



SAFETY & INSTALLATION

INSTRUCTION MANUAL

OUR MISSION

We are a diversified manufacturer and services provider that sets standards in terms of quality and safety for our stakeholders. Our mission is total customer support and satisfaction.

SAFETY AND OUR CUSTOMERS

JENNMAR has been in the business of manufacturing quality products since 1922 designed to enhance the safety of the men and women who work in the mining and tunneling industries.

Since we are in the business of manufacturing products designed to enhance safety, we recognize the importance of providing a safe and healthy workplace. Our people are our most important resource and we are committed to achieve safety excellence by creating a culture where safety is a corporate value. Achieving safety excellence regardless of the industry is a challenge that requires commitment and hard work on the part of management. It cannot be the program of the month approach, but an effort sustained over a long period of time that is not easy...but positive change never is.

This manual is designed to provide you “our valued customer” with information to utilize our products in the safest and most efficient manner possible. Contained in this manual are important safety and installation instructions for the various JENNMAR products that your company uses. This manual will be updated regularly by your JENNMAR sales/service representative.

We would encourage you to use this manual as part of your initial and ongoing safety training process to ensure that your employees are well trained and competent to perform their jobs using our products. At JENNMAR, we strongly believe that a well trained and competent employee who is confident of his or her abilities and constantly aware of their surroundings is the safest possible worker. There is no substitute for safety awareness. If you should ever have an installation or safety question about any of our products please do not hesitate to contact your JENNMAR sales/service representative.

A handwritten signature in black ink, appearing to read 'Tom'.



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PLATES AND PROPS

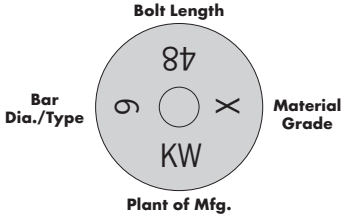
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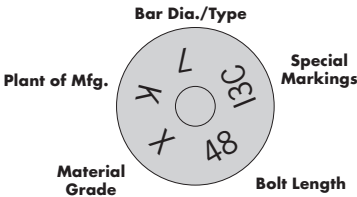
Bolt Head Markings & Recommended Torque

Bolt Head Markings



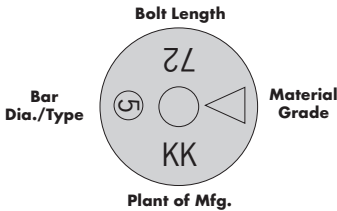
Bar Diameter/Type		
Code	Bar Diameter, in. (mm)	Bar Type
5	5/8 (16)	Smooth
⑤	5/8 (16)	Rebar
6	3/4 (19)	Smooth
⑥	3/4 (19)	Rebar/J-BAR
7	7/8 (22)	Smooth
⑦	7/8 (22)	Rebar/J-BAR
8	1 (25)	Smooth
⑧	1 (25)	Rebar/J-BAR
9	1-1/8 (29)	Smooth
⑨	1-1/8 (29)	Rebar/J-BAR

Special Markings	
Code	Description
A	w/ Paddle Wedge
C	Compression
I	INSTAL®
P	Combination
I2	INSTAL® II
I3	INSTAL® III
IB	INSTAL® B
N	Notch



Manufacturing Plant	
Code	Description
KK	Kentucky
KE	West Kentucky
K	Cresson, PA
KU	Utah
KV	Virginia
KC	East Virginia
KW	West Virginia

Material Grade	
Code	Grade
	GR 40
★	GR 55
△	GR 60
X	GR 75
XS	GR 90
	GR 100
2	GR 120
4	GR 140



Recommended Torque












Bolt Type	Bolt Diameter, in. (mm)				
	5/8 (16)	3/4 (19)	7/8 (22)	0.914 (23)	Others
	Recommended Torque, ft.-lbs (N-m)				
Torque/Tension	150-300 (203-407)	150-300 (203-407)	150-300 (203-407)	----	----
INSTAL II	----	150-300 (203-407)	150-300 (203-407)	150-300 (203-407)	----
INSTAL III	----	150-300 (203-407)	150-300 (203-407)	150-300 (203-407)	----
INSTAL B	150-250 (203-339)	----	----	----	----
Combination	----	150-300 (203-407)	150-300 (203-407)	----	----
Mechanical Bolt	150-300 (203-407)	150-300 (203-407)	150-300 (203-407)	150-300 (203-407)	----







Note:

Torque up to 400 ft.-lbs. may be used on 7/8" diameter and greater bolts based on site specific conditions.

Color Codes for Threaded, Cable and Bolts

Cable		
Length (ft)	Color Code	
5	Red	
6	Dark Blue	
7	Orange	
8	White	
9	Fluorescent Green	
≥10, >12	Safety Yellow	
≥12, >14	Dark Green	
≥14, >16	Brown	
≥16, >18	No Color	NC
≥18, >20	Light Blue	
≥20, >22	Black	
≥22, >24	Pink	
≥24, >26	Purple	

M3 Bolts		
Length (ft)	Color Code	
5	Red	
6	Dark Blue	
7	Orange	
8	White	
9	Fluorescent Green	
≥10, >12	Safety Yellow	
≥12, >14	Dark Green	
≥14, >16	Brown	
≥16, >18	No Color	NC
≥18, >20	Light Blue	
≥20, >22	Black	
≥22, >24	Pink	
≥24, >26	Purple	

Threaded Bolts		
Length (in)	Color Code	
30	Purple	
36	Yellow	
42	Green	
48	No Color	NC
60	Red	
72	Blue	
84	Orange	
96	White	

Note:

Color code schematic per ASTM F432-12 tables 11 and 12.

Approved by: D.Woodward V1 Rev: 03/31/16
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Combination Bolt

1. Drill hole approximately 1 inch longer than the bolt when completely assembled. Measure from where the plate touches the roof to the top of the bolt.
2. Insert appropriate length and type of resin cartridge into hole. For optimum performance, use a length of resin cartridge that will ensure complete resin encapsulation from the end of the rebar to the top of the coupler.
3. Insert top section of COMBINATION Bolt into hole first, assembling the remaining extensions as you push the bolt into the hole.
4. With the bolt in the bolt wrench, raise completely assembled bolt to the top of the hole. Do not thrust plate tight against the roof.
5. Keeping the plate just off the roof, rotate bolt rapidly 5-10 seconds (or time as otherwise specified by resin manufacturer) to mix resin. Always keep hands away from rotating parts.
6. Wait for resin to set up (per time specified by resin manufacturer) and torque bolt to within the torque range as specified in the roof control plan. This completes the installation.

Headed Rebar

1. Drill appropriate diameter hole 1" longer than the length of the bolt. Measure from where the plate touches the roof to the top end of the bolt.
2. Insert the appropriate length resin cartridge(s) into the drillhole. Care should be taken to ensure the resin cartridge is not broken before inserting into the hole.
3. With the square head of the bolt in the bolt wrench, push the bolt into the hole and through the resin cartridge.
4. Once the bolt is completely in the drillhole, and with the plate slightly off the roof without excessive upward boom pressure, rotate the bolt rapidly to mix the resin. Always keep hands away from rotating parts. Rotate for amount of time as specified for type of resin used.
5. When the proper mix time has been achieved, stop rotation, thrust the head of the bolt with plate tight against the roof using the bolt machine boom pressure. Hold tight against roof until resin sets up as per time specified.
6. Once resin hold time is achieved, installation is complete and wrench may be removed from bolt. This completes the installation. Do not attempt to rotate bolt once resin sets up.

Notched Bendable Bolt

1. Bolt notches can be a machined (milled) or heat pressed type notch.
2. Notched bendable bolts can be configured as either a non-tensioned headed rebar, torque-tension, Super-Twist, or INSTAL bolt.
3. All installation instructions for those type bolts are to be followed.
4. However, when bending a notched bolt, the restraining or gripping point must not be in the notched portion of the bolt. The restraining or gripping point must be outside the notched area either towards the top or bottom of the bolt. Gripping in the notch can result in bolt failure during the bending process. **DO NOT RESTRAIN IN THE NOTCHED AREA.**
5. Excessive bolt bending can cause the formation of cracks in the notched area resulting in a significant loss of bolt strength. When possible limit to 60 degrees, and never more than 90 degrees.
6. Once bent, and the top end of bolt is placed in the drill hole, the bolt is straightened out. Again, during the bolt straightening process, the bolt restraining or gripping point must be outside the notched area. **DO NOT RESTRAIN IN THE NOTCHED AREA.**
7. Once the bolt is straightened, the installation should be completed per the Installation Instructions for the particular type of bolt.

Mechanical Bolt

1. Drill applicable 1" or 1-3/8" diameter hole approximately 1"-1-1/2" longer than bolt when completely assembled. Measure from where the plate touches the roof to the top of the bolt. Adjustment to be made to accommodate header boards, crossbars, plank, etc.
2. Insert bolt into hole. If bolt equipped with bail type expansion shell, slide plastic retaining sleeve from expansion shell before inserting it into hole.
3. With the bolt in the bolt wrench, raise to top of the hole. Just hold bolt snug against roof while applying torque. Do not apply excessive up thrust when torquing bolt. Always keep hands from rotating parts.
4. Torque bolt to within the torque range as specified in the roof control plan. This completes installation.

Super Twist®

1. A hole of 1" diameter (or appropriate diameter for size of bar) is drilled into the mine roof strata approximately 1" longer than the torque tension rebar or j-bar used by the mine. Measure from where the plate touches the roof to the top of the bolt. Adjustment to be made to accommodate header boards, crossbars, plank, etc.
2. Insert resin cartridge into hole. Length and type of resin as specified in the roof control plan.
3. With the bolt in the bolt wrench, insert the torque/tension bolt into the hole to a point where the roof plate is just slightly off the roof line and no excessive boom pressure is applied. Now rapidly rotate the bolt counter-clockwise for 5-10 seconds (or as per resin manufacturers recommendations for type of resin being used) to ensure proper mixing of the resin. Always keep hands away from rotating parts.
4. Now hold the bolt assembly in place (do not apply any up-thrust) for a minimum of 10-30 seconds (depending what resin is used) to allow the resin to set up properly.
5. After the resin has set up properly, rotate the bolt assembly clockwise with minimum up thrust and apply a torque to the bolt as per the mine roof control plan. this completes the installation.

INSTAL II Bolt

1. Drill a 1-3/8" diameter hole approximately 1" to 1-1/2" longer than the bolt when completely assembled. Measure from where the plate touches the roof to the top of the bolt. Adjustment to be made to accommodate header boards, crossbars, plank, etc.
2. Insert appropriate length and type of resin cartridge into hole (system adaptable to any length of resin).
3. Insert the top section of the INSTAL II Bolt into the borehole with expansion anchor, support nut, and coupler with roll pin. Now, rotate the headed bottom section with hardened steel washer, optional anti-friction washer, and plate into the bottom end of the coupler. Make sure that both ends of the bolt are completely threaded into the coupler snug against the roll pin. Note: due to vibration in transit and handling, the couplers can sometimes loosen off the threaded portion of the bolt.
4. With the bolt in the bolt wrench, raise to top of the hole penetrating the resin cartridge. Do not rotate bolt until it is completely in the hole. Holding the bolt snug against the roof, without applying excessive up pressure with the boom of the bolting machine, torque bolt within torque range as specified in the roof control plan. Always keep hands away from rotating parts. This completes the installation.

INSTAL III Bolt

1. Drill a 1-3/8" inch diameter hole approximately 1-1/2"-2" longer than the bolt when completely assembled. Measure from where the plate touches the roof to the top of the bolt. Adjustment to be made to accommodate header boards, crossbars, plank, etc.
2. Insert resin cartridge into hole (system adaptable to any length of resin). Length and type of resin as specified in the roof control plan.
3. Insert INSTAL III Bolt in the hole with expansion anchor, support nut, hardened steel washer, optional anti-friction washer, and plate assembled on the bolt.
4. With the bolt in the bolt wrench, raise to top of the hole. Just hold bolt snug against the roof while applying torque. Do not apply excessive up-thrust when torquing bolt. Always keep hands away from rotating parts. Torque bolt to within torque range as specified in the roof control plan. This completes installation.

INSTAL B Bolt

1. Drill a 1" diameter hole approximately 1" to 1-1/2" longer than the bolt when completely assembled. Measure from where the plate touches the roof to the top of the bolt. Adjustment to be made to accommodate header boards, crossbars, plank, etc.
2. Insert appropriate type and length resin cartridge into hole (as specified in the roof control plan).
3. Insert INSTAL B bolt in the drill hole with J1 or J1M expansion anchor, support nut, anti-friction washer (optional), hardened steel washer, and plate assembled on the bolt.
4. With the bolt in the bolt wrench and without rotating, raise to top of the hole penetrating resin. Just hold bolt snug against the roof. Without applying excessive upward boom pressure, rapidly rotate bolt and torque within range as specified in roof control plan. Always keep hands away from rotating parts. This completes the installation.

Cable Bolt Markings

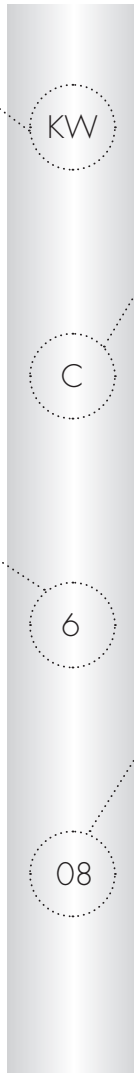
Cable housings and/or drive nut will be marked with a 4-7 character alpha-numeric identification.

Plant Identity	
KW	West Virginia
KK	Kentucky
KV	Virginia
KU	Utah
K	Pennsylvania
KC	East Virginia
KE	West Kentucky

Type of Bolt	
C	INSTAL with Expansion Shell on Stiffener Tube
P	Post Installation Tensioned System (no expansion shell)

Cable Diameter, in. (mm)	
5	0.5 (13)
6	0.6 (15)
7	0.7 (18)
8	0.8 (20)

Bolt Length, ft. (m)	
08	8 (2.4)
10	10 (3.0)
12	12 (3.7)
14	14 (4.2)
16	16 (4.9)



*Typical Bolt Lengths

Note:

An additional character "G" will be added at the end to designate galvanized cable or an "E" if epoxy coated (CABLEOX™).

No character will be shown for regular (bright) cable.

Non-Tensioned Cable Bolt

1. Drill borehole approximately 1" to 1-1/2" longer than the bolt length. Measure from where the plate touches the roof to the top end of the bolt.
2. Insert the appropriate length and type of resin cartridge(s) as specified in the roof control plan into the drillhole. Care should be taken to ensure the resin cartridge is not broken before inserting into the hole.
3. Using the cable bolt, push the resin and bolt as far as possible into the drillhole by hand.
4. With the square head of the cable bolt in the bolt wrench, push the JM Cable Bolt to the top of the hole. If the bolt is equipped with a stiffener tube, ensure that the stiffener tube enters the hole smoothly. When the stiffener is collared in the drillhole, slow clock-wise rotation of the cable bolt is permissible to aid in final penetration and begin mixing of the resin.
5. Once the cable bolt is completely collared in the drillhole, and with the plate slightly off the roof without excessive upward boom pressure, rotate bolt rapidly clockwise to mix resin for amount of time as specified for resin used. Always keep hands away from rotating parts.
6. When the proper mix time has been achieved, stop rotation, wait for 3 seconds, thrust the head of the JM Cable Bolt with plate tight against the roof using the bolt machine boom pressure. Hold tight for amount of time as per resin manufacturer's recommendations to allow resin to set up. Do not attempt to rotate bolt once resin sets up. This completes installation.

NOTE: JM CABLE Non-tensioned Cable Bolts are available for both 1" and 1-3/8" drillholes and either regular (brite), galvanized, or cableox epoxy coating.

Post-Tensioned Cable Bolt

1. Drill borehole approximately 1" to 1-1/2" longer than the bolt length. Measure from where the plate touches the roof to the top end of the bolt.
2. Insert the appropriate length and type of resin cartridge(s) as specified in the roof control plan into the drillhole. Care should be taken to ensure the resin cartridge is not broken before inserting into the hole.
3. Using the cable bolt, push the resin and bolt as far as possible into the drillhole by hand.
4. With the end of the cable inserted into the bolt wrench, push the PT Cable Bolt to the top of the hole. If the bolt is equipped with a stiffener tube, ensure that the stiffener tube enters the hole smoothly. When the stiffener is collared in the drillhole, slow clock-wise rotation of the cable bolt is permissible to aid in final penetration and begin mixing of the resin.
5. Once the cable bolt is completely collared in the drillhole with the plate slightly off the roof and without excessive upward boom pressure, rotate bolt rapidly clockwise to mix resin for amount of time as specified for resin used. Always keep hands away from rotating parts.
6. When the proper mix time has been achieved, stop rotation, hold until resin set time achieved. During hold time, do not push up on the bolt. Once resin set time achieved, remove wrench from end of bolt. Do not attempt to rotate bolt once resin sets up.
7. Insert end of cable into cable tensioning unit (CTU). While holding CTU on end of bolt, activate pressure to CTU and tension bolt. Never place fingers between plate and roof. Do not place hands or fingers on or near nose piece end of CTU. CTU will tighten up plate against roof and set housing and wedge assembly while applying tension to cable. Depending on roof conditions, more than one tensioning cycle with CTU may be required. If additional tensioning is required, simply retract cylinders on CTU and push CTU on cable tight against base of housing assembly and re-activate pressure to CTU. Once the tensioning is complete, retract cylinders on CTU, and remove unit from end of cable. This completes the installation process.
8. Do not alter or remove components of CTU except to change gripping wedges in nose piece. NOTE: JM Post-Tensioned Cable Bolts available for both 1" and 1-3/8" drillhole, and either regular (brite), galvanized, or cableox epoxy coating.

INSTAL Cable Bolt

1. Drill 1-3/8" diameter hole approximately 1"-2" longer than the bolt length. With plate on bolt, measure from where the plate would touch the roof to the top of the bolt.
2. Insert appropriate resin cartridge(s) into hole. Length and type of resin as specified in the roof control plan.
3. With square head of bolt in bolt wrench, insert JM INSTAL Tensionable cable bolt into borehole and push to top of hole. Do not rotate bolt during insertion. Ensure that the expansion shell and optional stiffener enter the borehole smoothly. Always keep hands away from rotating parts.
4. With plate touching lightly against the roof (do not apply excessive up-thrust), rotate the bolt clockwise until expansion shell anchors and bolting machine stalls out within recommended torque range as specified in the roof control plan. This completes the installation. Do not attempt to apply additional torque once the bolting machine stalls out. Always keep hands away from any rotating parts.

NOTE: these instructions apply to regular finish (brite), galvanized, or cableox cable.

FRICION-LOK® Stabilizer System

1. Drill a hole in the area to be bolted using the bolt spacing, bolt length and drilling procedure as specified in the roof plan, not to exceed the recommended drill hole for the size of FRICION-LOK being used.
2. The hole should be at least 2-4 inches longer than the overall length of the FRICION-LOK Stabilizer.
3. After placing a roof plate onto the FRICION-LOK tube, embossed side against the ring, drive the FRICION-LOK stabilizer (tapered end first) into the drilled hole, using the installation equipment provided, until the roof plate is firmly against the roof.
4. Take care to align the driver and drill with the FRICION-LOK stabilizer.
5. Do not continue to pound on the FRICION-LOK stabilizer after the plate is tight as you may damage the FRICION-LOK end.
6. If insertion time is too fast (than normal), check bit diameter to be sure hole is correct size. If insertion time is too slow, check bit diameter, steel length, proper operating dust flushing/vacuum system, and properly operating drilling/insertion machine.
7. Slot should close to no more than 1/4 inch over at least one-half the length of the tube.
8. If FRICION-LOK stabilizer fails to drive home, roof plate will be loose. Check to make sure hole drilled deep enough, is correct diameter and that drill is in good operating condition.
9. Keep hands away from all pinch points, rotating and/or vibrating parts, and bearing plate & bolt when inserting into drill hole. Always wear and utilize proper safety gear and eye protection.

IMPORTANT - be alert for anything in the installation that is different from your normal experience. Big changes are indications that something is wrong with the installation. Report differences to your supervisor.

M3 Expandable Bolt

1. Determine the proper diameter for borehole to be drilled into the mine strata based on the type of M3 Bolt being installed. Hole length should be 3 in. longer than the length of M3 bolt being installed.
2. Place a roof plate that matches the strength of the system over the bolt and resting on the flange of the ferrule end. Bolt assembly is then inserted into the borehole followed by the inflation wand, if using a portable pump and wand, or inflation head when using a mechanized bolting machine. Bolt assembly is then pushed flush to the roof or rib.
3. Inflate system to the following recommended inflation pressure:
Standard = 4350 psi (300 bar); Midi = 3481 psi (240 bar); Super = 4350 psi (300 bar)
4. Hold system tight to roof or rib with the recommended inflation pressures for at least 5 – 8 seconds. Release pressure and remove inflation wand or lower inflation head of bolting machine.

JMM and JMS Cable Truss System

1. A borehole is drilled into the mine roof strata at an angle of approximately 30-45 degrees from vertical. Be sure to allow enough room away from the rib for the shoe and plate. Spacing of the boreholes is determined by mine personnel based on entry width, mining conditions, and/or the approved roof control plan. Borehole depth should be 1"-2" longer than the length of the angle bolt.
2. With the proper amount of resin inserted into the hole first, the angle bolt with truss plate and shoe on the bolt is then put into the hole, pushed through the resin, and installed. Follow the appropriate installation instructions for type of bolt used (INSTAL or Cable). This step is repeated for the other angle bolt.
3. Hang the U-Bolts on each truss shoe. Slightly lift the U-Bolt upward and insert one end of the cable through the U-Bolt bearing block from the center entry direction. Once the end of the cable is through the U-Bolt bearing block, slip the cable housing and wedge assembly on the end of the cable. Repeat this step for the other U-Bolt. Note: Make sure to leave at least six inches of cable protruding beyond the cable housing and wedge assembly on the side that you will tension from.
- 3A. Alternative method: lay the u-bolts on the mine floor or across bolting machine (make sure bolting machine is turned off) and insert cable through the u-bolts and assemble horizontal member components as described above. With helper, the entire horizontal cable assembly is then lifted and the u-bolts are hooked onto the truss shoes. If working alone, lift one side first and hook it onto the truss shoe. Go to the other side and while pulling slightly on the cable, lift and hook u-bolt onto the other truss shoe.
4. With the complete horizontal member now hanging from the truss shoe, the cable can be adjusted by lifting upward on the cable and moving the housing and wedge assemblies towards the center of the entry as much as possible by hand. be careful when lifting and adjusting housing and wedge assemblies not to push u-bolt off truss shoe.

(Continued)

5. Insert the cable tensioning unit (CTU) onto the end of cable that has at least six inches of cable protruding beyond the u-bolt bearing block. Make sure the wedge/housing assembly opposite the side being tensioned is seated properly. Engage the hydraulic circuit to tighten the cable. If necessary, repeat the tensioning cycle several times until the cable is tight. Make sure full hydraulic pressure is applied to the cable and the cylinders are not "bottomed out". Do not place hands or fingers on or near nose piece end of CTU. Do not alter or remove components of CTU except to change gripping wedges in nose piece. Keep hands away from any rotating parts. The installation is complete.

Procedure for determining the proper length of the horizontal member for the JMM Cable Truss:

$$H = E - 2(S) - 3 + 2(C)$$

Where:

H - Horizontal Member Length

E - Entry Width

S - Angle Bolt Spacing from Rib

C - Cable Overlap (amount of cable)

Example:

if **E = 18 ft**, **S = 3 ft**, **C = 1 ft**, the length of the horizontal member is **11**.

JM Roof/Rib (R2) Plate

1. The JENNMAR Roof/Rib Plate (18" x 18" square) is designed for optimum surface control for the roof or rib. It is designed to be used in conjunction with the bolt system (including plate) for either roof or rib surface control.
2. Place the JENNMAR Roof/Rib Plate on the bolt system between the plate and roof or rib surface. The JENNMAR Roof/Rib Plate should be placed on the bolt with the double embossment side down (flat surface against roof or rib). Any size approved bearing plate may be used in conjunction with the JENNMAR Roof/Rib Plate.
3. Install the bolt according to the specific installation instructions for that type bolt. Always wear proper protective gloves and clothing when handling or installing the JENNMAR Roof/Rib Plate or any roof or rib control product. Always keep hands away from rotating parts and the JENNMAR Roof/Rib Plate when installing the bolt.

Jenmar ACS (100 ton & 55 Ton)

1. Avoid pinch points while handling and tightening the prop. Always wear appropriate personal protective equipment (PPE) when handling these props.
2. Optional carrying handles should not be used for any other purpose except carry and holding the prop during installation process.
3. Prepare the mine floor and roof as required to provide a suitable bearing surface.
4. Stand prop up close to vertical as possible. Typically the spindle end with plate attached is installed towards the mine roof.
5. Grab the handles of the spindle nut and rotate it clockwise, continue turning the spindle nut clockwise until the top plate contacts the mine roof.
6. Tighten the spindle nut until the prop is firmly installed.
7. Test the prop to insure it is tight and stable. If necessary, retighten prop by additional rotation of the spindle nut.
8. The ACS prop installation is now complete. Repeat above steps for next installation.

Jennmar Ball Buster and Quick Stick

1. Avoid pinch points while handling and tightening the prop. Always wear appropriate personal protective equipment (PPE) when handling these props.
2. Optional carrying handles should not be used for any other purpose except carry and holding the prop during installation process.
3. Prepare the mine floor and roof as required to provide a suitable bearing surface.
4. Stand prop up with the smaller diameter prop tube towards the mine roof and close to vertical as possible.
5. Extend the smaller diameter prop tube towards the mine roof. Wedges and/or header boards may be inserted above the top plate to firmly set the prop.
6. Test the prop to insure it is tight and stable. If necessary, retighten prop by additional wedges.
7. The Ball Buster or Quick Stick prop installation is now complete. Repeat above steps for next installation.

Jenmar Sand Prop

1. Avoid pinch points while handling and tightening the prop. Always wear appropriate personal protective equipment (PPE) when handling these props.
2. Optional carrying handles should not be used for any other purpose except carry and holding the prop during installation process.
3. Prepare the mine floor and roof as required to provide a suitable bearing surface.
4. Stand prop up with the smaller diameter prop tube towards the mine roof and close to vertical as possible.
5. Remove the strap holding the prop in the collapsed position.
6. Extend the smaller diameter prop tube towards the mine roof. Wedges and/or header boards may be inserted above the top plate to firmly set the prop.
7. Test the prop to insure it is tight and stable. If necessary, retighten prop by additional wedges.
8. The Sand prop installation is now complete. Repeat above steps for next installation.

J-LOK™ Resin

Gel Time

Generally, the sum of the Spin Time and Hold Time is the Gel Time. The time from the start of mixing until the resin starts to harden is the Gel Time. Gel Time is influenced by temperature of resin, strata and bolt. Additionally, the amount of heat generated in mixing during the spin time also affects Gel Time. Field trials are recommended.











Spin Time

Cartridge contents should be completely mixed to achieve maximum anchorage. The generally accepted mix standard is a minimum of 30 revolutions of the bolt. Spin Time is the time required, at typical bolter rotation of 400–600 rpm, to achieve the complete mix.

Hold Time

After the cartridge contents are mixed, the resin must harden to achieve strength. The time required after mixing is completed and the bolt has achieved a firm anchorage is referred to as Hold Time. Hold times may vary based on conditions.

Gel, Spin and Hold Times

Gel Time, Seconds	Spin Time, Seconds	Hold Time, Seconds	Color Code	
10	3 to 5	3 to 8	Pink	
20	3 to 6	4 to 8	Orange	
30	3 to 7	8 to 15	Blue	
45	4 to 9	8 to 20	White	
60	5 to 10	18 to 28	Green	
75 & 90	5 to 10	20 to 40	Green/White	
120	5 to 10	25 to 75	Yellow	
120–240 & Higher	5 to 15	45 to 240	Yellow/White	
TWIN-LOK, 10	3 to 5	3 to 5	Pink/White	
TWIN-LOK, 20	3 to 6	3 to 6	Orange/White	

Storage

J-LOK resin cartridges should be stored away from direct sunlight in a dry, cool, well ventilated area. Storage under adverse conditions will reduce shelf life. Product should not be subjected to temperatures above 90° F (32° C) for prolonged periods. J-LOK resin is formulated to be used at 55–60° F (13–16° C). At lower temperatures, gel time will be slower than normal and at higher temperatures the gel time will be faster than normal. For best results, pallets and cases of J-LOK resin should be allowed to acclimate to mine temperature.

J-LOK™ Resin

Cold Alert

At this time of year, special precautions in storage and awareness during installation of J-LOK™ resin are recommended.

- Store J-LOK™ in a cool well ventilated area. Excessive cold affects resin performance
- J-LOK™ is formulated to be used at 55 to 60°F. At lower temperatures, gel time will be slower than normal. J-LOK™ will need a longer time to acclimate to mine temperature
- Excessive cold can cause contraction of the resin in the cartridge, which will result in a limp cartridge unless resin is warmed to mine temperature
- J-LOK™ should be used at the normal temperature of 55 to 60° F. Lower temperatures can cause insertion problems and extended cure strength (hold) time.

Heat Alert

At this time of year, special precautions in storage and awareness during installation of J-LOK resin are recommended.

- Store J-LOK™ in a cool well ventilated area. Storing in direct sunlight with exposure to UV rays will affect resin shelf life and performance
- J-LOK™ is formulated to be used at 55 to 60° F. At higher temperatures, gel time will be faster than normal. J-LOK™ will need a longer time to acclimate to mine temperature
- Excessive heat can cause expansion of the resin in the cartridge, which will result in a limp cartridge when the resin is cooled down to mine temperature. The expansion of resin can also cause leakage, which results in a sticky cartridge.

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