

Wire rope inspection sheet: ASME B30.30-2023

One rope per sheet. How to fill it in: page 4. Mark ✓ nothing found, X found (write where and what), N/A does not apply. **Free analysis:** send us a photo of the completed sheet for a same-day response (page 2).

Date	Inspection type (codes: page 4)	Rope operating hours (30-0.2)	Inspector (print)	Trolley distance (m) or boom angle (°)	Hook height (m) and hook load
Customer / owner	Site / location	Crane make	Crane model	Serial number	Unit number
Winch number	Winch duty (main hoist, aux, boom hoist, trolley)	Rope length (m / ft)	Nominal diameter d (mm)	Construction (e.g. 6x36 WS)	Core (IWRC, WSC)
Lay (ordinary / regular or Lang, direction)	Grade / finish	OEM specified breaking force (crane manual, not the mill cert)	Minimum breaking force (mill cert)	Date installed	Certificate number
Rope manufacturer / supplier	Drum: single or multi-layer	Sheaves: steel or synthetic	Rope type, for your row of Table 30-1.8.2-2	Running or standing rope; boom hoist? Y / N	Rope service class: normal / heavy / severe / special
Periodic interval (months and rope hours, whichever comes first)					

Your limits for this rope (how to work them out: page 6; tables: page 8)

Broken wires that require removal (your row of Table 30-1.8.2-2)	6d one strand _____ 6d all strands _____ 30d all strands _____ valley breaks _____ end termination _____			30-1.8.2(h)
Diameter limit (Table 30-1.8.2-1, % of nominal d below dref): tick your rope	☐ IWRC, 6 strands or less, 19 class: more than 5.0% ☐ IWRC, over 6 strands, 36 class: more than 2.5%	☐ IWRC, 6 strands or less, 36 class: more than 4.0% ☐ Rotation-resistant (all): more than 3.5%	☐ IWRC, over 6 strands, 19 class: more than 3.5%	30-1.8.2(a)
Your minimum diameter = dref - (% x nominal d)	_____ mm			Table 30-1.8.2-1
Waviness: envelope limit = 1.10 x d	_____ mm			30-1.8.2(d)
Crushing limit = 5/6 x d	_____ mm			30-1.8.2(b)
Sheave grooves	Rope nominal Ø (d): _____ mm Worn groove at least d x 1.025 = _____ mm (30-1.7.2(d)) New sheave d x 1.06 = _____ to d x 1.10 = _____ mm (30-1.7.2(c))			

Reference diameter dref (recorded after break-in; copy it from the rope certificate or earlier report, do not re-measure): _____ mm, measured at _____ m from the _____ end on (date) _____. D1 _____ mm, D2 _____ mm, averaged (CRS practice).

1. Diameter: D1 and D2 at right angles, average (D1 + D2) / 2 (averaging: CRS practice)

#	Measured at	D1 (mm)	D2 (mm)	Average (mm)
1.1	_____ m from the _____ end			
1.2	_____ m from the _____ end			
1.3	_____ m from the _____ end			
1.4	_____ m from the _____ end			
1.5	_____ m from the _____ end			
1.6	_____ m from the _____ end			

3. Other measurements

	Check	Reading	Where (m from which end)
3.1	Largest waviness envelope (mm)		
3.2	Smallest width across a crushed section (mm)		
3.3	Crown wire broken off at both ends during maintenance		
3.4	Lay length (mm), same place each time (CRS practice)		

Notes



2. Broken wires: one line for every broken wire or group you find

	Where (m from which end)	One strand in 6d	All strands in 6d	All strands in 30d	Valley breaks in 30d	Breaks at end termination	Notes
2.1	___ m from the ___ end						
2.2	___ m from the ___ end						
2.3	___ m from the ___ end						
2.4	___ m from the ___ end						
2.5	___ m from the ___ end						
2.6	___ m from the ___ end						
2.7	___ m from the ___ end						
2.8	___ m from the ___ end						
2.9	___ m from the ___ end						
2.10	___ m from the ___ end						
2.11	___ m from the ___ end						

One strand: the most breaks in any single strand. All strands: the total across all strands. Valley breaks: breaks at or below the strand-to-strand contact points (30-0.2). Broken-wire limits: page 1.

	Check	✓ / X / N/A	If X: where and what		Check	✓ / X / N/A	If X: where and what
4. Rope condition				5. Rope ends and drum			
4.1	Steel core protrusion between the outer strands			5.1	End terminations: corroded, cracked, deformed, worn, damaged		
4.2	Kinking			5.2	End terminations installed correctly, not modified without approval		
4.3	Severe doglegs			5.3	Hand-tucked eye at the working end		
4.4	Minor doglegs			5.4	Swaged socket on Lang lay or Category 3 rope		
4.5	Birdcaging			5.5	Wedge sockets		
4.6	Corrosion			5.6	Wire rope clips		
4.7	Discoloration			5.7	Swivel		
4.8	Heat damage (welding, power line strike, lightning)			5.8	Dead wraps at each drum termination		
4.9	High or low strand			5.9	Drum flanges above the top layer during operation		
4.10	Localized change in lubrication condition			5.10	Drum surface free of defects that could damage the rope		
4.11	Lubrication condition, including hidden sections			5.11	Flange step-up, crossover and repetitive pickup points		
4.12	Non-destructive rope test, if used: date and result						

6. Sheaves: one line per sheave (groove gauges: page 9; groove limits: page 1)

	Sheave (which one)	Groove Ø (mm) or gauge OK / not OK (30-1.7.2(d))	Groove wear: corrugation (negative impressions), surface defects (30-1.7.2(a), Note to 30-1.8.1(c)(1)): ✓ / X	Flange: rim runs true, sides tapered and rounded (30-1.7.2(b)); cracks or chips (CRS practice); guard (30-1.7.2(f), (g)): ✓ / X	Bearing (CRS practice): ✓ / X	If X: where and what
6.1						
6.2						
6.3						
6.4						
6.5						

Actions: replace, cut and re-terminate, lubricate, inspect again (a rope shall not be lengthened or repaired, 30-1.5.3(d))

Service class and next periodic due (date and rope hours, whichever comes first)

Inspector name and signature

Date



Wire rope inspection: ASME B30.30-2023

A free inspection sheet and guide from Crane Rope Solutions. It shows what ASME B30.30-2023 asks you to check and record, and how to record it. One rope per inspection sheet.

How to use this guide

1. Work out your limits for this rope once (page 6) and write them at the top of page 1.
2. Inspect the rope and fill in the inspection sheet, pages 1 and 2. How to fill it in: page 4. A filled-in example is on pages 10 and 11.
3. Send us a photo of the completed sheet for a free analysis (below).

WHO

All inspections shall be performed by a designated person; any deficiency shall be examined by a qualified person, who determines whether it is a hazard and what must be done (30-1.8.1(a)). Users of wire rope shall be trained, as applicable, in inspection (30-1.2).

WHEN

Daily (frequent): all rope expected in use that day (30-1.8.1(b)). Periodic, unless otherwise specified by the crane maker, rope maker or a qualified person, at intervals not to exceed, whichever comes first (30-1.8.1(c)(2)): boom hoist rope normal 3 months or 500 h, heavy 2 months or 335 h, severe 1 month or 165 h, special under 165 h; all other rope normal 12 months or 2,000 h, heavy 6 months or 1,000 h, severe 3 months or 500 h, special under 500 h (hours of rope operation). Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life (30-1.8.1(c)(1)). After an unusual occurrence such as a lightning strike, abnormal shock load or overload: inspect as a periodic inspection (30-1.8.1(c)) or as a qualified person determines (30-1.8.1(d)). Rotation-resistant rope in boom hoist or luffing attachment service: the frequency of inspection shall be increased (30-1.4.2(f)(4)). Rope idle 1 to 6 months: inspect as a frequent inspection; idle over 6 months: as a periodic inspection (30-1.8.3).

HOW MUCH ROPE

A close visual inspection of the entire rope length shall be made. No attempt should be made to open the rope. (30-1.8.1(c)(1)). Non-destructive testing should be considered as an additional method (30-1.8.1(c)(1) Note).

Have on hand

- The rope certificate details (30-1.5.5): nominal diameter, length, classification, rotation-resistance category if any, swivel prohibited or allowed, finish, grade, core, lay direction and type, minimum breaking force.
- The reference diameter of the installed rope (30-1.8.4(d)).
- The rope service class (normal, heavy, severe or special) and whether it is a boom hoist rope.

Look closely at these areas (30-1.8.1(c)(1))

- Flange step-up, crossover and repetitive pickup points on the drum
- Reverse bends in the reeving system
- Equalizer sheaves and other sheaves where rope travel is limited
- End connections
- Sheave and drum groove wear or corrugation
- Known wear areas from experience with this machine
- Rope in the bridle reeving of boom hoists
- Change-of-layer points at drum flanges
- Fleeting or deflector sheaves
- At or near end connections where corroded or broken wires may protrude



Send it to us: free analysis, same-day response

When you finish the sheet, take a clear photo of both pages and text it to **604-813-WIRE (9473)** (scan the code), or email it to **dean@craneropesolutions.com**. Add photos of anything you marked X, with a tape or ruler in the frame. We send back our analysis the same day.

A photo review is advice only. It does not replace the inspection the standard requires; the decision stays with the qualified person.

ASME B30.30-2023, Ropes. Clause numbers in brackets point to the standard. Text marked Crane Rope Solutions (CRS) practice is our method, not the standard.



How to fill in the inspection sheet

1 Top of page 1: the inspection, crane and rope

- Date, inspection type (codes below), hours, your name, and the crane set-up at the time: Trolley distance: only for cranes with a trolley; otherwise write the boom angle. Hook height and hook load (none, block only, or tonnes). Set the crane up the same way each time if you can, so the same part of the rope sits at your points (CRS practice).
- Rope details from the mill certificate (size, construction, core, lay, grade, minimum breaking force) and the crane manual (OEM specified breaking force).

2 Your limits (page 1)

- Work them out once for this rope with page 6 and copy them onto each new sheet.

3 Section 1: diameter

- Measure in numerous locations along the entire length; the limit applies at any location (30-1.8.2(a)). Take two readings at right angles and average them, using calipers with jaws wide enough to span at least two strands (CRS practice). Compare each reading (D1 and D2) with your minimum: the limit applies at any location (30-1.8.2(a)).
- Measure across the tops of the strands, not into the gaps (CRS practice).
- Choose points you can find again (areas to look at: page 3), including the place with the smallest diameter you can find.
- For each point, write how far along the rope it is from the drum end or from the dead end (picture on page 5). Measure the distance with a tape measure, or read it from a rope counter, and mark the spot on the rope with a paint pen so the next inspection measures the same place (CRS practice).
- Reference diameter dref: shall be recorded after break-in on the rope certificate, periodic inspection report or other suitable document available to the inspector (30-1.5.1(i), 30-1.8.4(d)). Existing rope with no dref: it shall be recorded before or during the next periodic inspection.

4 Section 2: broken wires

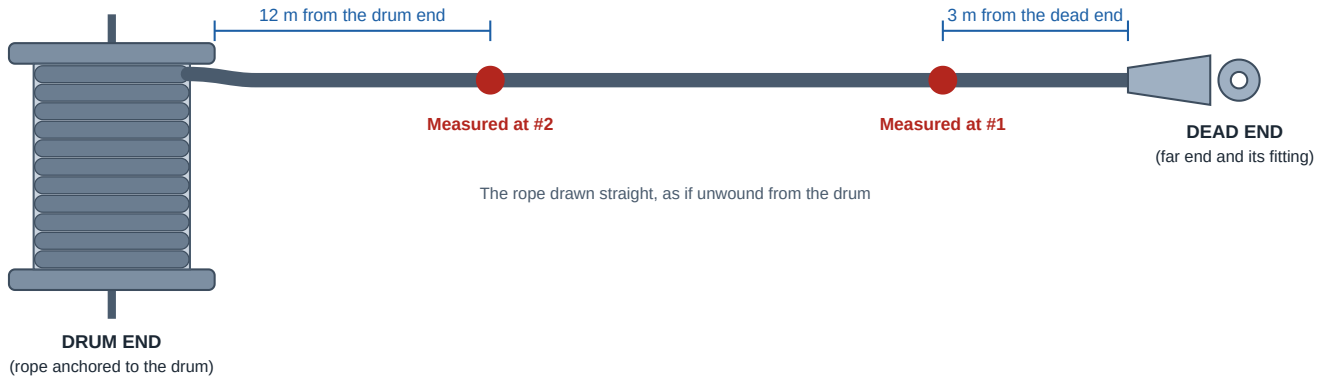
- Look along the rope this inspection covers (page 3). Write one line for every broken wire, or group of broken wires, that you find, and mark each spot on the rope with a paint pen (CRS practice).
- For each line, write how far along the rope it is from the drum end or the dead end. In each count column, write the most broken wires in any 6d length, and in any 30d length, that includes this spot. 6d and 30d mean 6 or 30 times the nominal diameter d: for a 28 mm rope, 168 mm and 840 mm.
- One strand: the most breaks in any single strand. All strands: the total across all strands. Valley breaks: breaks at or below the strand-to-strand contact points (30-0.2).
- A crown wire removed during maintenance: write it in row 3.3, and count it as one crown break (not a valley break) at later inspections (30-1.5.3(c)).

Inspection type codes

F frequent (daily) (30-1.8.1(b)) P periodic (30-1.8.1(c)) U after an unusual occurrence (30-1.8.1(d)) I idle rope returned to service (30-1.8.3)



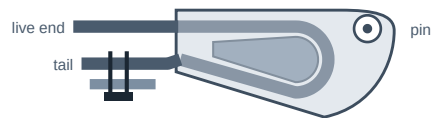
Finding your points again



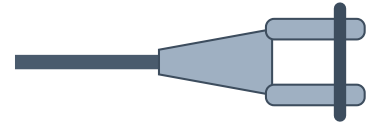
Common dead-end fittings (Crane Rope Solutions illustration)



Button (swaged or poured)



Wedge socket



Open spelter socket (pin through the jaws)

5 Sections 3 to 6: everything else

- Measurements: write the reading and where. Checks: mark ✓ nothing found, X found, N/A does not apply. For every X, write where it is (m from which end, or which part) and what you found in the same row.
- Corrosion (row 4.6): write where it is, and whether you see pitting (widespread or in one place) or obvious signs of internal corrosion such as magnetic debris coming from the valleys between the strands (30-1.8.2(c)). Discoloration with no pitting: row 4.7.
- Sheaves (section 6): one line per sheave, named so you can find it again (for example "Boom tip 2"). Groove: write the groove diameter in mm, or OK / not OK from a go / no-go gauge (page 9). Then mark ✓ or X for groove wear, flange and bearing as the column headings say, and for every X write what and where in the last column. Negative impressions: the pattern of the rope's strands pressed or worn into the groove.

6 Sign and send

- Sign or initial, write the next inspection due, and send us a photo of both pages for a free analysis and a same-day response.



Your limits from ASME B30.30-2023

Work these out once for each rope and write them on page 1. Then the rules below tell you what each finding means. **FAIL** the standard says (shall) the rope or that part comes out of service, or the item must be put right. **SHOULD** the standard recommends (should) it; the qualified person decides (30-1.8.1(a)). **EVALUATE** no fixed limit; the qualified person judges it (30-1.8.1(a)). Rows not listed are for the record only.

A. Broken-wire limits

- Find your rope type on the certificate: number of outer strands, 19 class or 36 class, rotation-resistant Category 1, 2 or 3, or standing rope.
- Go to that row of Table 30-1.8.2-2 (page 8) and copy the five broken-wire limits onto page 1 (standing rope: two). Reaching any of them requires removal.
- Example: 6x36 class running rope (6 strands or fewer, 36 class): 5 in one strand or 10 across all strands over 6d, 20 over 30d, 2 valley breaks, 2 at the end termination.

B. Minimum diameter

- Tick your rope type on page 1 (Table 30-1.8.2-1). The % is of the nominal diameter d.
- Minimum diameter = dref - (% x nominal d). The rope fails when the reduction is greater than the table value (Table 30-1.8.2-1).
- Example: 20 mm IWRC rope, 6 strands, 36 class: more than 4.0%. dref 20.8 mm. 4.0% of the nominal 20 mm = 0.8 mm. Minimum = 20.8 - 0.8 = 20.0 mm. A reading below 20.0 mm fails.
- Rotation-resistant rope: any loss of diameter goes to a qualified person at once (30-1.8.2(a) Note).

C. Other limits

- Waviness: measure the full width of the corkscrew. Fails when greater than 1.10 x d (20 mm rope: above 22.0 mm).
- Crushing: measure the smallest width across the flattened part. Fails at or below 5/6 x d (20 mm rope: 16.667 mm, so any reading of 16.66 mm or less fails).
- Broken-wire criteria apply on steel and cast iron sheaves and drums, and on multi-layer drums whatever the sheave material. With single-layer spooling, synthetic or synthetic-lined sheaves should not be used: there are no broken-wire criteria and internal breaks can be numerous before any show (Table 30-1.8.2-2 General Note).
- There are no precise rules for the exact time to remove a rope; once any one removal criterion is reached, replace it before returning to service (30-1.8.2).

D. Rules for the sheet rows

Row	Check	Rule	Clause
1.1 to 1.6	Each reading (D1 or D2)	FAIL Below your minimum diameter (page 1): reduction greater than Table 30-1.8.2-1	30-1.8.2(a)
1	Rotation-resistant rope: loss of diameter (core failure likely also shows as a lengthened lay)	EVALUATE A qualified person shall inspect the section at once and decide	30-1.8.2(a) Note
2	Most breaks in one strand, any 6d	FAIL Reaches or exceeds the one-strand limit over 6d (page 1). N/A for rotation-resistant and standing rope	Table 30-1.8.2-2
2	Most breaks across all strands, any 6d	FAIL Reaches or exceeds the all-strands limit over 6d (page 1)	Table 30-1.8.2-2
2	Most breaks across all strands, any 30d	FAIL Reaches or exceeds the all-strands limit over 30d (page 1). N/A for standing rope	Table 30-1.8.2-2
2	Valley breaks in any 30d	FAIL 2 or more. N/A for standing rope. One valley break: inspect 30d each side of it over a bend (should)	Table 30-1.8.2-2
2	Broken wires at the end termination	FAIL 2 or more. Broken wires at end terminations may be removed by cutting and re-attaching the termination if reducing the length is allowable (Note 2). Before fitting an end to a used rope, a periodic inspection shall be performed on 60 d from the end to be terminated; that length shall be at least the nominal diameter (30-1.7.4(h))	Table 30-1.8.2-2
3.1	Largest waviness envelope (mm)	FAIL Greater than your envelope limit (page 1)	30-1.8.2(d)
3.2	Smallest width across a crushed section (mm)	FAIL At or below your crushing limit (page 1)	30-1.8.2(b)
4.1	Steel core protrusion between the outer strands	FAIL Any	30-1.8.2(b)
4.2	Kinking	FAIL Any	30-1.8.2(b)
4.3	Severe doglegs	FAIL Any severe dogleg	30-1.8.2(b)
4.4	Minor doglegs	SHOULD Should be noted in the inspection documents: write where	30-1.8.2(b)
4.5	Birdcaging	EVALUATE Listed as distortion, not as a removal criterion: qualified person decides	30-1.8.2(b)
4.6	Corrosion	FAIL Widespread or local external pitting, or obvious internal corrosion (magnetic debris from the valleys)	30-1.8.2(c)
4.8	Heat damage (welding, power line strike, lightning)	FAIL Any apparent damage	30-1.8.2(e)
4.9	High or low strand	FAIL More than half the strand diameter above or below the rope surface	30-1.8.2(f)
4.10	Localized change in lubrication condition	EVALUATE A qualified person inspects that section and decides	30-1.8.1(b)(2), (b)(3)



Row	Check	Rule	Clause
4.11	Lubrication condition, including hidden sections	SHOULD Rope should be maintained in a well-lubricated condition; ensure normally hidden sections (e.g. over equalizer sheaves) are properly lubricated	30-1.5.3(a)
5.1	End terminations: corroded, cracked, deformed, worn, damaged	FAIL Severely corroded, cracked, deformed, worn or grossly damaged	30-1.8.2(g)
5.2	End terminations installed correctly, not modified without approval	FAIL Improperly installed, or modified without the approval of the fitting manufacturer or crane (LHE) manufacturer	30-1.8.2(g), 30-1.7.4(j)
5.3	Hand-tucked eye at the working end	FAIL Not allowed	30-1.7.4(d)
5.4	Swaged socket on Lang lay or Category 3 rope	FAIL Not allowed unless approved by a qualified person	30-1.7.4(g)
5.5	Wedge sockets	EVALUATE Inspect and apply the ASME B30.26 removal criteria (30-1.7.4(l)); selection, use and maintenance shall comply with ASME B30.26 (30-1.7.4(b)(2))	30-1.7.4(l)
5.6	Wire rope clips	EVALUATE Selection, use and maintenance shall comply with ASME B30.26	30-1.7.4(b)(1)
5.7	Swivel	FAIL On standard, Category 2 or Category 3 rope without the approval of the crane (LHE) manufacturer, rope manufacturer or a qualified person: not allowed	30-1.7.1
5.8	Dead wraps at each drum termination	FAIL Fewer than 2 during normal operation (unless the crane manufacturer, rope manufacturer or a qualified person specifies otherwise)	30-1.7.3(g)
5.9	Drum flanges above the top layer during operation	FAIL Less than 1/2 d, or less than 13 mm (0.5 in.)	30-1.7.3(c)
5.10	Drum surface free of defects that could damage the rope	FAIL Defects present: refer to the qualified person before use (CRS practice)	30-1.7.3(a)
5.11	Flange step-up, crossover and repetitive pickup points	EVALUATE Requires special attention at periodic inspection; evaluate against 30-1.8.2	30-1.8.1(c)(1)

E. Sheaves (section 6)

SHOULD Groove worn below $d \times 1.025$ (worn groove less than nominal plus 2.5%): should be replaced or reconditioned (30-1.7.2(d)).

NOTE Corrugated groove: if the rope is developing broken wires or distortion (such as waviness) where it touches the groove, the affected parts should be replaced or remachined; minor corrugation with acceptable rope performance may not need replacement (Note to 30-1.8.1(c)(1)).

FAIL Groove surface defects that could damage the rope (30-1.7.2(a)); groove sides not tapered and rounded at the rim, or flange rims not running true (30-1.7.2(b)); no close-fitting guard or other device where the rope can go slack, or on lower load block sheaves (30-1.7.2(f), (g)): refer to the qualified person before use (CRS practice).

SHOULD New sheave grooves should be 6% to 10% larger than d ; the arc of contact should support the rope between 120 and 150 degrees (30-1.7.2(c), (e)).

NOTE Bearings (Crane Rope Solutions practice): record the condition; refer anything found to the qualified person.

When: Sheave and drum groove wear and corrugation require special attention at every periodic inspection (30-1.8.1(c)(1)).

F. After the inspection

Limit reached: Once any removal criterion is reached, replace the rope before the equipment returns to service (30-1.8.2). Removed rope shall not be used to make standing rope (30-1.4.6(b)).

Corrective actions: A qualified person examines each deficiency, decides if it is a hazard and what must be done (30-1.8.1(a), shall). A wire rope shall not be lengthened or repaired (30-1.5.3(d)). Before re-terminating a used rope, inspect 60 d from the end (periodic inspection, shall); that 60 d length shall have a diameter equal to or greater than the rope's specified nominal diameter (30-1.7.4(h)). Crown wire removed: document it and count it as one crown break (not a valley break) at later inspections (30-1.5.3(c), shall).

Records: Daily (frequent) inspections need no record (30-1.8.4(a)). A dated report of rope condition at the latest periodic inspection shall be kept on file; it shall cover the 30-1.8.2 points, including the measured diameter (30-1.8.4(b)). If the rope is replaced, only the fact that it was replaced needs to be recorded. The reference diameter shall be retained and recorded on the rope certificate, periodic inspection report or other suitable document (30-1.8.4(d)). A long-term inspection program should be established and should include records of the examination of rope removed from service (30-1.8.4(c)).



How many broken wires require removal?

Find the row for your rope type and strand class, count over the lengths shown, and remove the rope when the number in the table is reached. d = nominal rope diameter.

Table 30-1.8.2-2: broken wire criteria indicating rope removal

Rope type	Over $6 \times d$		Over $30 \times d$		At end termination
	Within a single strand	Across all strands	Across all strands	Valley break type	
Running rope: ≤ 6 strands, 19 class	3	6	12	2	2
Running rope: > 6 strands, 19 class	4	8	16	2	2
Running rope: ≤ 6 strands, 36 class	5	10	20	2	2
Running rope: > 6 strands, 36 class	6	12	24	2	2
Rotation-resistant Category 1	N/A	6	12	2	2
Rotation-resistant Category 2	N/A	2	4	2	2
Rotation-resistant Category 3	N/A	2	4	2	2
Standing rope: all	N/A	3	N/A	N/A	2

Applies to wire rope on steel and cast iron sheaves and drums, and on multi-layer drums regardless of sheave material. With single-layer spooling, synthetic sheaves or sheaves with synthetic linings should not be used: there are no broken-wire criteria, and internal breaks can be numerous before any show outside. If one valley break is found, $30 \times d$ of rope on both sides should be inspected over a bend. Broken wires at end terminations may be removed by cutting and re-attaching the termination if reducing the length is allowable. Summarized from ASME B30.30-2023 Table 30-1.8.2-2 for field reference.

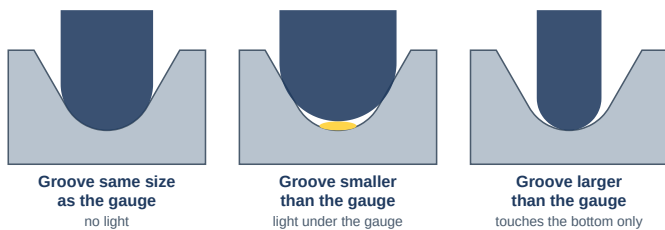


Checking sheave grooves with groove gauges

There are two types of groove gauge: **go / no-go gauges** and **actual size gauges**. How to use them, and what to do about a groove outside the limits, is Crane Rope Solutions practice unless a clause is given. The groove sizes come from ASME B30.30-2023 (box at the bottom).

1. Go / no-go gauges

1. Clean the groove so the gauge sits on bare metal, not grease or dirt.
2. A go / no-go gauge is made to a groove size, not to the rope size: check the size marked on it. For a 28 mm rope use a **minimum gauge of 28.70 mm** (B30.30 worn-groove minimum, $d \times 1.025$). ASME B30.30 30-1.7.2(d) recommends (should) a smallest size for worn grooves; 30-1.7.2(c) gives 6% to 10% for new grooves (should).
3. Place it into the groove, square to the sheave. **Plastic gauges: do not push down hard.** They flex, and pressing down can easily give a wrong reading, so plastic gauges are not the best choice. Crane-specific steel groove gauges are available at craneropesolutions.com.
4. Shine a flashlight behind the gauge.
5. **Minimum gauge, any light under it** (middle picture): the groove is worn smaller than the minimum: the sheave should be replaced or reconditioned (30-1.7.2(d)).
6. **Gauge touches only the bottom, with gaps at both sides** (right picture): the groove is larger than the gauge. Crane Rope Solutions practice is to refer a groove more than 10% over d (30.80 mm for 28 mm rope) to a qualified person; new grooves should be 6% to 10% over d (30-1.7.2(c)).
7. Check several places around each sheave and write the result in section 6 of the sheet.



2. Actual size gauges

Crane Rope Solutions offers actual size gauges in 0.25 mm steps. Try gauges until you find the one that best fills the groove without letting light underneath it. That gauge is your true groove size. Write the size in section 6 of the sheet.

Check it against the minimum. ASME B30.30 30-1.7.2(d): a worn groove should not be less than the nominal rope diameter plus 2.5%. For a 28 mm rope: $28 \times 1.025 = 28.70$ mm, so the closest 0.25 mm step at or above it is the **28.75 mm** gauge.

Why we prefer actual size gauges

A go / no-go gauge only tells you pass or fail. An actual size gauge shows how much wear is left, so your maintenance plan can move from pass, pass, pass, fail to 100% life remaining, 75%, 50%, 25%, replace.

100% 29.75 mm	75% 29.50 mm	50% 29.25 mm	25% 29.00 mm	Plan to replace 28.75 mm
------------------	-----------------	-----------------	-----------------	-----------------------------

Example, 28 mm rope: new groove 29.75 mm, minimum gauge 28.75 mm. Life remaining = $(\text{gauge now} - \text{minimum}) / (\text{new} - \text{minimum})$. Crane Rope Solutions planning practice: "Plan to replace" is the last 0.25 mm step at or above the minimum, so plan the work before the groove goes below it. Example figures; use your manufacturer's limit where it has one.

What ASME B30.30-2023 says. ASME B30.30 30-1.7.2(d): groove diameters of worn sheaves should not be less than the nominal rope diameter plus 2.5%. Groove diameters of new sheaves should be 6% to 10% larger than the nominal rope diameter (30-1.7.2(c)). Sheaves with grooves worn smaller than the minimum should be replaced or reconditioned (30-1.7.2(d)).



Don't have gauges? Scan to see our groove gauges.

Want a free gauge? Give us a shot at quoting your wire ropes and we will send you a free groove gauge, just to say thank you.

604-813-WIRE (9473) | dean@craneropesolutions.com



EXAMPLE, made-up readings. A 28 mm rope filled in to show how the sheet works. Your blank sheet is pages 1 and 2.

Wire rope inspection sheet: ASME B30.30-2023

One rope per sheet. How to fill it in: page 4. Mark ✓ nothing found, X found (write where and what), N/A does not apply. **Free analysis:** send us a photo of the completed sheet for a same-day response (page 2).

Date 2026-04-03	Inspection type (codes: page 4) P	Rope operating hours (30-0.2) 240	Inspector (print) J. Smith	Trolley distance (m) or boom angle (°) 60 deg	Hook height (m) and hook load 15 m, block
Customer / owner Example Crane Co.	Site / location Vancouver yard	Crane make ABC Cranes	Crane model Example 100T	Serial number EX-12345	Unit number 12
Winch number W2	Winch duty (main hoist, aux, boom hoist, trolley) Boom hoist	Rope length (m / ft) 210 m	Nominal diameter d (mm) 28	Construction (e.g. 6x36 WS) 8x26 WS	Core (IWRC, WSC) IWRC
Lay (ordinary / regular or Lang, direction) Right regular lay	Grade / finish 1960 / bright	OEM specified breaking force (crane manual, not the mill cert) Per crane manual	Minimum breaking force (mill cert) Per mill cert	Date installed 2025-12-15	Certificate number EX-0001
Rope manufacturer / supplier Crane Rope Solutions	Drum: single or multi-layer Multi-layer	Sheaves: steel or synthetic Steel	Rope type, for your row of Table 30-1.8.2-2 over 6 strands, 19 class (8x26)	Running or standing rope; boom hoist? Y / N Running; boom hoist Y	Rope service class: normal / heavy / severe / special Severe
Periodic interval (months and rope hours, whichever comes first) 1 month or 165 h					

Your limits for this rope (how to work them out: page 6; tables: page 8)

Broken wires that require removal (your row of Table 30-1.8.2-2)	6d one strand 4 6d all strands 8 30d all strands 16 valley breaks 2 end termination 2			30-1.8.2(h)
Diameter limit (Table 30-1.8.2-1, % of nominal d below dref): tick your rope	☐ IWRC, 6 strands or less, 19 class: more than 5.0%	☐ IWRC, 6 strands or less, 36 class: more than 4.0%	☒ IWRC, over 6 strands, 19 class: more than 3.5%	30-1.8.2(a)
Your minimum diameter = dref - (% x nominal d)	27.86 mm			Table 30-1.8.2-1
Waviness: envelope limit = 1.10 x d	30.80 mm			30-1.8.2(d)
Crushing limit = 5/6 x d	23.33 mm			30-1.8.2(b)
Sheave grooves	Rope nominal Ø (d): 28 mm Worn groove at least d x 1.025 = 28.70 mm (30-1.7.2(d)) New sheave d x 1.06 = 29.68 to d x 1.10 = 30.80 mm (30-1.7.2(c))			

Reference diameter dref (recorded after break-in; copy it from the rope certificate or earlier report, do not re-measure): **28.84** mm, measured at **1** m from the **dead** end on (date) **2025-12-16**. D1 **28.88** mm, D2 **28.80** mm, averaged (CRS practice).

1. Diameter: D1 and D2 at right angles, average (D1 + D2) / 2 (averaging: CRS practice)

#	Measured at	D1 (mm)	D2 (mm)	Average (mm)
1.1	3 m from the dead end	28.62	28.54	28.58
1.2	120 m from the drum end	28.50	28.42	28.46
1.3	150 m from the drum end	28.76	28.72	28.74
1.4	180 m from the drum end	28.80	28.74	28.77
1.5	___ m from the ___ end			
1.6	___ m from the ___ end			

3. Other measurements

	Check	Reading	Where (m from which end)
3.1	Largest waviness envelope (mm)	none	
3.2	Smallest width across a crushed section (mm)	none	
3.3	Crown wire broken off at both ends during maintenance	none	
3.4	Lay length (mm), same place each time (CRS practice)	190	3 m from the dead end

Reading this example: 8x26 WS is sold as an 8x19 class rope (Crane Rope Solutions note; confirm the classification on the rope certificate, 30-1.5.5(j)). Running rope, over 6 strands, 19 class, so Table 30-1.8.2-2 gives 4 in one strand and 8 across all strands over 6d, 16 over 30d, 2 valley breaks, 2 at the end termination. Table 30-1.8.2-1: more than 3.5%. 3.5% x 28 = 0.98 mm, so the minimum is 28.84 - 0.98 = 27.86 mm.

Reading this example: The lowest average at this inspection is 28.46 mm at point 1.2 (120 m from the drum end). The minimum diameter at the top of this sheet is 27.86 mm, so every reading passes.



EXAMPLE, made-up readings. Page 2 of the example sheet.**2. Broken wires: one line for every broken wire or group you find**

	Where (m from which end)	One strand in 6d	All strands in 6d	All strands in 30d	Valley breaks in 30d	Breaks at end termination	Notes
2.1	120 m from the drum end	2	3	6	0	0	6 within 840 mm
2.2	___ m from the ___ end						
2.3	___ m from the ___ end						

One strand: the most breaks in any single strand. All strands: the total across all strands. Valley breaks: breaks at or below the strand-to-strand contact points (30-0.2). Broken-wire limits: page 1.

	Check	✓ / X / N/A	If X: where and what		Check	✓ / X / N/A	If X: where and what
4. Rope condition				5. Rope ends and drum			
4.1	Steel core protrusion between the outer strands	✓		5.1	End terminations: corroded, cracked, deformed, worn, damaged	✓	
4.2	Kinking	✓		5.2	End terminations installed correctly, not modified without approval	✓	
4.3	Severe doglegs	✓		5.3	Hand-tucked eye at the working end	N/A	
4.4	Minor doglegs	✓		5.4	Swaged socket on Lang lay or Category 3 rope	N/A	
4.5	Birdcaging	✓		5.5	Wedge sockets	✓	
4.6	Corrosion	✓		5.6	Wire rope clips	N/A	
4.7	Discoloration	✓		5.7	Swivel	N/A	
4.8	Heat damage (welding, power line strike, lightning)	✓		5.8	Dead wraps at each drum termination	✓	
4.9	High or low strand	✓		5.9	Drum flanges above the top layer during operation	✓	
4.10	Localized change in lubrication condition	X	30-40 m from drum end: dry; lubricated	5.10	Drum surface free of defects that could damage the rope	✓	
4.11	Lubrication condition, including hidden sections	✓		5.11	Flange step-up, crossover and repetitive pickup points	✓	
4.12	Non-destructive rope test, if used: date and result	N/A					

6. Sheaves: one line per sheave (groove gauges: page 9; groove limits: page 1)

	Sheave (which one)	Groove Ø (mm) or gauge OK / not OK (30-1.7.2(d))	Groove wear: corrugation (negative impressions), surface defects (30-1.7.2(a), Note to 30-1.8.1(c)(1)): ✓ / X	Flange: rim runs true, sides tapered and rounded (30-1.7.2(b)); cracks or chips (CRS practice); guard (30-1.7.2(f), (g)): ✓ / X	Bearing (CRS practice): ✓ / X	If X: where and what
6.1	Boom tip 1	29.50	✓	✓	✓	
6.2	Boom tip 2	28.75	✓	✓	✓	Last step: plan replacement (CRS)
6.3	Block 1	29.75	✓	✓	✓	
6.4	Block 2	29.25	✓	✓	✓	
6.5	Block 3	29.50	✓	✓	✓	

Actions: replace, cut and re-terminate, lubricate, inspect again (a rope shall not be lengthened or repaired, 30-1.5.3(d))

Lubricated 30-40 m; see next box

Service class and next periodic due (date and rope hours, whichever comes first)

Severe: 2026-05-03 or 405 rope h, first

Inspector name and signature

J. Smith

Date

2026-04-03

Reading this example: Worst spot 120 m from the drum end: 2 in one strand (limit 4), 3 across all strands in 6d (limit 8) and 6 in 30d (limit 16), so the rope passes the broken-wire limits. Boom hoist rope in severe service: periodic inspection at intervals not to exceed 1 month or 165 h, whichever comes first.

Reading this example: Boom tip 2 reads 28.75 mm. The worn-groove minimum is $28 \times 1.025 = 28.70$ mm, so 28.75 is the last 0.25 mm gauge step above it: no life left (Crane Rope Solutions planning practice). Below 28.70 mm the sheave should be replaced or reconditioned (30-1.7.2(d)), so plan it now.



Words used on these forms

From ASME B30.30-2023

Term	Clause	What it means
Diameter, nominal, d	30-0.2	The conventional diameter value by which a rope is named, designated or ordered.
Diameter, measured, dm	30-0.2	The actual diameter found by direct measurement.
Diameter, reference, dref	30-0.2	The measured diameter from a section of rope not subjected to significant bending, wear or other cross-sectional deformation or degradation, taken after break-in.
Break-in	30-0.2	The first pull-down phase just after installation, when load is first applied and the rope's parts adjust and set in among one another at operating conditions.
Crown break	30-0.2	A wire break on the outside of the rope, above the strand-to-strand contact points, with both ends visible.
Valley break	30-0.2	A wire break at or below the strand-to-strand contact points.
Crossover point	30-0.2	In multiple-layer spooling, the points where the rope crosses the layer before it.
Flange point	30-0.2	Where the rope touches the drum flange as it changes layers.
Repetitive pickup point	30-0.2	On short-cycle work, rope on a single layer spooled again and again over a short part of the drum.
Birdcage	30-0.2	Deformation where the outer strands are pushed away from the rope axis, usually from shock loading or localized twisting.
Dogleg, minor / severe	30-0.2	Minor: a bend with no strand distortion that cannot be seen while the rope is under tension. Severe: a permanent, localized, irreparable bend that, through strand distortion, restricts the natural adjustment of the rope's parts in operation; caused by improper use or handling; results in an indeterminate loss of strength.
Kink	30-0.2	A deformation caused by a loop of rope being pulled tight; irreparable damage and an indeterminate loss of strength.
Lay length	30-0.2	The length along a rope for one complete turn of a single strand.
Regular lay / Lang lay	30-0.2	Regular: wires in the strand laid opposite to the strands. Lang: wires laid the same direction as the strands.
Rotation-resistant wire rope	30-0.2	Stranded rope with at least two layers of strands, the outer layer laid opposite to the layer under it, which reduces load-induced torque.
Standard wire rope	30-0.2	Stranded wire rope not designed to reduce load-induced torque (non-rotation-resistant).
Running rope	30-0.2	A rope that travels around sheaves or drums, such as main, auxiliary and boom hoist rope.
Guy (standing, stay rope, pendant)	30-0.2	A fixed length of strand or rope that holds a structure in a fixed position or keeps a constant distance between two parts.
D/d ratio	30-0.2	The pitch diameter of the sheave or drum, D, divided by the nominal rope diameter, d.
Groove corrugation	30-0.2	A repeating pattern worn into a sheave or drum groove where each strand contacts it; it may cause rope wear and distortion.
Hours of rope operation	30-0.2	The actual or estimated operating time of the rope.
Normal / heavy / severe / special rope service	30-0.2	Normal: under 85% of rope rated load and not more than ten lift cycles per hour, except for isolated instances. Heavy: 85% to 100% of rope rated load, or more than ten cycles per hour, as a regular specified procedure. Severe: normal or heavy with abnormal conditions. Special: other service identified by a qualified person.
Rated load	30-0.2	The maximum allowable force in the rope at the applicable design factor.
Working end	30-0.2	The nondrum end of the wire rope. This form calls it the dead end.
Minimum breaking force	30-0.2	The minimum load at which a new, unused rope will break when pulled to destruction in direct tension.
Qualified person	30-0.2	A person who, by a recognized degree or certificate of professional standing in an applicable field, or by extensive knowledge, training and experience, has shown the ability to solve problems relating to the subject matter and work.
Shall / should	30-0.2	Shall: a requirement. Should: a recommendation.

All inspections shall be performed by a designated person; any deficiency shall be examined and a determination made by a qualified person (30-1.8.1(a)). When damage is discovered, a qualified person shall inspect the affected section (30-1.8.1(b)(3)). Users of wire rope shall be trained in inspection (30-1.2).

Words this form uses (Crane Rope Solutions)

D1 and D2	Two diameter readings at the same point, at right angles to each other. The form uses their average.
Negative impressions	The pattern of the rope's strands pressed or worn into the groove surface of a sheave or drum.
Measured at	A point you can find again, written as the distance from the drum end or the dead end.
Winch number	The number or name of the winch this rope is on.
Winch duty	What the winch does: main hoist, auxiliary hoist, boom hoist, trolley.
OEM specified breaking force	The breaking force the crane manual asks for. Not the figure on the mill certificate.
Minimum breaking force (mill cert)	The figure on the rope's mill certificate.
Drum end / dead end	The drum end is where the rope is fixed to the drum. On this form the dead end means the other end of the rope and its end fitting (button, wedge socket, spelter socket).

