | Short Tons | Metric Tons | (Inches |
|---|---|---|---|---|---|---|
| 1 | .90 | 20 | 18.14 | 80 | 72.57 | 3/8 |
| 2 | 1.81 | 22 | 19.95 | 90 | 81.64 | 7/16 |
| 3 | 2.72 | 24 | 21.77 | 100 | 90.75 | 1/2 |
| 3 3/4 | 3.40 | 25 | 22.67 | 110 | 99.79 | 9/16 |
| 4 | 3.62 | 29 | 26.30 | 115 | 104.32 | 5/8 |
| 5 | 4.53 | 30 | 27.21 | 125 | 113.39 | 3/4 |
| 6 | 5.44 | 35 | 31.75 | 130 | 117.93 | 7/8 |
| 6 1/4 | 5.66 | 38 | 34.47 | 135 | 122.47 | 1 |
| 7 | 6.35 | 40 | 36.28 | 140 | 127.00 | 1 1/8 |
| 8 | 7.25 | 45 | 40.82 | 150 | 136.07 | 1 1/4 |
| 9 | 8.16 | 50 | 45.35 | 165 | 149.68 | 1 3/8 |
| 10 | 9.07 | 55 | 49.89 | 200 | 181.43 | 1 1/2 |
| 11 | 9.97 | 60 | 54.43 | 250 | 225.79 | 1 5/8 |
| 12 | 10.88 | 65 | 58.96 | 265 | 240.40 | 1 3/4 |
| 14 | 12.70 | 70 | 63.50 | 300 | 272.15 | 1 7/8 |
| 15 | 13.60 | 75 | 68.03 | 325 | 294.83 | 2 |
| 19 | 17.23 | | | 350 | 317.51 | |