



# CS Series Shears



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## Operator's Manual CS-Series

Safety, Operation & Maintenance



Part #CSE00001

Connect Work Tools - [www.connectworktools.com](http://www.connectworktools.com) - 920.238.6657

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## Contact Information



**Connect Work Tools**  
**115 Commerce Blvd**  
**Cleburne, TX 76033**

**E-mail: [info@connectworktools.com](mailto:info@connectworktools.com)**  
**Main Phone: 920-238-6657**  
**Fax: 715-395-3703**

Contact your Connect Work Tools Representative or the Connect Work Tools Parts Department for replacement manuals. Inquiries regarding the content of this manual must include the release date shown below.

*Information in this manual is subject to change without advance notice.*

**Table 1.1 About this manual**

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Release Date	March 2024
Product Name	CWT Shear
Series	CS
Serial Numbers	CS7 101+ CS15 101+
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Original Instructions	American English

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## 1.0 Policies & Procedures



### Attention Read the Manual



To guarantee safe, reliable and long-term service intervals, only qualified and approved personnel should operate, inspect, and maintain your CWT Shear. Improper installation, operation or maintenance of the CWT Shear could result in serious injury or death. Operators and personnel responsible for the shear are required to read, understand, and follow the operational and safety procedures included in this manual. Other manuals, such as those published by the machinery used in support of the CWT Shear, should also be read.



**DO NOT OPERATE THIS CWT SHEAR UNTIL YOU HAVE READ AND COMPREHEND THESE PROCEDURES.**

Always follow your workplace safety practices to protect yourself and your co-workers.

### 1.1 Registration

The Warranty Registration Form included in this manual must be completed by, YOU, the customer and returned to Connect Work Tools indicating the first date your CWT Shear was operated.

### 1.2 Notice

It is mandatory that this operational manual remain with your CWT Shear permanently. If this manual is misplaced or damaged, please contact Connect Work Tools Customer Service Department at (920) 238-6657 or visit [www.connectworktools.com](http://www.connectworktools.com) for a replacement manual.

All efforts have been made by Connect Work Tools to provide complete and accurate information throughout this manual. However, because of differing equipment requirements some variations might exist.

Connect Work Tools reserves the right to improve and modify the CWT Shears line of products at any time without public notice or obligation. Connect Work Tools also maintains the option to discontinue manufacturing any and all parts of the line of CWT Shears at any time.

### 1.3 Warranty

All maintenance or repairs to be considered for warranty reimbursement must be pre-authorized by the Connect Work Tools Customer Service Department. Any alterations, modifications or repairs performed before authorization by the Connect Work Tools Customer Service Department will render all warranty reimbursement consideration null and void without exception. Turn to page 66 for Warranty Claim Procedures. Improper operation or improperly performed maintenance may void any warranty.



## 2.0 Safety Information

### Safety Statements and Hazard Alerts

Workplace safety is a direct result of equipment operation and maintenance. Within this manual, you will find important safety information. The information will include specific information related to the CWT Shear. It is imperative that operators, maintenance personnel, or individuals loading or transporting the equipment read and understand the safety contents of this manual, as well as all safety decals and labels. Safety decals and labels must be kept legible and intact on the attachment. Inspecting safety warnings is a part of periodic maintenance, replace damaged, missing or illegible safety labels or decals.

Connect Work Tools cannot anticipate all unsafe and dangerous situations relating to your workplace, therefore the safety precautions written in this manual and on the equipment are not all-encompassing. The basic safety instructions are summarized in this chapter and also appear throughout the manual along with additional rules for operational safety.

### Purpose of Safety Messages

The reason safety messages and information has been included in this manual is most importantly to protect you and those individuals in the work area. Additionally, it is provided to eliminate damage to surroundings, shears and the carrier due to incorrect operation and use or lack of maintenance of the equipment.

### Key Points before operating equipment

1. Know your surroundings, survey the area prior to operation.
2. Know where the potential hazards are within the work area and notify personnel of those hazards.

Safety messages provide the following information:

1. **Alert** personnel to potential hazards
2. **Identify** the nature of the hazard
3. **Describe** the severity of the hazard, if encountered
4. **Instruct** how to avoid the hazard

### Signal Words

Safety symbols and signal words, as shown below, are used to emphasize all operator, maintenance and repair actions which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to equipment. Please follow the recommended preventative measures and safe operating practices.



*This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.*



*This safety alert and signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.*



*This safety alert and signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*



*This safety alert and signal word indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.*



*This signal word indicates a potentially hazardous situation which, if not avoided, may result in property damage or damage to the equipment.*



*This signal word indicates a situation which, if not avoided, may result in damage to the equipment.*

Fig. S1 Safety Signal Words

### Signal Words Used for Non-Hazard Messages

This manual contains other message types that use the signal words IMPORTANT and NOTE. These are informational messages that provide instructions and are not considered hazardous to workers.

**IMPORTANT** - Identify instructions that if not followed, may damage the equipment or diminish the service life of components.

**NOTE** - Highlight suggestions, which will enhance installation, reliability, or operation.

**ATTENTION, BECOME ALERT, YOUR SAFETY IS INVOLVED.**




## 2.0 Safety Information

### Safety, Information and Identification Labels

Information labels affixed to the Connect Work Tools shears include safety warnings, identification and instructions important to operation and service.

Keep all safety & identification labels clean. Words and illustrations must be legible.

Before operating this equipment, replace damaged or missing labels. For replacement, contact your Connect Work Tools representative.

Fig.	Label	Description
Fig. S2		<b>READ THE MANUAL</b> - Decal directs personnel to read the manual before operating the equipment.
Fig. S3		<b>STAY CLEAR</b> - Decal alerts personnel and by-standers to maintain a safe distance from the Shear while in operation.
Fig. S4		<b>LIFT POINT</b> - Decal directs personnel where to attach shackle for lifting the equipment.

### Label Positions

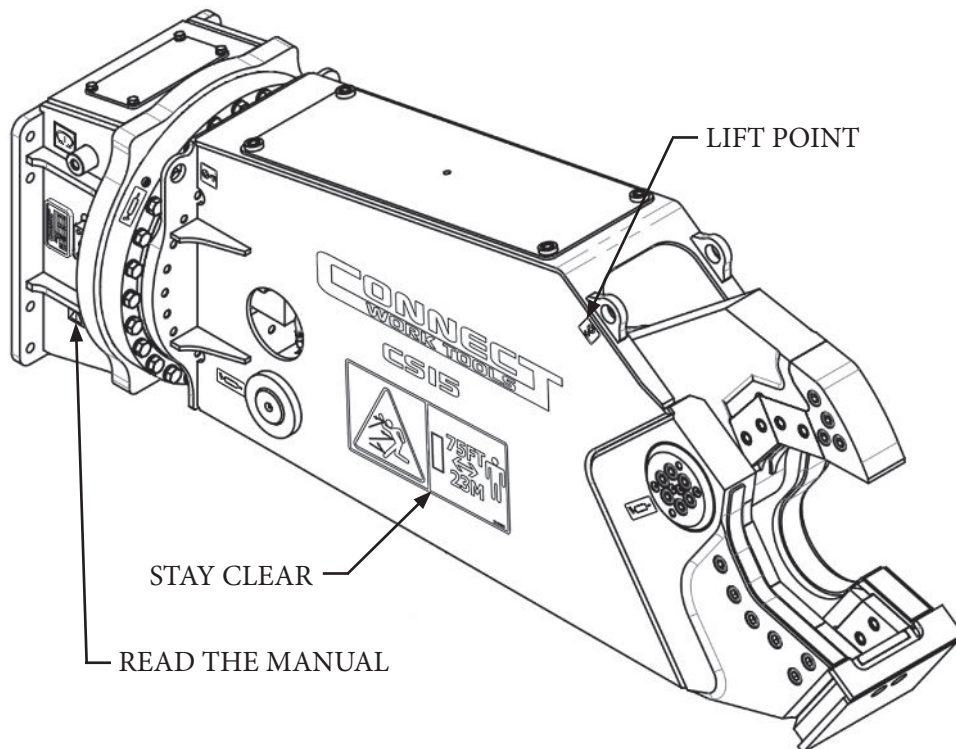


Fig. S5 Label Positions



## 2.0 Safety Information

### Meaning of Pictograms

Pictograms are used to rapidly communicate information. For the purposes of this manual and labels affixed to the Connect Work Tools equipment, pictograms are defined as follows:

 <ul style="list-style-type: none"> <li>• <i>Read the Manual</i></li> <li>• <i>Refer to the manual for further details</i></li> <li>• <i>Procedures are explained in the manual</i></li> </ul>	 <p><i>Personnel maintain a safe distance from shear</i></p>
 <p><i>Read the Service Manual for Additional Information</i></p>	 <p><i>Fragments/debris becoming airborne projectiles</i></p>
 <ul style="list-style-type: none"> <li>• <i>Crush Point</i></li> </ul>	 <p><i>Protective guards required on cab when operating this work tool</i></p>
 <ul style="list-style-type: none"> <li>• <i>Pinch Point</i></li> </ul>	 <p><i>Leaking fluid under pressure</i></p>
 <p><i>Moving part (in direction indicated by arrow)</i></p>	 <p><i>Hot Surfaces</i></p>
 <ul style="list-style-type: none"> <li>• <i>Falling object</i></li> <li>• <i>Unsupported loads</i></li> </ul>	 <p><i>Gas/Oil under pressure</i></p>
<p><i>Personal Protection Equipment</i></p>	
 <ul style="list-style-type: none"> <li>• <i>Hearing Protection</i></li> </ul>	 <p><i>Shut off carrier &amp; remove key before servicing</i></p>
 <ul style="list-style-type: none"> <li>• <i>Safety Eyewear</i></li> </ul>	 <p><i>Identifies lift point</i></p>
 <ul style="list-style-type: none"> <li>• <i>Gloves</i></li> </ul>	 <p><i>The check mark is used to indicate correct actions or approved methods that are recommended</i></p>
 <ul style="list-style-type: none"> <li>• <i>Safety Shoes</i></li> <li>• <i>Falling Part</i></li> </ul>	

Fig. S6 Meaning of Pictograms

## 2.0 Safety Information

### Owner's Responsibilities

#### Personal Protective Equipment (PPE)



Ensure that only qualified personnel operate and service the Connect Work Tools equipment.

Ensure personal protection equipment is available to personnel and enforce the use of PPE.

Ensure that base machines are in safe, working order and all guards and safety equipment is installed and in operating condition.

Ensure safety-related materials such as instructions and including this manual are kept in a convenient location so that they are easily accessible to operators and maintenance personnel.

Personnel operating or nearby the equipment and exposed to the hazard of falling, flying and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases shall use the particular personal protective equipment (PPE) necessary to protect them from the hazard. Such PPE may include safety eyewear, face shield, hearing protection, safety footwear, gloves and dust mask. Supervisors shall review proper PPE selection and ensure PPE is made available to personnel. Personnel are responsible for wearing PPE as directed by the supervisor.

#### Protective Equipment - Guarding



Equipment designed with guards shall have guards in place when equipment is in use. Guards are fitted to the equipment to protect against unsafe situations that could not be eliminated through design measures. Where it was not possible to prevent an unsafe situation by means of a guard, safety messages appear on the equipment, warning personnel of a hazardous condition.

Guards shall not be removed unless for the purpose of inspection and service of components. All guards must be reinstalled after service or adjustments are completed. Do not operate the Connect Work Tools equipment without guards.

Additional guarding, not included with the CWT equipment, is necessary at the operator's station to protect the operator and other nearby personnel against flying debris from material being cut or demolished. Do not handle, demolish or cut material without proper guards installed.

To prevent accidental start up, the control switch shall be located in a protected area that is guarded and makes it difficult to accidentally operate the equipment.



If the shear is not functioning properly, you **MUST** shut the machine down and follow proper lock-out, tag-out and repair procedures.



**NEVER** operate equipment without the original equipment safety guards in place. If the cab glass is missing or damaged, check with your dealer or manufacturer for proper replacement.

## 2.0 Safety Information



Ensure that the cab is equipped with the proper safety guards for CWT applications. In addition, it is required that the cab be equipped with an approved Falling Object Protection Structure (FOPS) when under operation. The FOPS must meet the requirements of SAE standard J1356. A transparent, shatter-resistant shield covering the front of the cab is also mandated. Contact your base machine equipment dealer or manufacturer for more information on the availability of FOPS. Lack of proper FOPS may result in injury or death.



**DO NOT** close the attachment on a structure and reverse the excavator in an attempt to pull down material.



**DO NOT** attempt to shear brittle materials such as axles and railroad rail. Brittle materials break or shatter rather than shearing. The material being processed could become a projectile and cause injury or death. **DO NOT** process any material in any position that may propel it toward operator, other workers, buildings or equipment.



**DO NOT** process or handle material with the attachment over the operator's cab.



Clear all persons and equipment from the area of operation and machine movement. **NEVER** move loads over people or equipment. When viewing the operation of the attachment, maintain a safe distance of at least 75 feet (23m).



**NEVER** approach power lines with any part of the machine. Keep clear at a minimum of 15 feet (3m).



Avoid tipping. The attachment will alter the lift capacities of the base machine. Overloading the excavator could result in serious injury or death. Lift capacities will vary if the base machine is not on level ground. Carry loads in recommended positions for maximum stability. Use the recommended excavator counterweight.



**DO NOT** allow riders on the base machine and never on the attachment.

## 2.0 Safety Information



**NEVER** remove any pins unless the attachment is on the ground and blocked up, doing so could result in serious injury or death. Metal chips or debris may become airborne when a connecting pin is struck. Use a brass punch when striking pins and always wear protective clothing and proper eye protection. Keep people clear when removing or installing pins.



Under no circumstances should any modifications be made to CWT equipment without factory authorization.



**ALWAYS** lower the boom to the ground before leaving the cab. If it is necessary to work on an attachment off the ground, securely support the machine and attachment. **DO NOT** rely on a cylinder to hold the attachment in the air. **DO NOT** work under a machine that is supported only by a jack.



**DO NOT** let hot hydraulic oil get in contact with the skin as it could cause severe burns. Wear adequate protective clothing and safety equipment. **DO NOT** tamper with any hydraulic line or component while it is pressurized. Escaping fluid under pressure can penetrate the skin, causing serious injury. Relieve pressure before unhooking hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard to search for leaks. If **ANY** fluid is injected into the skin, seek immediate medical attention.



**DO NOT** weld on any structural member unless specifically authorized by Connect Work Tools. Any unauthorized welding or welding procedures will void the warranty, and may cause structural failure or result in personal injury.



Before operating the shear, read and observe all safety instructions in the operation and maintenance sections of this manual. If you are unfamiliar with any operation or maintenance procedure, seek instruction before proceeding.



Keep clear of all potential pinch points, including the moving upper jaw, cylinder connections, bucket linkages or other moving parts.



**ALWAYS** wear close-fitting clothing and safety equipment appropriate to the job. Safety equipment should be worn at all times when viewing, operating, or maintaining the attachment to prevent injury. Safety equipment includes eye protection, hard hat, steel toe shoes, gloves, and hearing protection.



# CS Series Shear

*Model Description*

*Features*

*Serial Number Key*

*Shear Component Location Diagram*

*Attachment Glossary*

*Shear Specifications*

## Shear Basics

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## 3.0 CWT Shear Basics

### 3.1 Model Description

CWT Shear models are currently available for base machines with operating weights from 11,000 lbs (5,000 kg) up to 40,000 lbs (15,000 kg). Each has its own range of cutting depths. Rotating models feature a rotate motor that hydraulically controls the stick body for 360 degree continuous rotation. This option allows the shear's jaw to be positioned to cut at virtually any angle.

CWT Shears are manufactured with a regenerative valve, allowing for decreased cycle times and increased efficiency. The logic valve design has been proven to be significantly more dependable than other system designs. CWT shears also feature high-strength, abrasion-resistant steel construction to assure long, uninterrupted service – even in the most severe conditions. The main pivot group of every model is manufactured for long life and pivots on uniquely designed over-size bearings.

These shears are designed to bring the material into the jaws where the shear force is greatest, making them the most efficient cutting tool. Mobile shears can cut a wide variety of materials including H-beams, I-beams, channel iron, pipe, round stock, steel plate, wire, rebar, and concrete. These dynamic shears are ideal for scrap processing, demolition work, road and bridge reconstruction, and jobs where torching is not practical or cost-effective. A wide selection of models and sizes are now being offered.

### 3.2 Features

- Patent tip that covers the entire tip reducing maintenance downtime
- Massive pivot group eliminates the need for an auto-guide system
- 360 degree continuous rotation on a turntable bearing
- Maximum cutting strength with minimal weight
- Optimum reach reduces machine movement and wear; which drastically increases safety
- Made with high-strength, abrasion-resistant steel for durability
- Factory upgrading and rebuilding services available for prolonged life
- Thinner, taller blades result in a stronger jaw structure
- Increased visibility with an integrated end cap and nut. Compact main shaft design



## 3.0 CWT Shear Basics

### 3.3 Shear Component Location Diagram - CS7

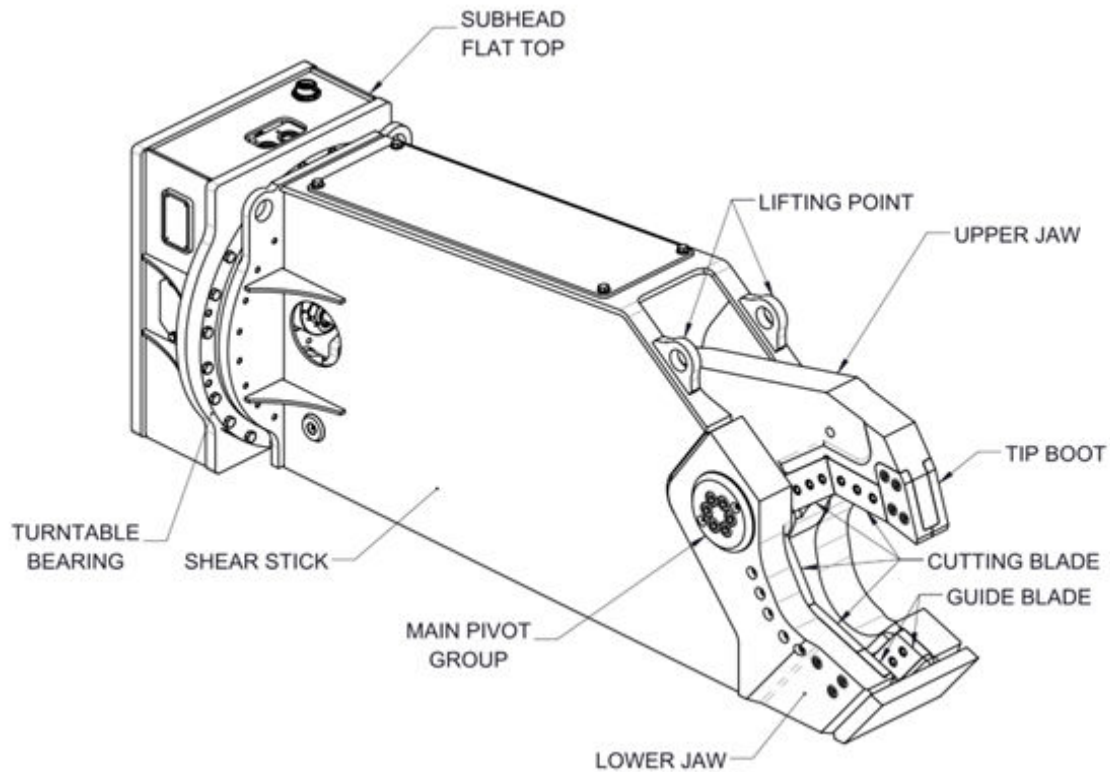


Fig. SB1 Component Location Diagram

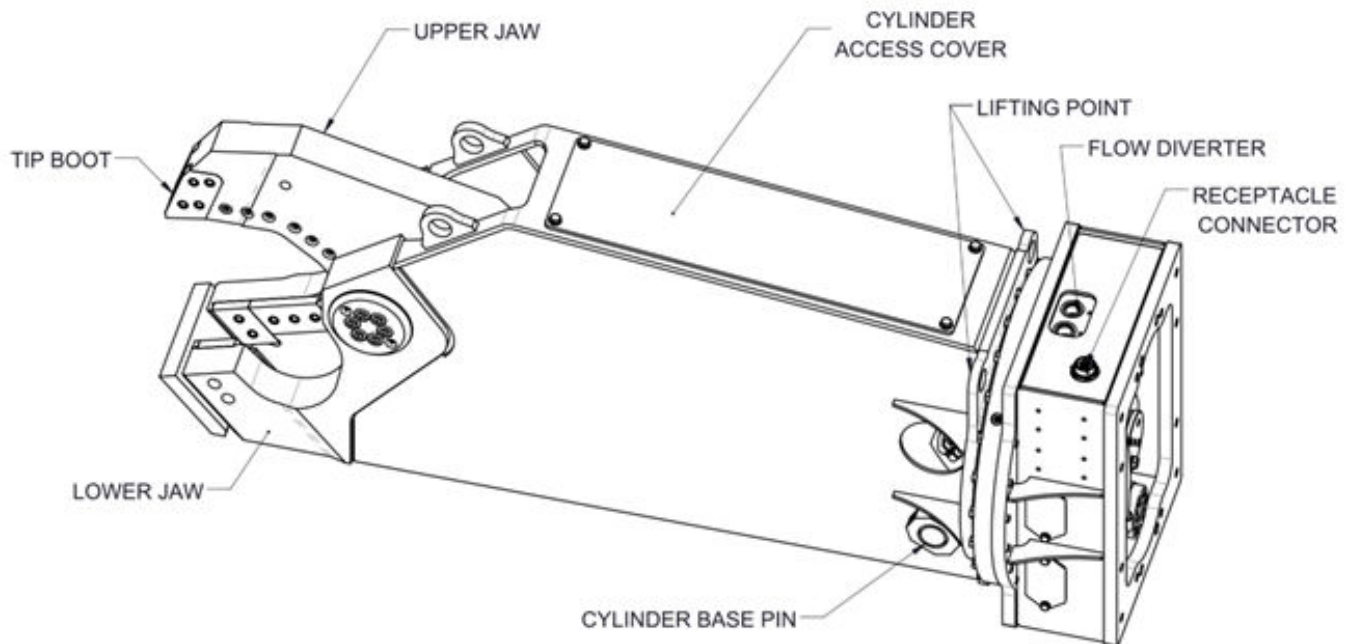


Fig. SB2 Component Location Diagram

## 3.0 CWT Shear Basics

### 3.3 Shear Component Location Diagram - CS7 with skid steer loader bracket

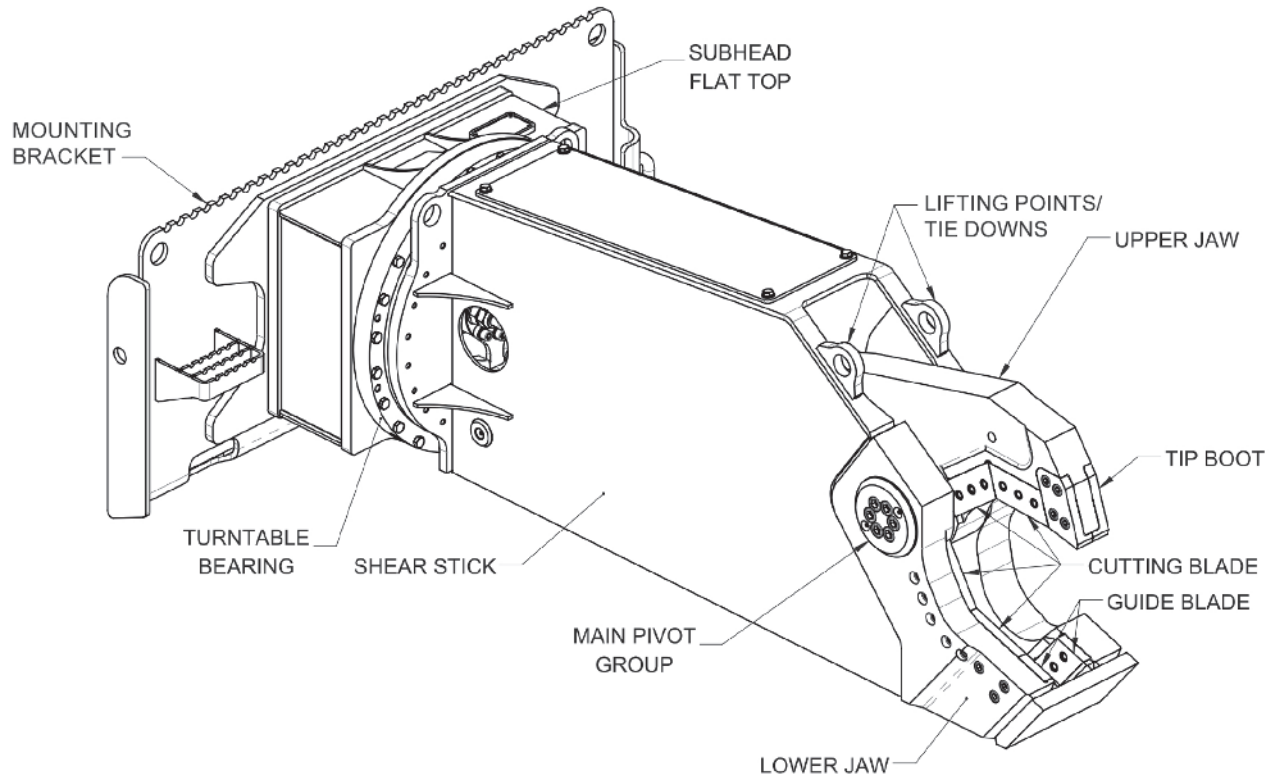


Fig. SB3 Component Location Diagram

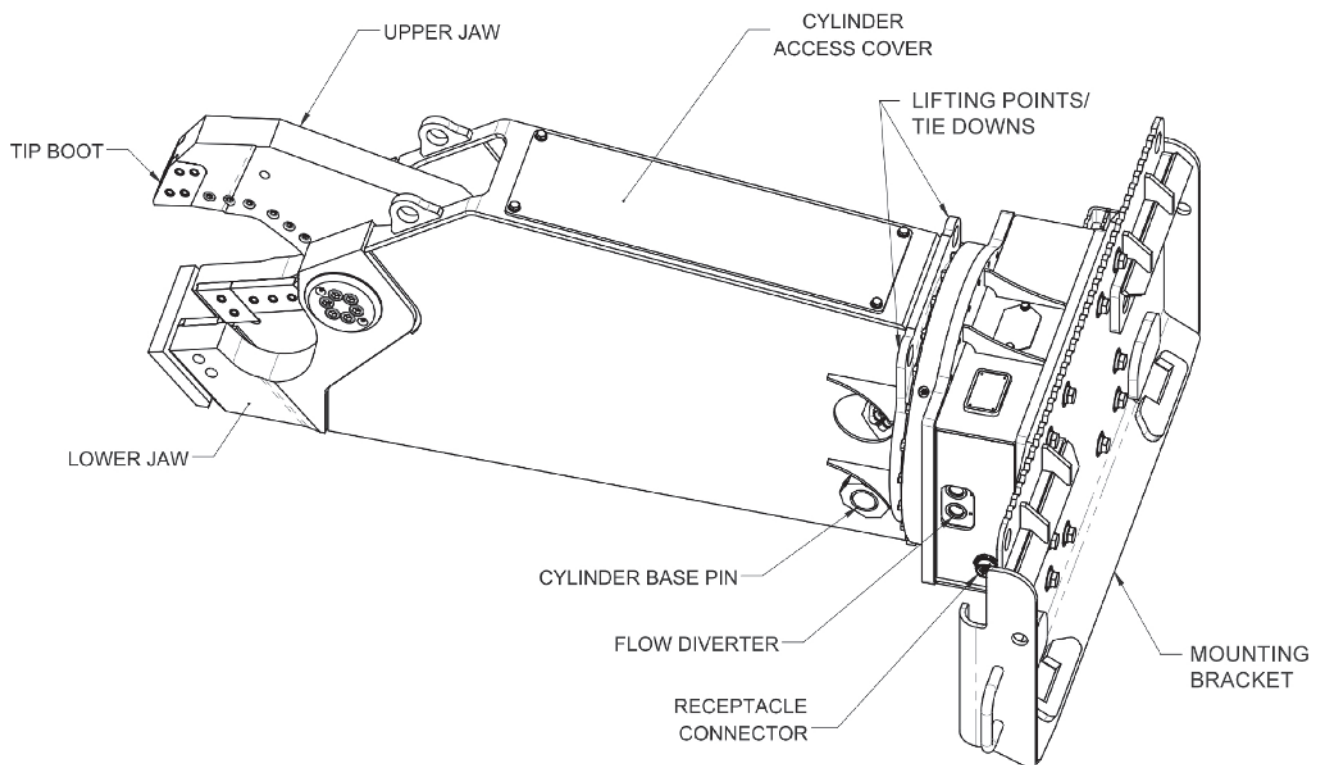


Fig. SB4 Component Location Diagram

## 3.0 CWT Shear Basics

### 3.3 Shear Component Location Diagram - CS15

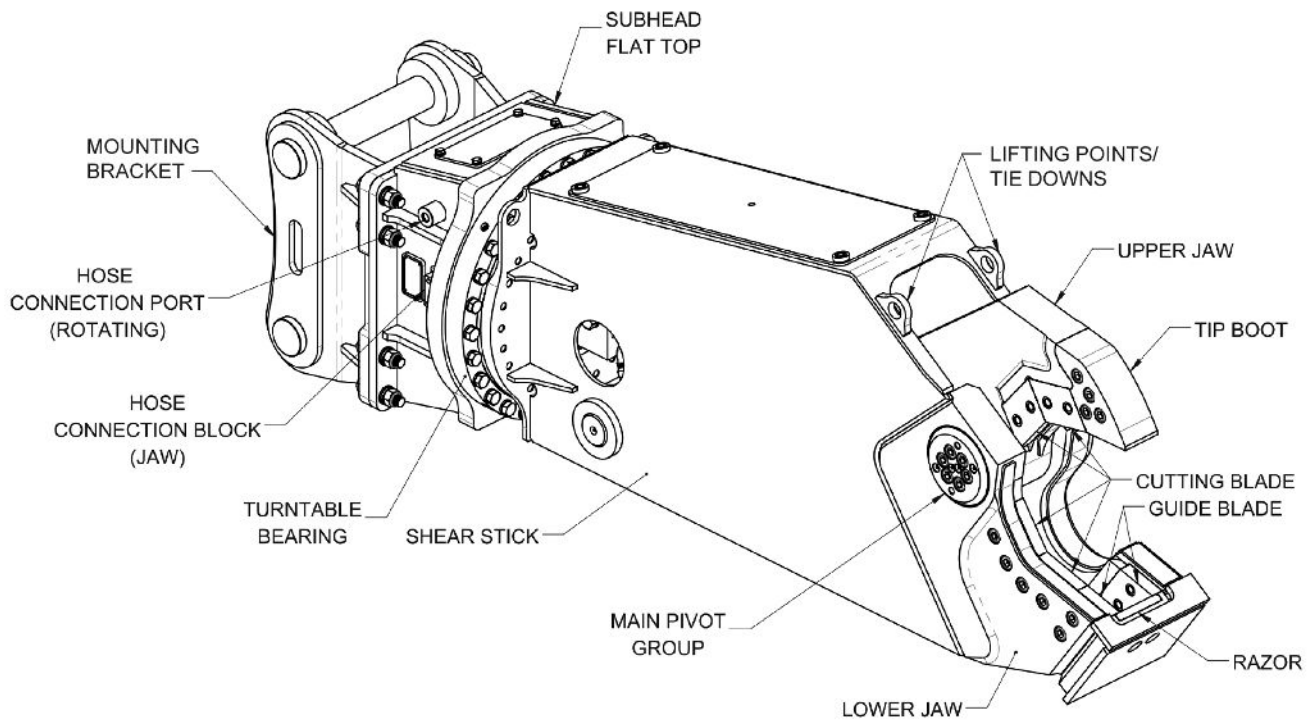


Fig. SB5 Component Location Diagram

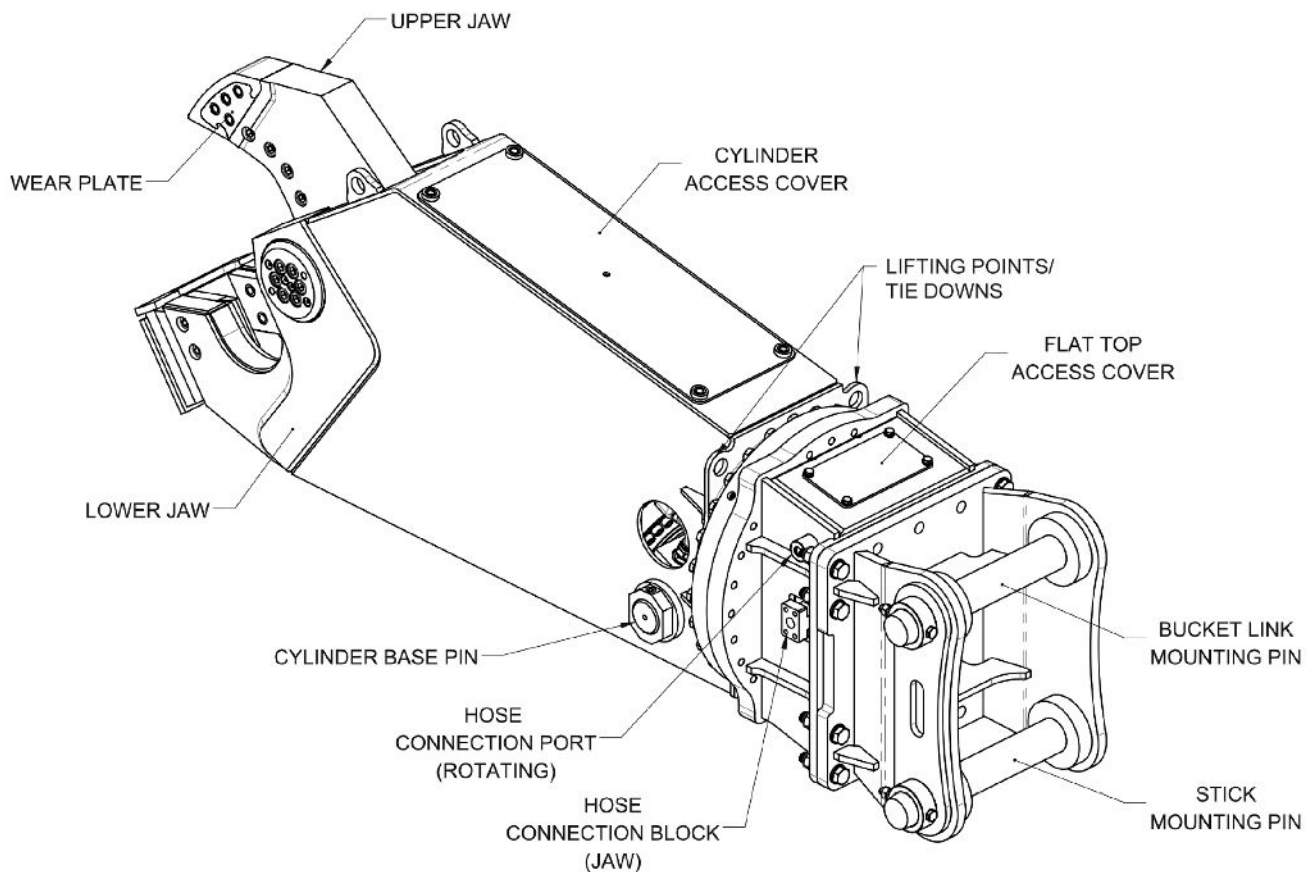


Fig. SB6 Component Location Diagram

## 3.0 CWT Shear Basics

### 3.4 Attachment Glossary

**Apex:** The point where the primary and secondary cutting blades come together.

**Blade Gap:** The gap between the upper and lower cutting blades as the blades bypass. A very important dimension that must be maintained regularly to prevent material from jamming in the blades.

**Blade Shims:** Thin metal shims used to adjust the position of the lower cutting blades to maintain a proper blade gap. Shims are installed between the adjustment plates and the blades.

**Boom Connection:** Part of the shear's sub-head mounting bracket that attaches to the excavator's boom tip.

**Build-Up:** Welding process where worn off parent material is replaced with new metal. A very important maintenance procedure that must be performed regularly throughout the life of the shear.

**Cutting Blades:** The blades in the upper and lower jaws that shear material as they bypass. The primary blades are those in the upper and lower jaws that are nearest to the shear throat. The secondary blades are those that are farthest from the shear throat.

**Cylinder Connection:** This connection point is where the mounting bracket attaches to the rod end of the excavator's stick cylinder. Part of the shear mounting bracket that articulates the tip-up function of the shear.

**End Cap:** Protects and adjusts the main pivot group of the shear. The end cap is a vital component to the adjustment of the main pivot group and must not be removed without consulting the Connect Work Tools Customer Service Department.

**End Cap Shims:** Thin, circular shims are used in the main pivot group of CWT Shears. End cap shims provide factory adjustment of the upper shear for close blade tolerance.

**Flow Control Valve:** A hydraulic component in a rotating shear's sub-head assembly that limits the flow of hydraulic oil to the rotation motor.

**Front Cylinder Pin:** The mounting pin that attaches the rod end of the cylinder to the upper jaw.

**Guide Blades:** A replaceable component located on both sides of the lower shear. The main purpose of the guide blades are to support the upper shear during the cutting cycle.

**Guide Blade Shims:** Thin metal shims used to adjust the guide blades out to maintain the proper guide blade gap. Shims come in a designated set that determines when the guide blades can be indexed or replaced.

**Guide Blade Gap:** The gap between the front wear plate and the guide blades as the upper jaw is cycled into the lower. This is an important maintenance item to ensure longevity of the shear's structure.

## 3.0 CWT Shear Basics

### 3.4 Attachment Glossary - *continued*

**Hard Surfacing:** Welding process for protecting the parent material by acting as a wear surface on the shear jaws.

**Lifting Points:** Small holes in the top and rear of the shear to be used when mounting or transporting the shear. These points must never be used for cable hanging the shear for cutting operations.

**Lower Jaw:** The stationary jaw of the shear which contains the lower cutting blades, guide blades, and razor.

**Main Pivot Bearing:** Hardened bushings that the main shaft of the shear rotates on during operation. There are two oversized main bearings installed on both sides of the main pivot group.

**Main Pivot Group:** High tolerance area of the shear that contains the main bearings, thrust washers, main shaft, end caps, and shims.

**Main Shaft:** The shaft on which the upper jaw pivots causing the shearing action of the attachment.

**Mounting Bracket:** The bracket welded to the rear of the sub-head that allows it to be attached to the excavator. The mounting bracket is pinned to the excavator boom tip and excavator stick cylinder.

**Port Block:** Hydraulic manifold mounted on both sides of the sub-head that direct the excavator's hydraulic flow to the shear cylinder.

**Rear Cylinder Pin:** Pin that connects the barrel end of the shear cylinder to the rear of the shear jaw.

**Regenerative Valve:** Hydraulic valve mounted to the shear cylinder which provides rapid advance during the closing phase of the shear cycle.

**Rotation Motor:** Hydraulic rotation component.

**Rotation Control Valve:** Valve used in the hydraulic rotation circuit to direct flow to the rotate motor.

**Shear Cylinder:** Hydraulic cylinder that powers the cutting action of the shear.

**Shear Stick:** The main body of the shear that includes the upper and lower jaw.

**Sub-Head:** The Sub-Head contains the rotation hydraulic system valves, manifolds and the hydraulic swivel, and attaches to the turntable bearing or the shear stick for non-rotating shears.

- **Flat Top Sub-head:** Sub-Head with a machined flat plate with a hole pattern for bolting a Mounting Bracket
- **3<sup>rd</sup> Member Sub-head:** Sub-head that is designed to pin to the tip of the excavator stick

**Swivel Manifold:** Allows continuous hydraulic flow to the shear cylinder during rotation of shear without twisting or binding the hydraulic hoses.



## 3.0 CWT Shear Basics

### 3.4 Attachment Glossary - *continued*

**Throat:** Area where the upper and lower jaws meet during operation. The throat area is the optimum area for shearing material. The shear is most powerful on the primary blades nearest the pivot point.

**Turntable Bearing:** Rotary gear bearing mounted to the shear stick and is driven by a planetary gearbox. This bearing is commonly referred to a slewing ring.

**Upper Jaw:** Movable jaw of the shear that contains cutting blades. The shear cylinder articulates the upper shear into the lower shear to perform the cutting action of the shear.

**Wear Parts:** Consists of the cutting blades, guide blade, razor and wear guard. These parts can be easily replaced to refresh the wear areas of the shear jaws.

### 3.5 Serial Number Tag

CONNECT <sup>TM</sup> WORK TOOLS				
Serial Number:				
Model Number:				
Weight:		kg	lb	
Open/ Close	Pressure:	bar	psi	
	Flow:	l/min	gpm	
Rotate	Pressure:	bar	psi	
	Flow:	l/min	gpm	

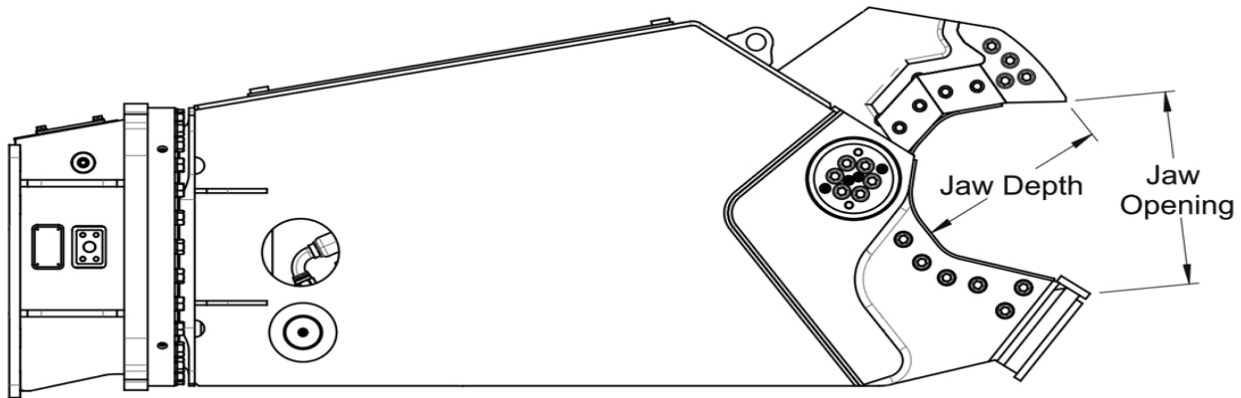
Fig. SB6 Serial Decal



## 3.0 CWT Shear Basics

### 3.6 Shear Specifications

Shear Specifications										
Model	Minimum Excavator Stick Mount		Minimum Skid Steer Loader		Attachment Weight		Jaw Opening		Jaw Depth	
	lbs	kg	lbs	kg	lbs	kg	inch	mm	inch	mm
CS7 with SSL Bracket	15,432	7,000	6,614	3,000	1,704	773	11.6	295.5	12.6	319.5
CS7 Flat Top	15,432	7,000	6,614	3,000	1,448	657	11.6	295.5	12.6	319.5
CS15 with Bracket	26,455	12,000	X	X	3,860	1,751	16.1	459.0	16.1	408.6
CS15 Flat Top	26,455	12,000	X	X	3,279	1,487	16.1	459.0	16.1	408.6



### 3.6 Shear Specifications - continued

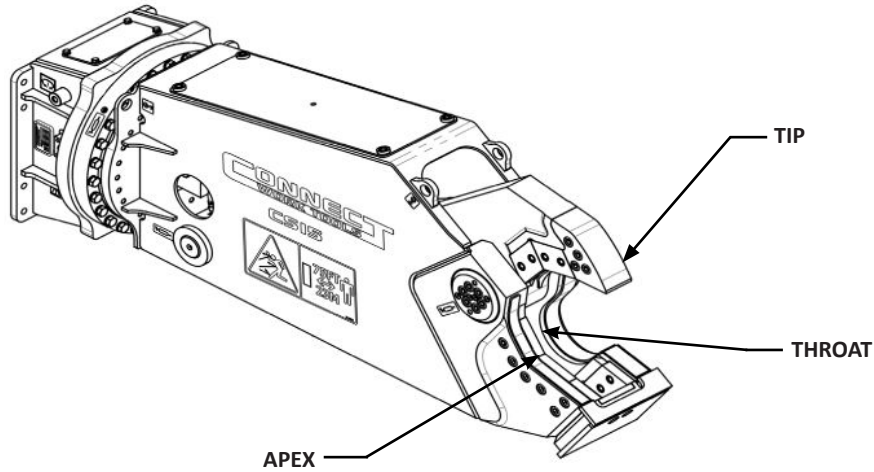
Cycle Time in Seconds (Full cycle from open to full close back to full open)

Cycle Time in Seconds					
LPM	38	76	114	151	189
GPM (US)	10	20	30	40	50
CS7	9.7	4.8	3.2	2.4	1.9
CS15	17.7	8.8	5.9	4.4	3.5

*3% efficiency loss applied  
These cycle times assume correct installation of  
lines and valves.*

## 3.0 CWT Shear Basics

### 3.7 Cutting Force



### Cutting Forces

Model	Throat - (Ton)	Apex - (Ton)	Tip - (Ton)
CS7 W/ BRKT	155	66	35
CS7 FLAT TOP	155	66	35
CS15 W/ BRKT	228	131	66
CS15 FLAT TOP	228	131	66

Model	Throat - (Metric Ton)	Apex - (Metric Ton)	Tip - (Metric Ton)
CS7 W/ BRKT	140	60	32
CS7 FLAT TOP	140	60	32
CS15 W/ BRKT	207	119	60
CS15 FLAT TOP	207	119	60

Maximum System Pressure: CS7 - 4300 psi (30 MPa)

CS15 - 5000 psi (34.4 MPa)

### 3.8 Rotation Chart

Rotation Chart				
Model Rotation	Flow	Setting	Pressure	Rotation Speed
CS7	GPM	4	1450 psi (10MPa) or Recommended Max. 2000 psi (14MPa)	12 RPM/5 SEC
	LPM	15		
CS15	GPM	5	1450 psi (10MPa) or Recommended Max. 3000 psi (14MPa)	12 RPM/5 SEC
	LPM	20		



# CS Series Shear

*Lifting and Transporting Information*  
*Hydraulic control and Pressure requirements*  
*CWT Shear Start-up Procedure*  
*CWT Shear Storage*

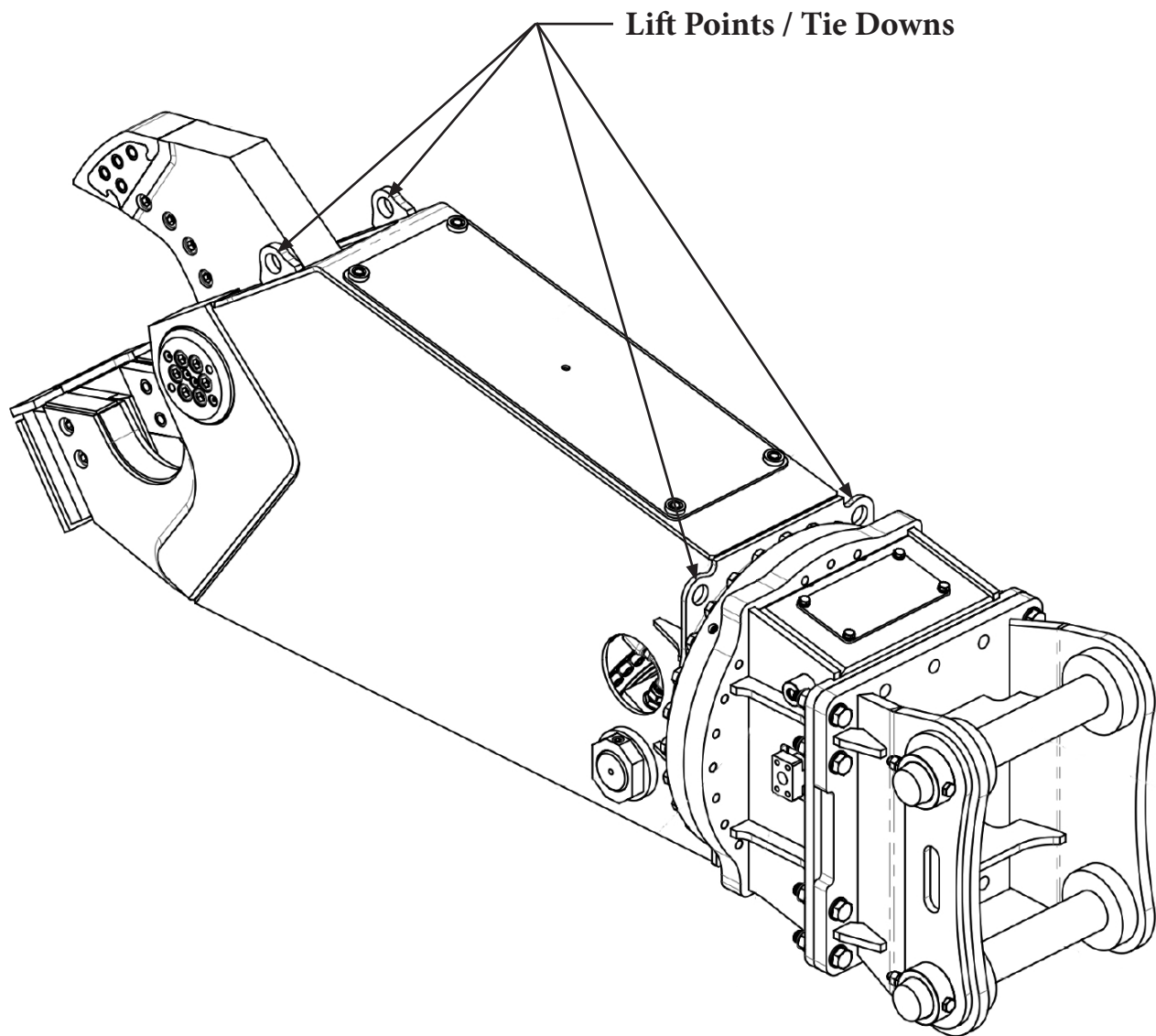
## Installation of Shear

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## 4.0 CWT Shear Installation

### 4.0 Lifting and Transporting Information

Use shackles in all four (4) points with appropriately rated straps or chains to lift the shear. See chart for weight and center of gravity.



## 4.0 CWT Shear Installation

### 4.1 Lifting and Transporting Information

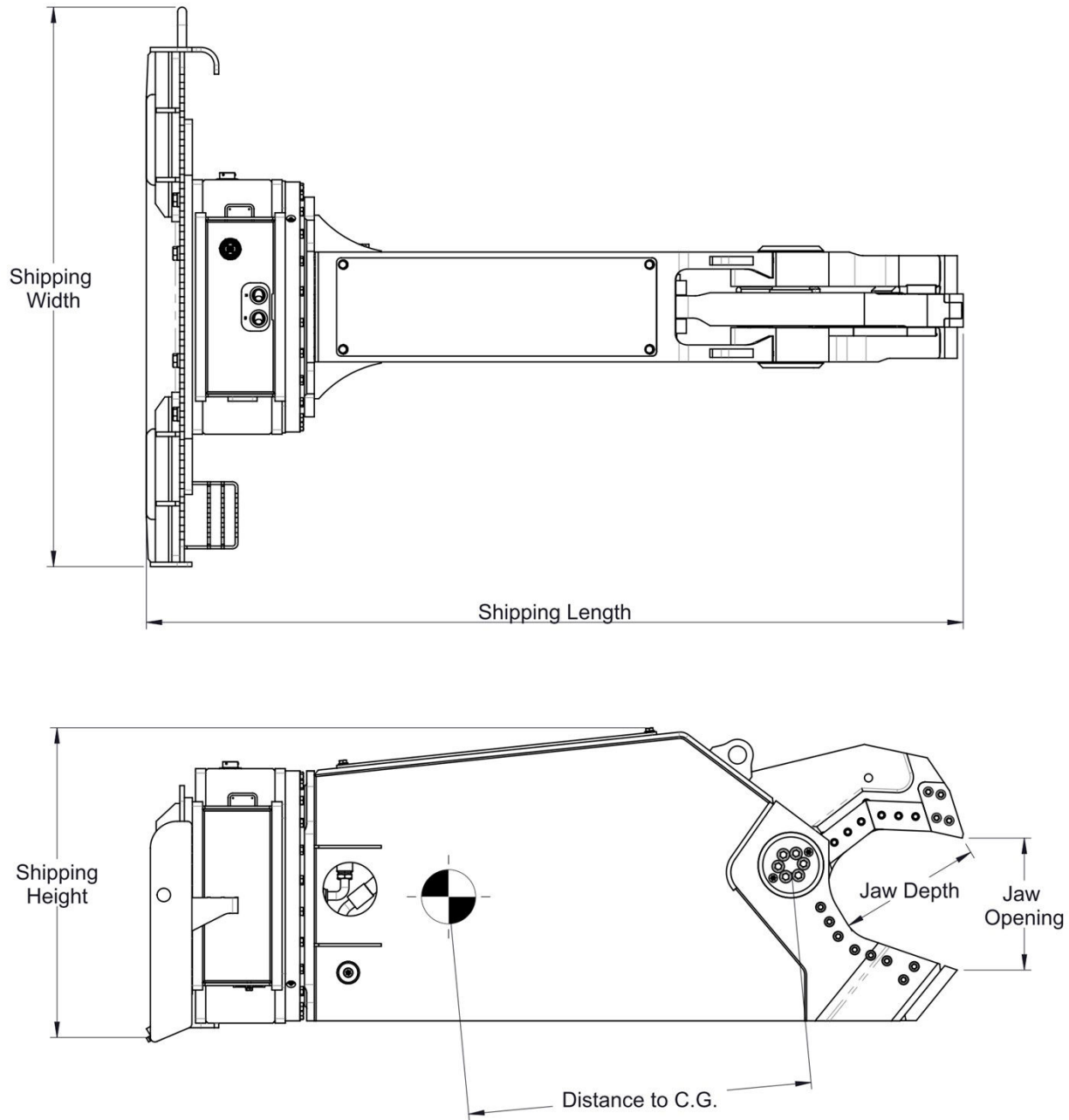


Fig. SI1 Tie Down/Lift Points

## 4.0 CWT Shear Installation

### 4.1 Lifting and Transporting Information - continued

#### Shipping Dimensions

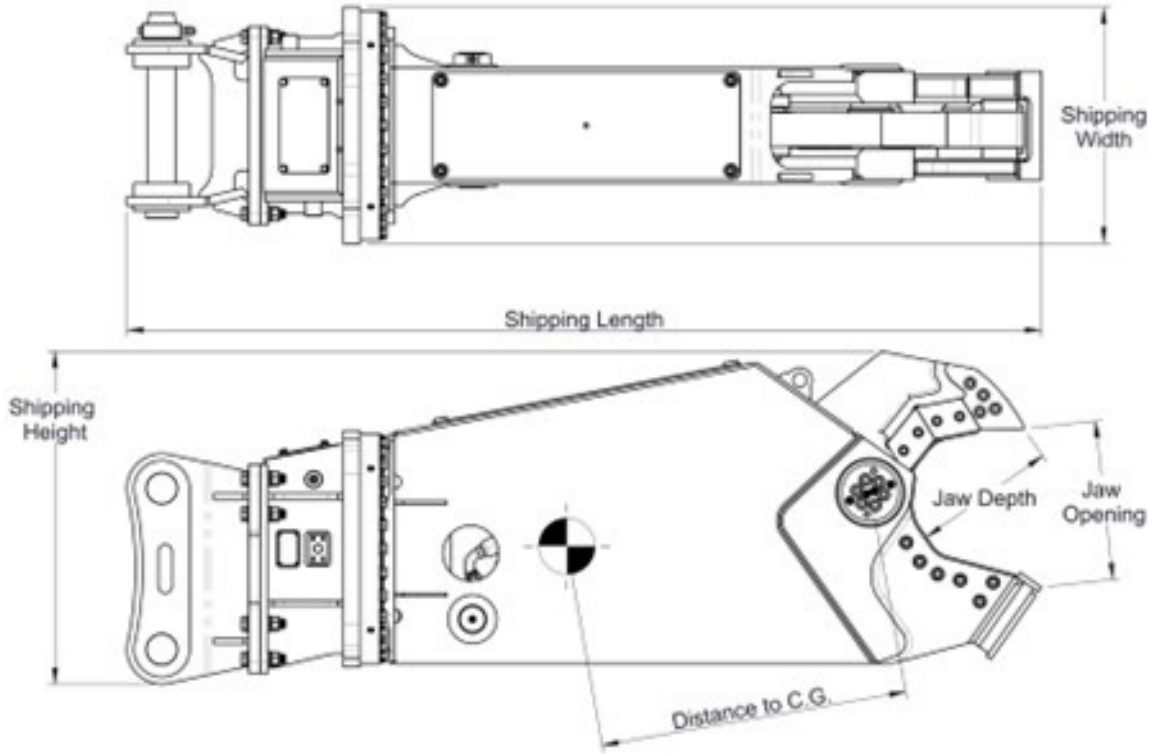


Fig. SI2 Shipping Dimensions

### Shipping Information

	Shear Weight		Distance to C. G.		Length		Width		Height	
	lbs	kg	Inch	mm	Inch	mm	Inch	mm	Inch	mm
<b>CS7 with SSL Bracket</b>	1,700	770	27.4	697	72.0	1829	49.3	1253	27.3	694
<b>CS7 Flat Top</b>	1,450	660	22.8	578	68.0	1726	23.1	586	25.9	659
<b>CS15 with Bracket</b>	3,860	1,750	34.9	887	103.6	2631	26.8	680	37.7	959
<b>CS15 Flat Top</b>	3,280	1,490	27.6	702	88.5	2248	26.8	680	36.5	927

Listed weight is for typical brackets, weight varies by configuration.



## 4.0 CWT Shear Installation

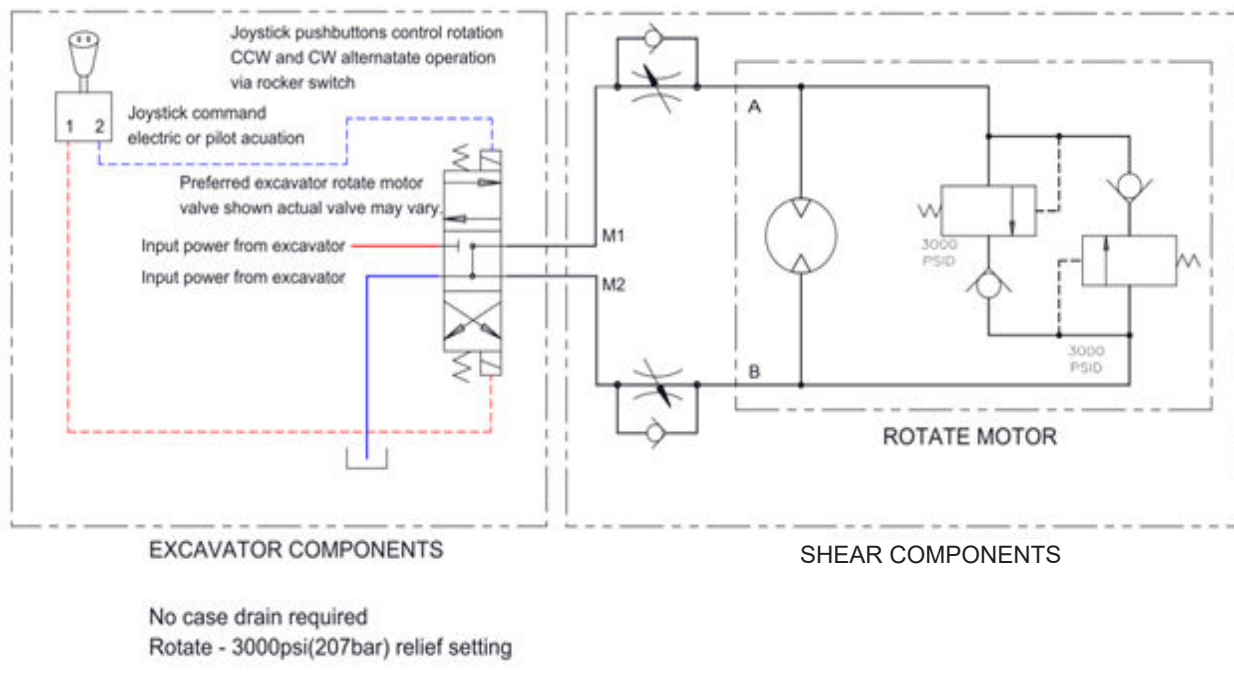
### 4.2 Hydraulic Control and Pressure Requirements

**Rotation Circuit:** See chart from Section 3.6 for flow and pressure range for CS15 and smaller shears.

**Shear open and close:** Set to maximum excavator operating pressure: CS7 - 4300 psi (30 MPa)

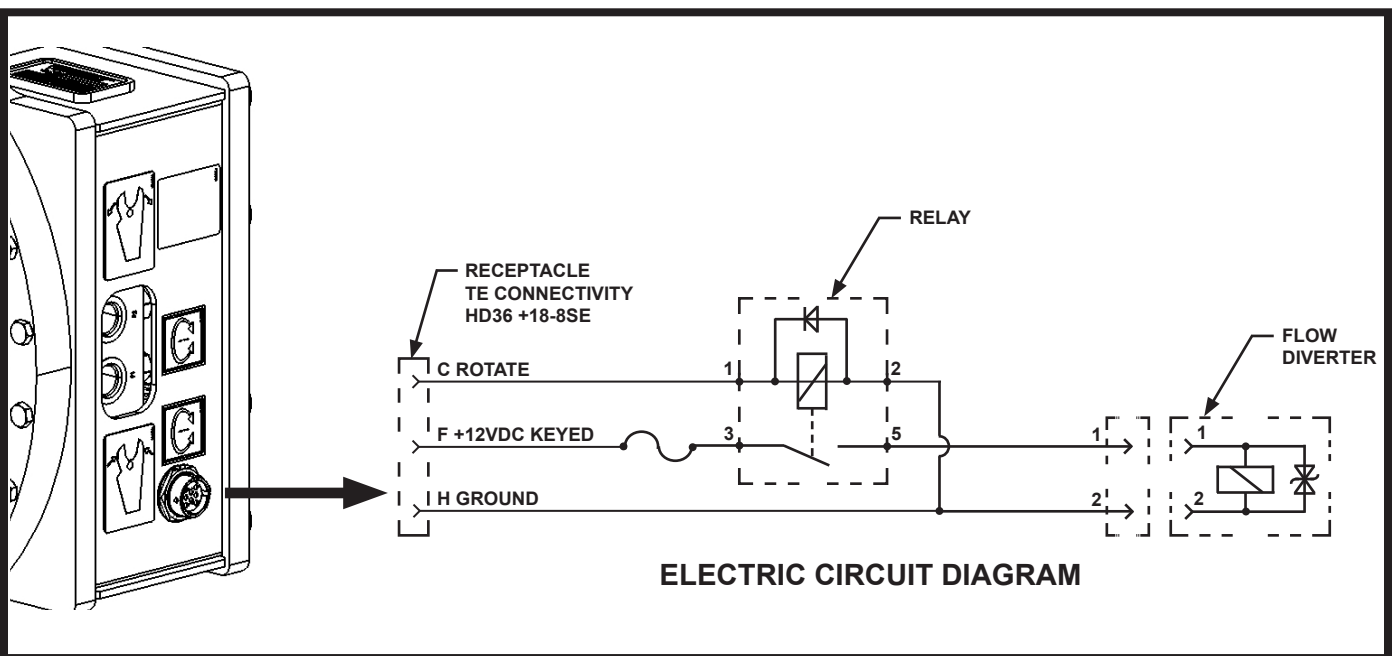
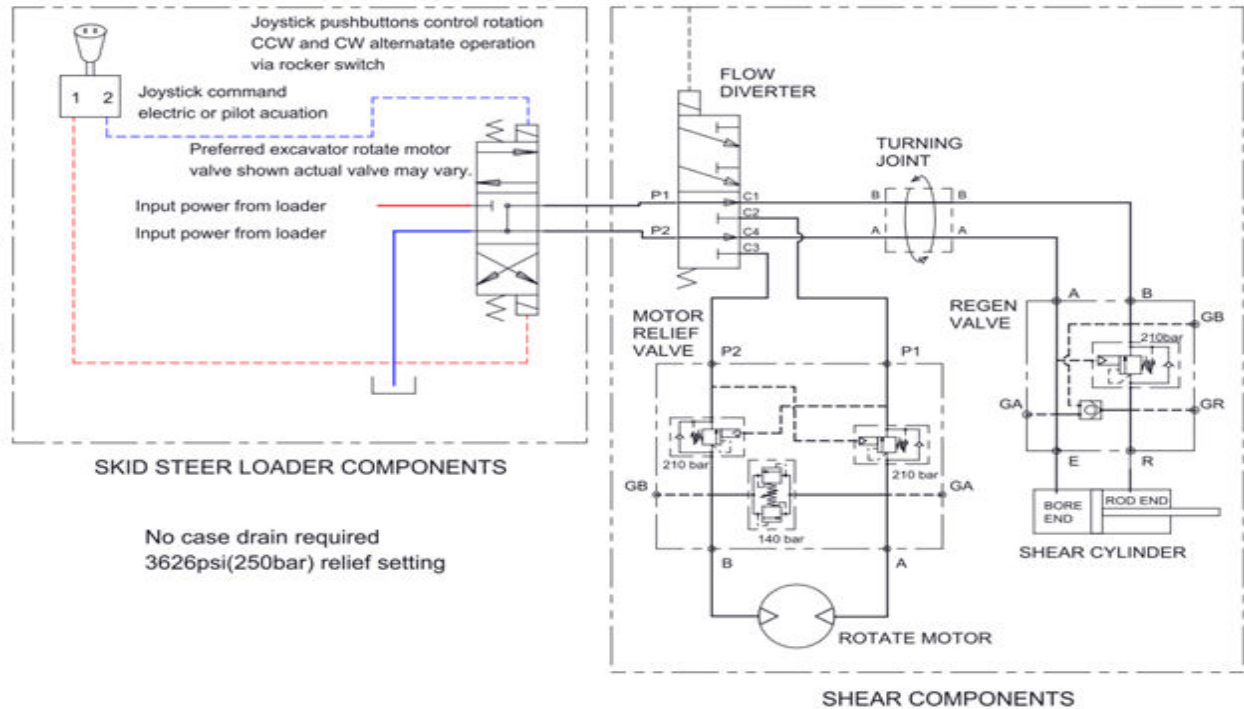
CS15 - 5000 psi (34.4 MPa)

Minimum Recommended Line Size			
Excavator Pump Flow Up To		Cylinder Bore (CLOSE)	Cylinder Rod (OPEN)
GPM	LPM	1st Line Size	1st Line Size
15	57	1/2 (-08)	1/2 (-08)
40	151	3/4 (-12)	3/4 (-12)
72	273	1.0 (-16)	1.0 (-16)



## 4.0 CWT Shear Installation

CS7 TYPICAL SET UP FOR SKID STEER OR EXCAVATOR WITH ELECTRIC ROTATE SIGNAL



## 4.0 CWT Shear Installation

### 4.3 CWT Shear Start-up Procedure

Prior to the operation of the shear, bleed any air out of the cylinder. Trapped air in the system causes cavitation, oxidation of the oil, and excessive heat. These conditions lead to hydraulic oil break down, contamination, noise, sluggish operation, reduced component life and potential cylinder damage. This procedure will need to be completed for each of the following: upon installation, after hydraulic repairs have been made, or when a shear has been stored or idle for an extended period of time.

#### WITH CYLINDER FULLY RETRACTED

1. Place the excavator at idle speed or slightly above idle speed.
2. Slowly open and close the shear partially (approximately  $\frac{1}{4}$  travel in each direction) to start filling the rod and bore ends of the cylinder, repeat this partial movement 5 times in each direction gradually increasing the travel range with each cycle. **DO NOT** move the shear to full open or full close until the rod and bore or the cylinder are partially filled with oil.
3. Slowly open and close the shear fully to finish filling the rod and bore ends of the cylinder, repeat this partial movement 5 times in each direction. **DO NOT** hold the shear in full open or full close to build pressure until the rod and bore or the cylinder are fully filled with oil.
4. Slowly open and close the shear fully building to full pressure at each end of the stroke. Pay attention for unusual noises and check for any hydraulic leaks.

### 4.4 CWT Shear Storage

1. Using wood blocking, block your CWT Shear up off the ground.
2. Grease the pins and machined bores of the mounting bracket of the shear. Apply a generous layer of grease to the shear blades, cylinder rod and all other exposed unpainted surfaces.
3. Cover your CWT Shear with a heavy duty cover and place in an enclosed building or storage unit.



# CS Series Shear

*Before You Start*  
*General Instruction for Operation*  
*CWT Shear Controls*  
*Operating the Rotator*  
*Understanding Your CWT Shears*  
*Productive and Efficient CWT Shear Operation*  
*Operational Concerns*  
*Getting the Most Out of Your CWT Shear*

## Shear Operation

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## 5.0 CWT Shear Operation

### 5.1 Before You Start

#### UNDERSTAND YOUR SAFETY PROGRAM & GUIDELINES



1. Read and comprehend the safety section of this manual and the base machine's safety manual.
2. Know your employer's safety regulations for your job. Inquire with your foreman on specific instructions and safety equipment required.
3. Familiarize yourself with the traffic rules at the work site.
4. Know which hand signals are used on the job and who is responsible for signaling you.  
Take signals from only **ONE** person to avoid confusion.

#### UNDERSTAND YOUR EQUIPMENT

1. Learn the location and purpose of all controls. Ensure proper operation of all controls. If any malfunctions are encountered, shut down the machine, report the malfunction to your supervisor, and lock out the machine from operation.
2. Be familiar with each safety device on the machine, including indicators, warning devices and caution instructions. They will alert you to hazardous conditions that may prevent operating further.



3. **ALWAYS** wear proper protective clothing including, but not limited to: hard hat, safety shoes, ear protectors, reflective clothing, safety goggles and proper work gloves.
4. Recognize any work area clearances.

#### GETTING STARTED

1. Ensure all safe viewing distance decals are installed and legible; contact CWT for replacements as needed.
2. Have a DAILY Safety Conversation with all those on the job site. Discuss any out-of-the ordinary work that may be planned for the day. Remind them of the required safe working distance.
3. Each day before starting, visually inspect the machine by walking around it entirely. Verify work site footing has sufficient strength to firmly support the machine and all components.
4. Clear the work area. **ALWAYS** look out for other workers. In any work area, people become a serious safety hazard. Before operating, walk completely around the machine to be sure there are no other workers next to, under or on the machine. Warn nearby workers that you are starting up; **DO NOT** start up until they are at a safe working distance.
5. Once started, keep bystanders clear of the machine. Keep them in sight especially when moving the boom, swinging the upper structure, or traveling. **ALWAYS** be alert for bystanders in or near the operating area.



## 5.0 CWT Shear Operation

### 5.2 General Instructions for Operation



1. Read the Operator's and Safety Manual for the base machine on which the shear is mounted.
2. **KNOW** the capacity of the excavator and its attachments. Overloading the machine could result in serious injury. The new attachment may have modified the base machine's lift capabilities.
3. It is mandatory that a Falling Object Protection Structure (FOPS) be installed surrounding the excavator cab for all material handling applications.
4. The shear is strictly for processing materials. **DO NOT** use the attachment for unapproved purposes or warranty may be voided.
5. **DO NOT** continuously process oversized materials by forcing them into the shear throat with the downward force of the excavator. This practice is detrimental to the life of the shear and is strongly discouraged.
6. Should your CWT shear stall during processing, reduce the amount of material being processed at one time. Continuously overloading the shear and cycling the excavator to full system pressure can cause the unit to overheat and can simultaneously have adverse effects on the shear and the excavator's hydraulic system.
7. Occasionally, cycle the shear cylinder completely during processing. Fully opening and closing the shear allows additional hydraulic fluid to circulate through the system, this process prevents overheating.
8. Inspect, lubricate and maintain your CWT Shear daily. Tighten any loose bolts or fittings to the proper torque as specified in this manual.
9. Maintain a safe distance from the material. Avoid contact between the excavator and the shear or any material held by the shear jaws.
10. **NEVER** leave your CWT Shear suspended in the air or pass it over people, occupied vehicles, or buildings.
11. When working in confined spaces, be aware of exposed parts, such as cylinder rods and hoses, to avoid damage.
12. Maintain at least 15 feet (5m) between your CWT Shear and any nearby power lines.
13. **ALWAYS** lower your CWT Shear to the ground and turn off the base machine when leaving the machine unattended.
14. **DO NOT** close your CWT Shear on a structure and reverse the excavator in an attempt to pull material down. This is not only dangerous, but will likely cause damage to the excavator and shear.
15. Avoid collision of the boom or shear, especially when working with limited visibility or inside buildings. Recognize the height and reach of your CWT Shear during operation, transport, and when swinging the excavator.
16. **DO NOT** use your CWT Shear as a wrecking ball or a jackhammer.
17. **DO NOT** alter factory hydraulics presets of your CWT Shear or vary from the excavator manufacturer specifications. This will void the warranty.
18. **DO NOT** shear high tensile steel (i.e. axles, railroad rail, spring steel and some types of wire) as blade and upper damage will result. This type of material shatters when processed and can become a projectile which could result in injury or death.
19. **DO NOT** attempt to shear material stuck through the lower jaw.
20. Before shearing thinner material, make sure that the shear blades are sharp and properly adjusted. Failure to do so could cause material to become jammed in the shear blades.
21. The shear rotation function is for positioning only. **DO NOT** use it for bending or prying.
22. **DO NOT** use the force of the excavator to force the shear into a pile.
23. **DO NOT** utilize excavator force or weight at either end of the upper shear in an attempt to unjam the shear or to sever materials that are too large for the shear.

## 5.0 CWT Shear Operation

### 5.3 CWT Shear Controls

There are four core movements of your CWT Shear, stick in, stick out, shear open, shear close, plus one additional movement for rotating the shear when equipped with the rotation circuit. CWT Shear controls will vary slightly depending on the type of base machine it is installed on. The shear open/close and rotation systems are customized to each machine. Before operation, review your CWT Shear operations with the installation technician.



***Determine the control for each movement of your CWT Shear before attempting to operate. Practice machine movements as described in Getting the Feel of the Shear instructions in this section.***

### 5.4 Operating the Rotator

The rotator allows the shear 360° of continuous rotation in both directions for accurate processing at all angles. The rotator's function is solely to position the shear, it is not to be used as a means of bending, twisting, or breaking material.



***DO NOT use the shear rotator for any other purpose except to position the shear for a cut. Using the rotator for any other purpose, such as bending or twisting material, will damage the rotation components and may void the shear warranty.***

### 5.5 Back-Driving the Rotator

Back driving occurs when an excessive, off-center force is applied to the shear. Examples of this are closing the jaws on a rigid material without the jaws being square to the material or handling a heavy load off-center in the jaws. Back driving puts unnecessary stress on the rotation system and, if done continually, can lead to rotation component issues. Follow the tips below to minimize back driving as much as possible.

1. When handling a load in the jaws, try to grip it as close to its center of gravity as possible.
2. When processing long suspended material, make several shorter cuts rather than one long cut where the material can come loose and back drive the rotator.
3. When processing any rigid material, use the rotator to square the jaws to perform the cut. If the jaws are not square, the rotator will back drive to adjust to the cut.

## 5.0 CWT Shear Operation

### 5.6 Understanding Your CWT Shear

Before starting the first job with a new machine, it is recommended that the operator locate an open spot on firm, level ground that is free of obstructions. Once the machine is moved to the selected area, the operator should dedicate time to familiarize his/herself with the “operating feel” of the machine and the CWT Shear. This machine is extremely powerful and safety controls should be considered when preparing to operate it. Ensure safe operation by inspecting the machine as stated in the Getting Started section. Read and understand this manual.

The control levers should be moved in a gradual, deliberate way rather than with jerky, abrupt movements. Erratic operation can cause damage and early wear to various parts on the machine, and can also overheat the hydraulic system. For example, as each control lever is moved forward or backward from the center, or neutral position, the oil flows to the cylinder or motor controlling a function. The component (boom or attachment) starts to move. The component moves faster as the control lever is moved further forward or backward. Holding the lever in the forward or backward position will hold that movement at a given rate of speed. To slow the movement down, gradually move the lever toward the neutral position. Movement is ceased at the neutral position. The position is maintained until the control lever is moved again. Feathering the controls is a technique that will increase output and make operating your CWT Shear easier. When starting any motion of the machine, move the control slightly from neutral until it starts to move, then smoothly move the control to increase motion to desired speed. Repeat the process when stopping a motion.

### 5.7 Productive & Efficient Operation

Operators should become accustomed to performing work in the most proficient manner possible. Keep the surfaces of the shear chin plate and the upper jaw free of dirt as much as possible. Dirt is much more abrasive than steel and needlessly increases build-up and hard surfacing time and intervals.

Ensure you have enough room to maintain a safe distance from other personnel and machines. Material should be picked from a pile, swung to the side and cut in a new area. This process prevents redundant cutting of the same pieces and allows for the newly prepared material to be loaded out with another material handling machine.

Material processing areas should be positioned as close as safely possible to the location for loading materials for transportation. Less time dedicated to processing, loading, and transporting materials greatly affects operational costs and productivity and dramatically reduces man hours, fuel costs and equipment wear.

Operators should develop the skill of assessing material to be processed and visualizing a starting and finishing point using the fewest cuts possible. Excessive moving, positioning and handling material costs time and money. Bringing the jaws to full open, when only partial jaw open is needed for a cut wastes time and fuel and slows other excavator functions as well as causes needless wear to hydraulic components, hoses and O-rings. More efficient processing will extend the life of your CWT Shear.



***Blind piercing is not advised. Know what material you are cutting.***

## 5.0 CWT Shear Operation

### 5.8 Operational Concerns

#### *Shear stalls just before cutting heavy material:*

Place the material in an open area of the prepared pile. Open the shear and position the jaw so it is square with the material and as deep in the throat as possible. Close the jaw as rapidly as possible utilizing the regeneration, the speed will assist in the start of the cut.

#### *Shear chatters during cutting:*

Chattering happens when material is jamming in the shear, this can be at the piercing tip, or at the cutting blades. This is an indicator that blade maintenance should be performed. Check all aspects of blades, starting with the blade gaps.

### 5.9 Getting the Most Out of Your CWT Shear

- With new blades, cut thinner material first, then as the blades wear, change over to heavier material.
- The life and quality of the blades fluctuates significantly due to the materials being processed. The general range of service for blades and replaceable tips is 40-150 hours per edge.
- The life of the shear and blade components relies heavily on the proper torque of the CWT Shear blade bolts. Using the proper torque specifications in this manual will help avoid loose blades which can ultimately damage the blade seats. **Torque daily.**
- Avoid placing the tip of the shear into the processing pile - only pierce when absolutely necessary.
- The CWT Shear is not designed to become a battering ram, it is a precision tool and should be treated and maintained as it was intended.
- Operating on worn out blades requires significantly more cutting force of "good" blade edges. It places undue stress on the upper jaw, the pivot group and the entire shear as a whole. Worn out blades increases the possibility for jammed material between the blades.

#### Required items and personnel:

- A welder
- Feeler gauges
- Torque wrench & multiplier
- High torque sockets & Allen drivers
- Grease gun



# CS Series Shear

*Maintenance Safety Procedure*  
*General Maintenance Instructions*  
*Recommended Spare Parts List*  
*Maintenance Schedule*  
*Gearbox Lubrication & Maintenance*  
*8-Hour Service & Inspection Checklist*  
*80-Hour Service & Inspection Checklist*  
*Lubrication Diagram*  
*Bolt Torque Guidelines*

## Shear General Maintenance

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## 6.0 CWT Shear General Maintenance

### 6.1 Maintenance Safety Procedures

- Inspect and maintain your CWT Shear daily. **DO NOT** operate a neglected or damaged shear, this could result in major structural damage.
- **ALWAYS** lower your CWT Shear to ground level before leaving the cab. If it is necessary to perform maintenance on the CWT Shear at higher elevations, secure & support the base machine and shear. **DO NOT** rely on the cylinder to hold the shear in the air. The shear will drop if a control is moved or hydraulic pressure is otherwise released. **DO NOT** work under a machine that is supported solely by a jack.
- **NEVER** operate the machine under unsafe conditions. Lock the machine out and attach a “DO NOT OPERATE” tag to the key.
- If multiple people are working on a machine, each must be familiar with the controls and must be aware of the maintenance the others are performing. Before working on a machine, **BE SURE TO LOCK OUT AND TAG THE CONTROLS SO NO ONE HAS THE POTENTIAL TO START IT.**
- **ALWAYS** utilize two people when performing checks with the engine running.
- Keep hands and extremities away from moving parts. **NEVER** lubricate or work on a machine while it is in motion.



- **ALWAYS** wear proper personal protective equipment when maintaining your CWT Shear. This includes, but is not limited to: hard hat, safety glasses with side shields, steel toe shoes, gloves, and hearing protection.

### 6.2 General Maintenance Instructions



1. Ensure all maintenance personnel read and understand all maintenance procedures before starting machine.
2. Use only factory approved parts. Failure to do so may cause damage or unnecessary downtime and could void the warranty.
3. Lubricate the attachment every eight hours; refer to the lubrication schedule as outlined in this manual.
4. Use the CWT Shear Inspection Checklists included in this manual to ensure all maintenance is complete.
5. If operating in extremely cold temperatures, use your CWT Shear on lighter materials first and work up to heavier materials.
6. Rotate the CWT Shear blades to achieve maximum life out of all four edges.
7. **DO NOT** disassemble or work on the pivot group without first consulting the Connect Work Tools Customer Service Department.
8. The adjustment plates behind the blades of your shear are custom machined specifically for your attachment, should they become damaged, please contact your Connect Work Tools Service Department for replacements.
9. When welding on the shear, **ALWAYS** guarantee you have a ground cable connected to the attachment component being welded on. **NEVER** allow a current to travel through the hydraulic cylinder, the pivot group or the rotation group.



## 6.0 CWT Shear General Maintenance

### 6.2 General Maintenance Instructions - *continued*

10. **DO NOT** weld the shear's guide blades, and/or the other blades, into their blade seats. Proper adjustments are made to your CWT Shear using these guide blades. **DO NOT** allow excessive gaps.
11. **DO NOT** hard surface or weld across the jaw in any high stress locations. **DO NOT** exceed more than two passes of hard surface rod when hard surfacing.
12. **DO NOT** perform any welding on the excavator without first contacting the manufacturer for proper instructions.
13. Replace or rotate the blades when edges have rounded to approximately 1/4" (6mm) radius.
14. Torque bolted connections as prescribed in this manual.
15. Hydraulic system pressure **MUST BE** relieved before any hydraulic components are disconnected.
16. Should upper jaw become jammed, **DO NOT** utilize the weight of the excavator on the shear to free it.
17. **DO NOT** allow hot hydraulic oil to contact skin as it could result in severe burns.

### NOTICE

*CWT recommends that the shear cylinder and swivel seals be replaced every 3,000 hours. Internal damage to the cylinder can occur when the shear is operated with worn-out seals. Shear performance will decrease if this happens. It is recommended that this work be performed by an authorized Connect Work Tools technician.*

*Connect Work Tools recommends a Premium No. 2EP grease.*

### 6.3 Recommended Spare Parts List

Original equipment parts are inspected to CWT standards for proper fit and function; however, by stocking spare parts for your CWT Shear, you maintain the following benefits:

1. Eliminates overnight freight costs.
2. Stocked spare parts assures proper maintenance will be performed, increasing the efficiency of the shear.
3. Reduces downtime for maintenance.
4. Eliminates the possibility of back-ordered parts.

CWT recommends to have the following parts in stock for your CWT Shear:

Spare Parts List		
CWT Shear	Qty	Part No.
Complete Blade Kit	1	See parts manual for part number
Hydraulic O-ring Kit	1	See parts manual for part number

### NOTICE

*Refer to the parts manual for specific part numbers. Be sure to reference your CWT Shear serial number.*

## 6.0 CWT Shear General Maintenance

### 6.4 8-Hour Inspection Checklist

8-Hour Inspection & Service Checklist	
Fortress Shear Model:	Excavator Hour Meter:
Fortress Serial Number:	Date:
<b><u>Lubricate all Grease Zerks until grease extrusion is visible</u></b>	
_____	A. Each side of main pivot group
_____	B. Side of front cylinder pin (close upper jaw for access)
_____	C. Rear cylinder pin (both sides)
_____	D. Boom pivot and stick cylinder pin on mounting bracket
_____	Turntable bearing zerks on bearing, zerks on top (Grease a few pumps each zerk, excessive grease can push the bearing seal out).
_____	E.
<b><u>Inspect and measure blade gaps. Shimming is required if gap is exceeded</u></b>	
_____	A. Check guide blades/tip boot gap. <b>Not to exceed Max Blade Gap shown on chart in Section 7.4</b>
_____	B. Check cutting blade gap. <b>Not to exceed Max Blade Gap shown on chart in Section 7.4</b>
_____	C. Inspect all cutting blades, tip boot, and blade razor for damage
_____	D. If cutting edges are worn to 1/4" (6mm) radius, Rotate cutting blades
<b><u>Perform Blade bolt torque check</u></b>	
_____	A. All M12 Class 12.9 bolts or nuts <b>81 Ft-lbs./110 Nm. Dry - Anti Seize</b>
_____	B. All M20 Class 12.9 bolts or nuts <b>395 Ft-lbs./535 Nm. Dry - Anti Seize</b>
<b><u>Inspect pins, retaining hardware, &amp; wear guard</u></b>	
_____	A. Boom pivot pin of mounting bracket
_____	B. Cylinder connection pin of mounting bracket
_____	C. Front and Rear shear cylinder pins
_____	D. Pin retaining bolt and cotter pins
_____	E. Inspect wear guard for worn or cracked welds
<b><u>Inspect hydraulic components</u></b>	
_____	A. Inspect jump hoses for signs of wear and leaks
_____	B. Inspect rotation motor and valve for leaks
_____	C. Inspect regenerative valve for leaks
_____	D. Inspect shear cylinder for leaks
<b><u>Inspect safety devices</u></b>	
_____	A. Ensure all safety decals in place and legible
_____	B. Ensure all cab protection in good condition
_____	C. Ensure all excavator warning systems are working

See Parts & Service Manual for Procedures

Inspected By: \_\_\_\_\_

## 6.0 CWT Shear General Maintenance

### 6.5 80-Hour Inspection Checklist

#### 80-Hour Inspection & Service Checklist

Fortress Shear Model: \_\_\_\_\_

Excavator Hour Meter: \_\_\_\_\_

Fortress Serial Number: \_\_\_\_\_

Date: \_\_\_\_\_

#### Inspect all blades for wear and gaps

- \_\_\_\_\_ A. Rotate or replace primary and secondary blades, razor, and guide blades.
- \_\_\_\_\_ B. Replace Tip Boot depending on wear.  
Measure and record blade gaps, shimming is required if gap is exceeded  
**Not to exceed Max Blade Gap shown on chart in Section 7.4**

#### Inspect upper shear

- \_\_\_\_\_ A. Build-up and hard surface upper shear if needed

#### Inspect lower shear

- \_\_\_\_\_ A. Build-up and hard surface lower shear if needed
- \_\_\_\_\_ B. Inspect all welds for wear or cracking

#### Inspect hydraulic components

- \_\_\_\_\_ A. Inspect jump hoses for signs of wear and leaks
- \_\_\_\_\_ B. Inspect rotation motor and valve for leaks
- \_\_\_\_\_ C. Inspect hydraulic swivel and regenerative valve for leaks
- \_\_\_\_\_ D. Inspect shear cylinder for leaks

#### Inspect all bolts connecting the turntable bearing to the sub-head

- \_\_\_\_\_ A. Replace bolts if any are found broken re-torque as necessary

**See Part & Service Manual for Procedures**

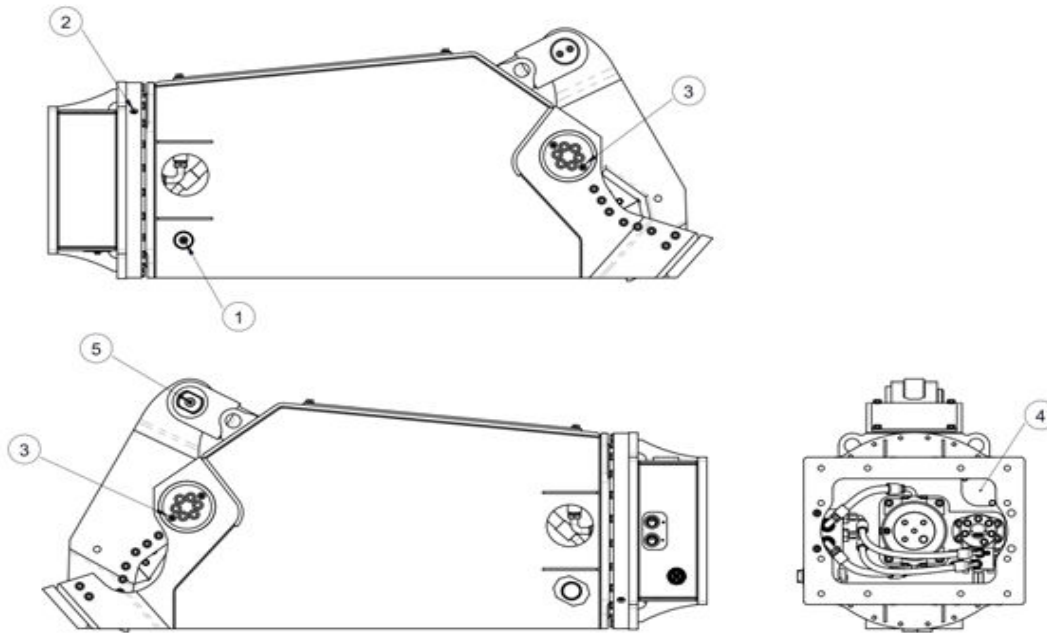
## 6.0 CWT Shear General Maintenance

### 6.6 Shear Lubrication

Regular lubrication of your CWT Shear is absolutely vital to proper operation and long life of the attachment. Lubrication should occur **every 8 hours** of operation. CWT recommends a premium grease No. 2EP. Grease fitting locations are indicated by the “GREASE” decals on the attachment. Grease the main pivot group fittings with the shear jaws open and with the shear jaws closed to evenly distribute the grease throughout the pivot group. Grease point 5 is often missed as blade maintenance is done with the jaw open and grease point 5 is performed when jaw is closed. **Do not miss grease point 5.**

### 6.7 Location of Grease Points

CS7



CS15

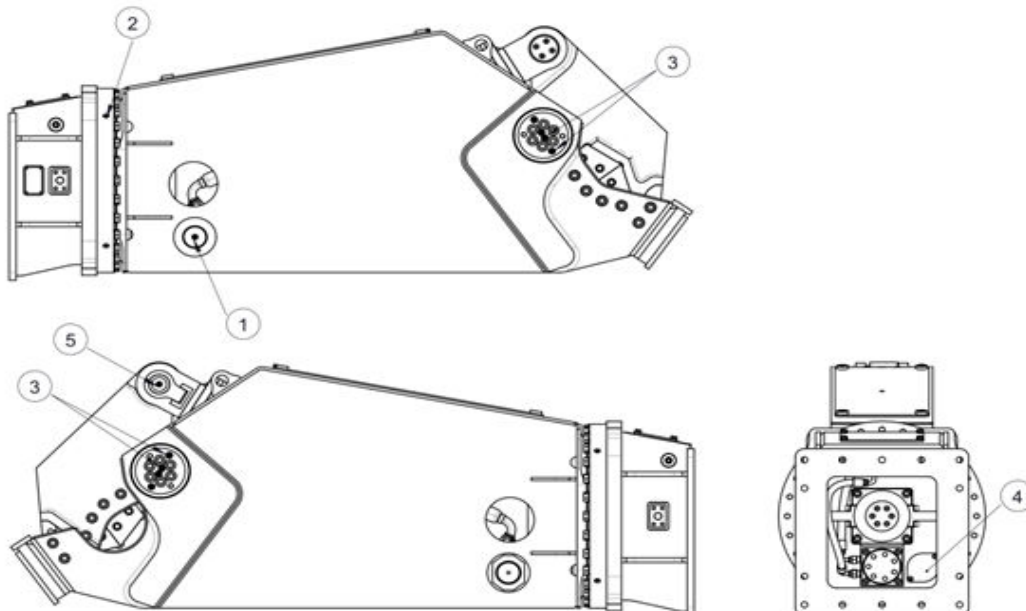
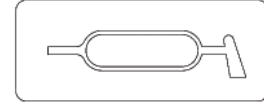


Fig.GM1 Shear Lubrication

## 6.0 CWT Shear General Maintenance

### 6.7 Location of Grease Points - *continued*

Location of Grease Points	
Item	Location
1	Rear Cylinder Pin
2	Turntable Bearing
3	Main Pivot Group
4	Turntable Gear
5	Forward Cylinder Pin



Example: Grease Decal

### 6.8 Bolt Torque Guidelines

Correct bolt installation is imperative to guarantee the safe and efficient operation of the shear.

Follow the steps below to properly install bolts:

1. It is important to verify the nuts and bolts are the same size and class of fastener before replacement begins. Contact the CWT Parts Department for replacement parts if needed. Unless otherwise specified, use class 10.9 metric hex head cap screws, class 10.9 metric flat head cap screws, and class 12.9 metric socket head cap screws.



*Inferior fasteners can fail and cause injury or death and damage to the equipment.*

2. Use clean components - verify bolts, nuts & bolt holes are free of dirt, oil, grease and other contaminants.
3. By default fasteners use Blue Loctite 242 except where noted otherwise in the parts manual.
4. Hydraulic Fitting fasteners refer to Section 9 of this manual.

Metric Fasteners							
Fastener Property Class		10.9	12.9	10.9	12.9	10.9	12.9
Thread Treatment		Dry		Loctite 242 or 271		Anti-Seize	
Basic Major Dia. (mm)	Thread Pitch (mm/thread)	Torque (Ft*Lbf)/(N*m)		Torque (Ft*Lbf)/(N*m)		Torque (Ft*Lbf)/(N*m)	
10	1.5	53/72	62/84	61/83	71/97	39/54	46/63
12	1.75	92/126	108/147	106/145	124/169	69/94	81/110
14	2	147/200	172/234	170/231	198/269	110/150	129/176
16	2	230/313	269/365	265/360	310/420	173/235	202/274
20	2.5	449/610	525/713	517/702	604/820	337/458	394/535
22	2.5	612/830	715/970	703/954	822/1,115	459/622	536/727
24	3	777/1,055	909/1,233	894/1,213	1,045/1,418	583/791	681/925



# CS Series Shear

*Blade Removal*

*Blade Bolt Torque Specifications*

*Torque Values for Blade Bolts*

*Shimming of Guide Blade*

*Guide Blade Rotation Procedure*

*Primary and Secondary Blade Rotation Procedure*

*Shimming of the Primary and Secondary Blades*

## Blade Maintenance

Connect Work Tools - [www.connectworktools.com](http://www.connectworktools.com) - 920.238.6657



## 7.0 CWT Shear Blade Maintenance

### 7.1 Blade Removal

Safety precautions are necessary when removing and handling the shear blades, these processes can be hazardous if not done properly. Please read and comprehend the following warnings and instructions when removing a blade from the blade seat, this will ensure your safety and avoid damaging your CWT Shear.



***Wear proper personal protective equipment at all times while maintaining your CWT Shear. Personal protective equipment includes, but is not limited to: eye protection, hearing protection, hard hat, work gloves and steel toe boots.***



***Verify that the blade is supported prior to removing the blade bolts. When these nuts and bolts are removed, the blade could cause serious injury by falling.***

1. Partially loosen all blade bolts leaving them moderately threaded into the blade nut.
2. The blades may loosen from their seats easily. If the blades are loose, ensure they are supported before continuing to remove the blade bolts and nuts.
3. If the blades are still tight, loosen the bond between the blade and the seat by gently tapping on the blade face with a soft-faced mallet.



***NEVER hit a blade with any hardened steel tool. The blades could chip or break and cause serious injuries.***

4. If the blade remains unmoved, place a wood block or similar object against the retaining nut of one of the blade bolts and strike with a mallet. Verify the bolt being struck is within 1/2" of being fully threaded into the nut to prevent damage to the fastener or blade.
5. If these methods are ineffective and you are not able to remove the blades, please contact Connect Work Tools for further instruction.



***Full blade kits are available by calling Connect Work Tools Customer Service at (920) 238-6657.  
For best service, please have your CWT Shear serial number on hand when calling.***

## 7.0 CWT Shear Blade Maintenance

### 7.2 Blade Bolt Torque Specifications

The life of the blade components depends greatly on the proper torque of the CWT Shear blade bolts. Following the proper torque specifications in this manual will help prevent the loosening of blades and possible damage to the blade seats.

With the CWT Shear, the blades can be rotated to utilize all four blade edges. Even though blade bolts and washers can typically be used for the life of the accompanying blade set, due to the critical nature of their function CWT requires that blade fasteners (bolts, nuts and washers) be replaced with each new set of blades. When using existing blade fasteners during blade rotations, always examine the hardware for any deficiencies or damage and replace as necessary. If a bolt has become elongated or a washer has spun, it will be problematic or impossible to achieve proper torque to secure the blade in the seat. Refer to the chart below for proper torque values on blade bolts.

*These values should only be used for blade bolts.*

### 7.3 Torque Values for Blade Bolts

Bolt Torque Reference Guide			
*All Blade M12 (Class 12.9) bolts or nuts	81	Ft-lbs.	Anti Seize
	110	Nm.	
*All Blade M20 (Class 12.9) bolts or nuts	395	Ft-lbs.	Anti Seize
	535	Nm.	

\* When connection is a nut and bolt, hold bolt and torque nut.

When blades are tapped, torque bolt.

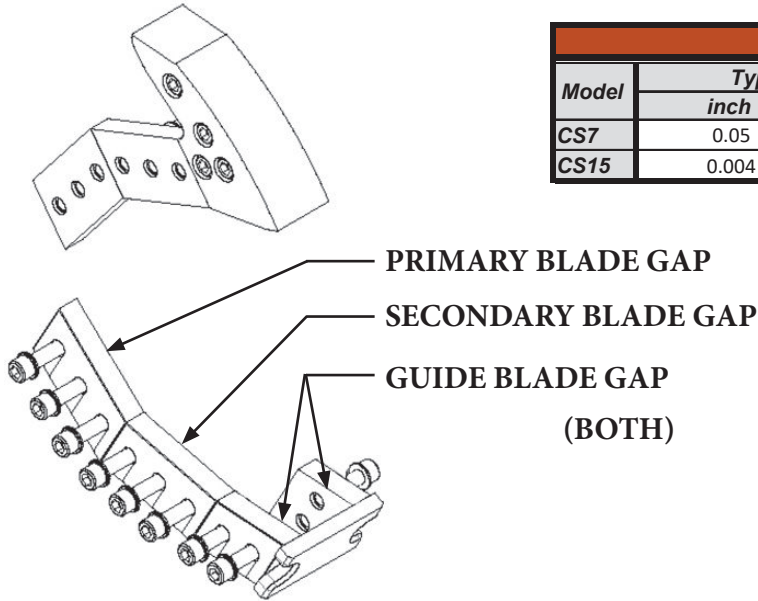
### 7.4 Shimming of Guide Blade

The guide blade gap is an adjustment that keeps the shear blades in line and ensures the proper operation during the shearing process. Monitor this blade gap. When necessary, shim the guide blade to keep the gap within the specifications listed in Fig. BM2 on page 43. When guide blades have worn to a 1/4" (6mm) radius it is time to rotate the blades. If the blades have worn where more than 0.170" (4.3 mm) of shimming is needed to maintain the blade gap, the blades must be replaced.

*This adjustment should be checked every 8 hours.*

## 7.0 CWT Shear Blade Maintenance

### 7.4 Shimming of Guide Blade - *continued*



Blade Gap Reference Guide				
Model	Typical Blade Gap		Max Blade Gap	
	inch	mm	inch	mm
CS7	0.05	0.1	0.020	0.5
CS15	0.004	0.1	0.020	0.5

Fig.BM1 Primary and Secondary Shimming



**Always wear proper personal protective equipment when performing blade maintenance. Personal protective equipment includes, but is not limited to: eye protection, work gloves and steel toe boots. Wear an approved respirator when grinding.**

**Wear proper gloves at all times during blade maintenance.**

1. Stop the upper jaw when the Tip Boot on the upper shear begins to slowly bypass the guide blades. Record the gap on both sides of the blade using a feeler gauge. Cycle your CWT Shear in steps checking the gap at several different points along the Tip Boot surface.
2. Locate the smallest gap along the Tip Boot and mark it. The gap at this location should not exceed the max blade gap on the chart above. If the gap is more than this, it will be necessary to shim the guide blades.
3. Guide blade shims are provided in each new CWT blade kit. Included in each kit are 8 shims that total 0.170" (4.32mm).
4. To determine the amount of shims to use, subtract the desired gap from the smallest gap that was recorded earlier.

### NOTICE

- Refer to section 7.1 Blade Removal Procedure if the guide blades are stuck in their seat.
  - Connect Work Tools recommends all blades be rotated if the shear has been operated for more than 80 hours since the last blade rotation.
5. To shim the blades, loosen the guide blade bolts and slide the guide blades out far enough to place the shims between the adjustment plate and the guide blades.

## 7.0 CWT Shear Blade Maintenance

### 7.5 Blade Cutting Edge Wear

Proper adjustment and rotation of the cutting blades is essential for shear performance and extended shear life. Rotate blades when the cutting edges are worn to  $\frac{1}{4}$ " (6mm) radius. CWT recommends rotation intervals of approximately **40-80 hours**, depending on the material being processed. Scheduled blade rotation maintains uniform blade gaps, which allows the blades to be shimmed correctly. Thinner materials may require shorter rotation intervals. Frequent rotation and adjustment of the cutting blades may be necessary when processing thin or non-ferrous materials.

If excessive wear is present on the blade faces, the blades cannot be rotated to place the uneven surfaces against the mating surface of the blade seats. Irregular surfaces will not be supported and will break, possibly resulting in damage to the blade seat.

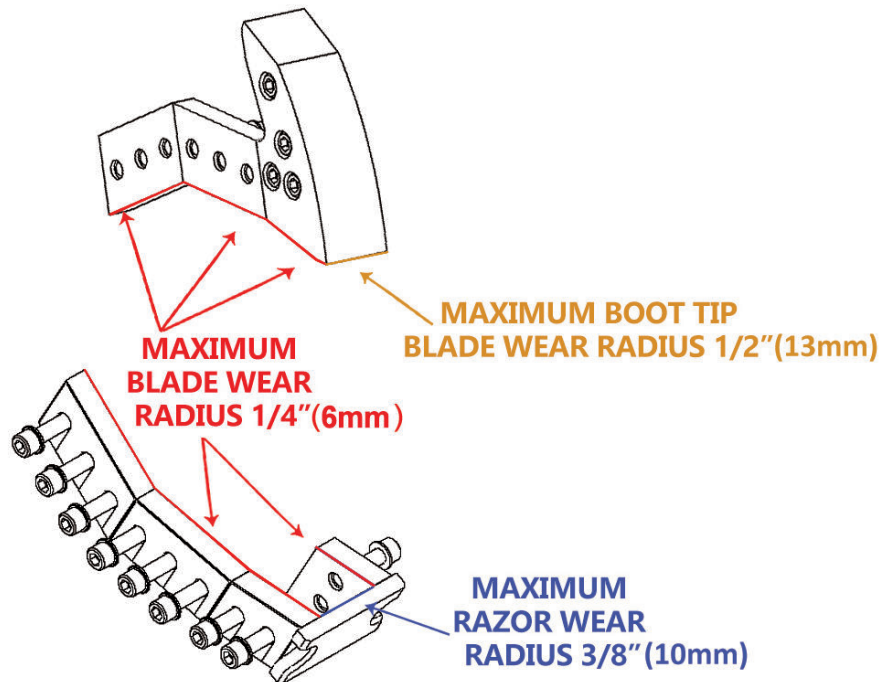


Fig.BM2 Blade Cutting Edge Wear

The following chart should be used to track blade rotation and wear

Blade Rotation Table		
40-80 Hours	Date	Hour Meter    Performed By
Installed		
Rotation 1		
Rotation 2		
Rotation 3		

Inspected By: \_\_\_\_\_

See Service Manual for Procedures

## 7.0 CWT Shear Blade Maintenance

### 7.6 Primary and Secondary Blade Rotation Procedure

Use the following instructions to properly rotate the primary and secondary cutting blades: Refer to the Blade Removal instructions from this section to remove the upper shear blades. **It is imperative to keep track of all parts and their positions as you remove them. This will be important when reinstalling.**

Once the blades are removed, clean the edges with a small grinder. Remove all sharp burrs and smooth out any deformities. Remove any debris or burrs from the blade seat, avoid excessive material removal from the blade seat.

Remove the blade bolts, shims and guide blades, making sure that the blade pockets are clean and free of debris. For upper blade rotation, refer to Fig.BM3-BM6. For Lower blade rotation, refer to Fig.BM7-BM10. After each blade rotation, reinstall and torque bolts per the specifications listed on the blade assembly drawing in the parts section of this manual. Check guide blade gap and shim if required, refer to Fig.BM2.

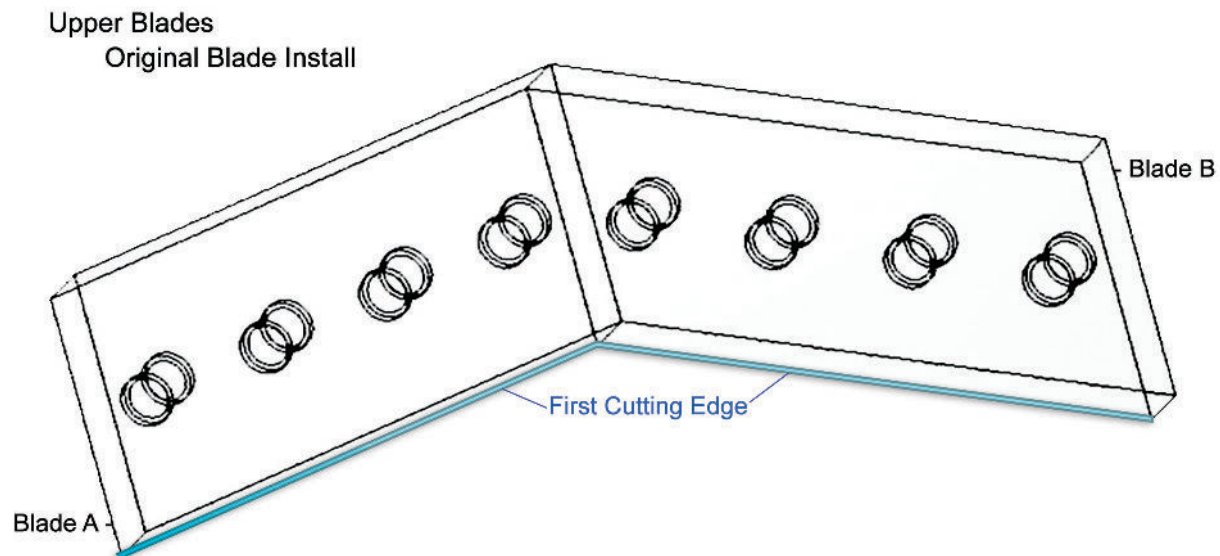


Fig.BM3 Primary and Secondary Blade Rotation

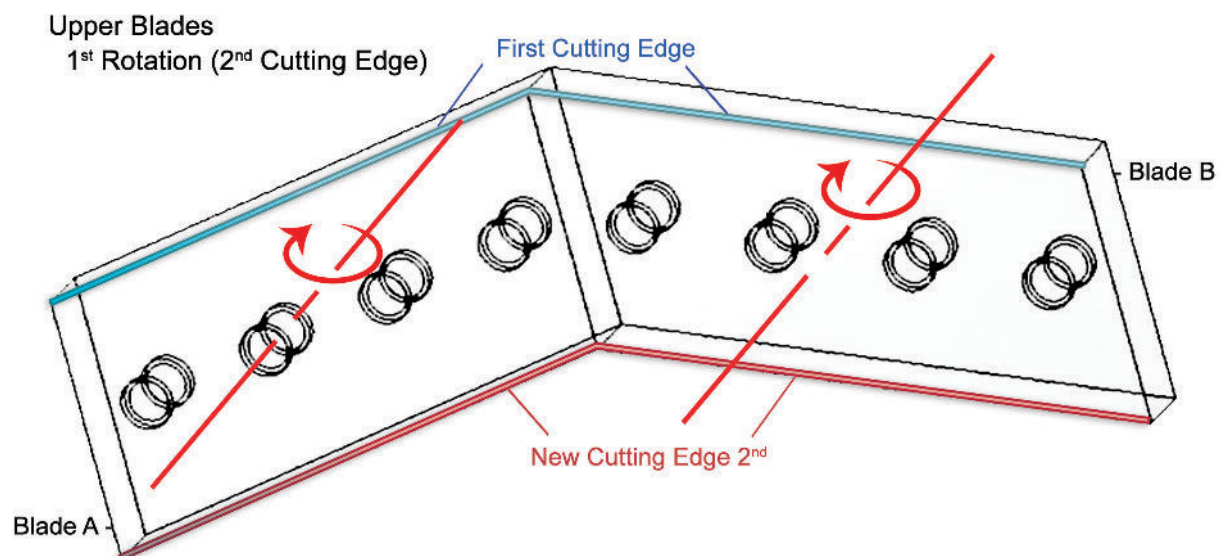


Fig.BM4 Primary and Secondary Blade Rotation



## 7.0 Fortress Shear Blade Maintenance

### 7.6 Primary and Secondary Blade Rotation Procedure - continued

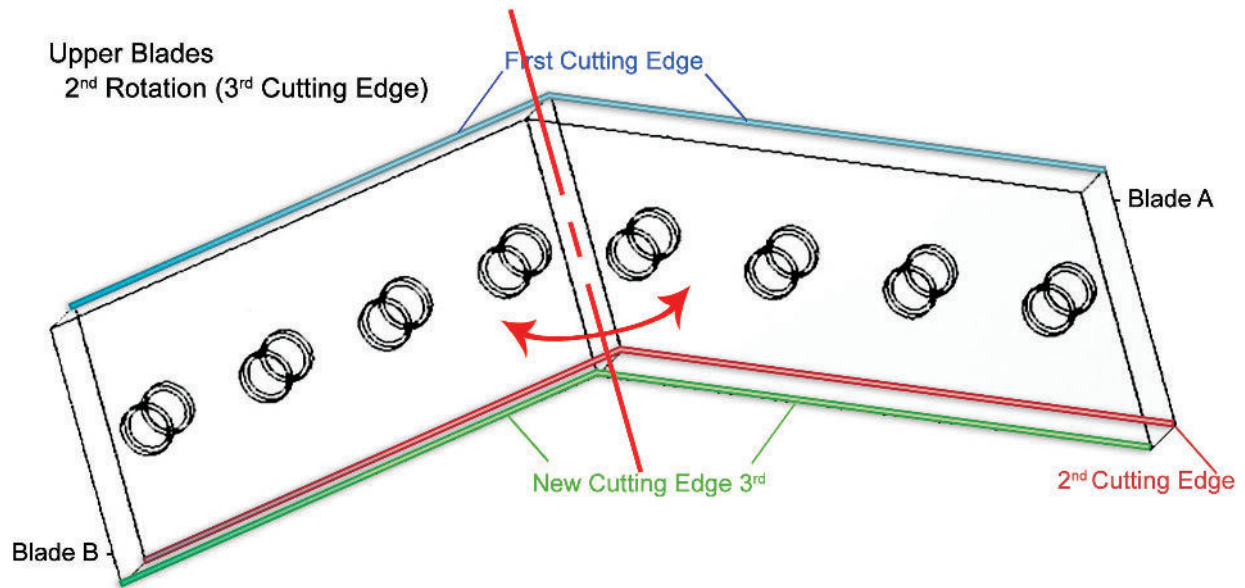


Fig.BM5 Primary and Secondary Blade Rotation

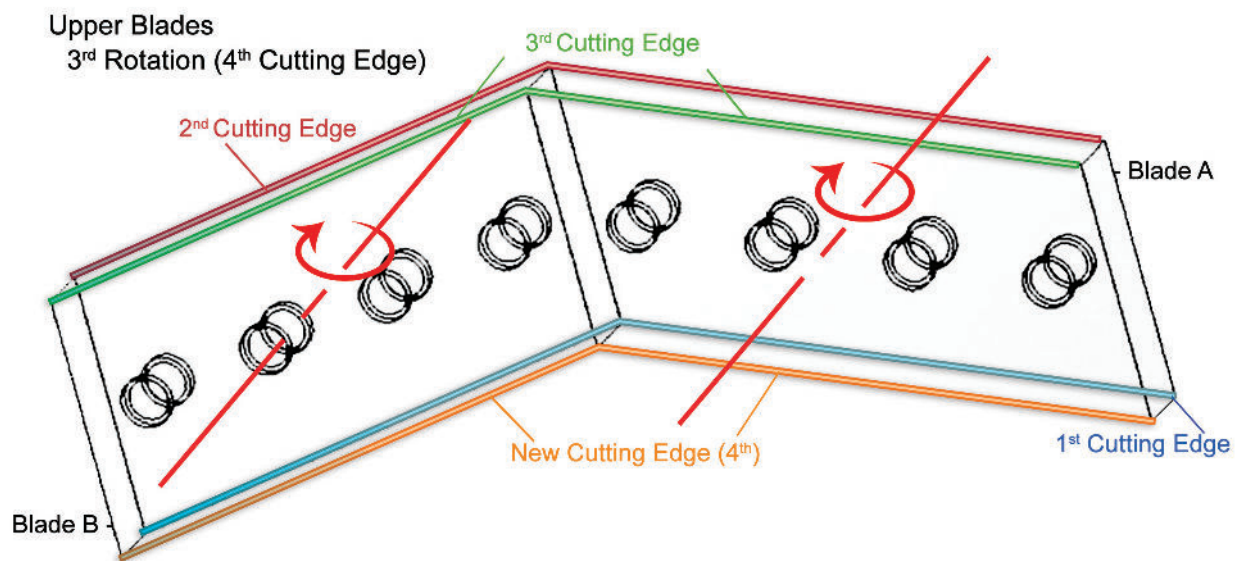


Fig.BM6 Primary and Secondary Blade Rotation



## 7.0 CWT Shear Blade Maintenance

### 7.6 Primary and Secondary Blade Rotation Procedure - *continued*

Lower Blades

Original Blade Install

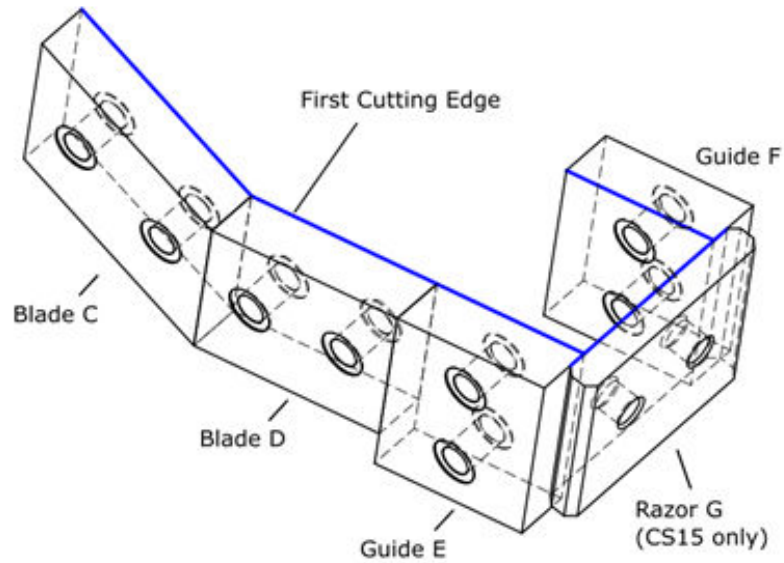


Fig.BM7 Primary and Secondary Blade Rotation

Lower Blades

1st Rotation (2nd Cutting Edge)

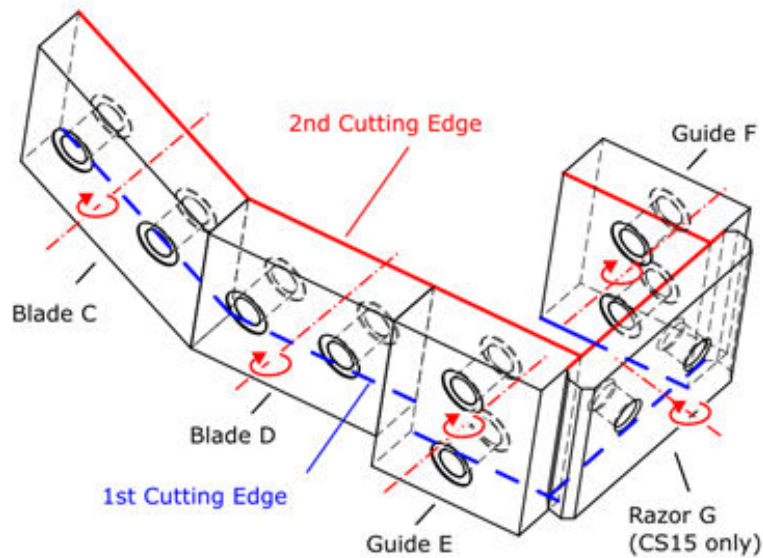


Fig.BM8 Primary and Secondary Blade Rotation

## 7.0 CWT Shear Blade Maintenance

### 7.6 Primary and Secondary Blade Rotation Procedure - *continued*

Lower Blades

2nd Rotation (3rd Cutting Edge)

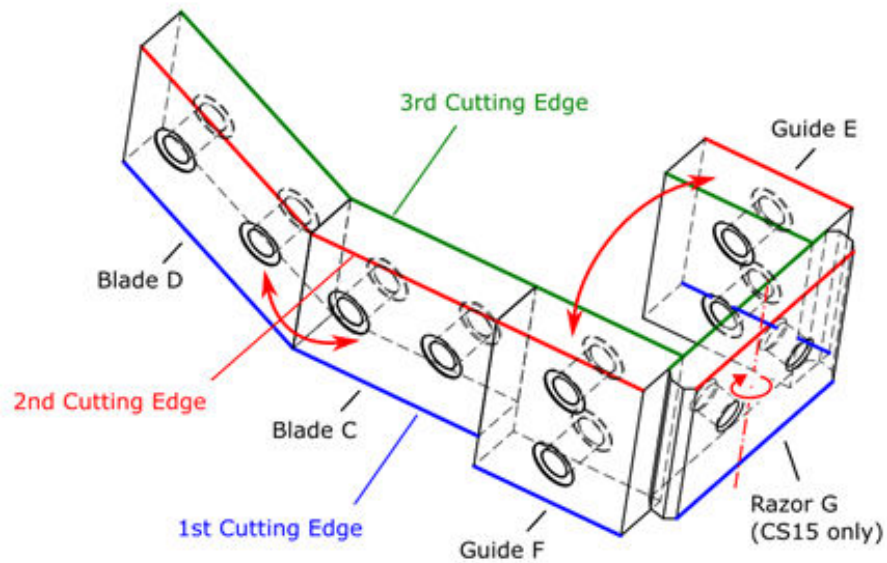


Fig.BM9 Primary and Secondary Blade Rotation

Lower Blades

3rd Rotation (4th Cutting Edge)

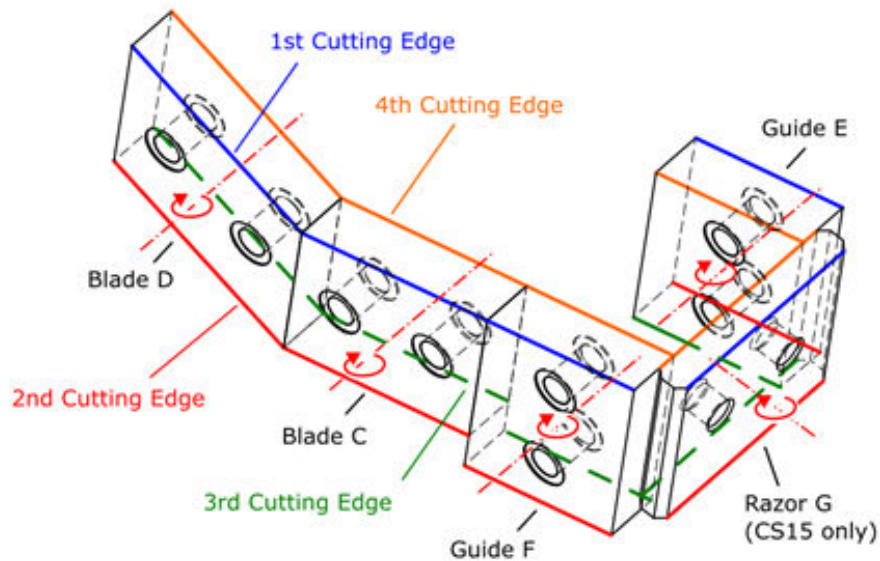


Fig.BM10 Primary and Secondary Blade Rotation

## 7.0 CWT Shear Blade Maintenance

### 7.7 Shimming of the Primary and Secondary Blades

When rotating the blades, it is important to follow the instructions below to maintain proper blade gap. Shimming is typically required if the gap exceeds 0.004" (0.1mm). For most shearing processes, this gap should be kept at blade gap onto section 7.4 for maximum blade gaps.



*Serious injury could occur if the shear moves while checking the blade gaps. Keep hands away from moving shear.*

*Shim only the lower primary and secondary blades.*

1. To check blade gap, close the shear until the secondary blades in the upper and lower shear begin to bypass. Begin with the thickest shims, verifying how many shims can be slipped between the blades and note this amount. A feeler gauge may also be used to check the blade gap.
2. An entire shim set for each primary and secondary blade set measures 0.170" (4.33mm). If the entire set can be slid between the blades, a blade replacement is required. **Do not** shim the primary and secondary blades out more than 0.170" (4.33mm). This may cause structural damage to the shear.
3. Close the shear further until the primary blades begin to bypass. Verify how many shims can be slid between the blades or use the feeler gauge. Again, note this gap. If the blades have been rotated properly and at the correct intervals, the blade gap should be uniform over the entire span of the blades. If the gap is not even, contact CWT Service.
4. Once the blade gap is verified and recorded, open the shear. The lower blades should be shimmed.
5. To install the lower shims, loosen the lower blade bolts and slide the blades out slightly. Place the shims between the existing adjustment plate and the lower blades. Tighten the bolts until snug.
6. Slowly cycle the shear until it is fully closed, continuously checking the gap at different intervals to ensure it maintains at blade gap. If it becomes too tight, you may need to remove a shim.
7. When the gap is correct, apply the correct torque to the blade bolts. Refer to chart Bolt Torque Reference Guide on page 42.



# CS Series Shear

*General Welding Guidelines*  
*General Guidelines for Wear Guard Maintenance*  
*General Guidelines for Build-up and Hard Surfacing*  
*Build-up Recommendations*  
*Hard surfacing Recommendations*  
*Shear Build-up Procedure*  
*Shear Hard Surfacing Procedure*  
*Hard Surfacing Patterns*

## Welding Maintenance

Connect Work Tools - [www.connectworktools.com](http://www.connectworktools.com) - 920.238.6657

## 8.0 CWT Shear Welding Maintenance

### 8.1 General Welding Guidelines

Instructions must be followed exactly as stated for pre-heat and post-heat procedures. Review the following guidelines for build-up and hard surfacing of your CWT Shear.

Put on all necessary personal protective equipment before starting the welding process. It is important to shut off the excavator's main power switch and disconnect all ground cables from the battery before beginning any maintenance. Severe electrical problems, including permanent damage to any on-board computer systems in the excavator could occur if power is not disconnected.

Connect a grounding clamp as close to the area being serviced as possible without permitting the current to travel through these main shear components: pivot group, hydraulic cylinder, hydraulic swivel, rotate motor, gearbox and slewing ring. A piece of metal can be affixed to the area to place a grounding clamp if necessary, remove this weld when the maintenance is complete.

Remove the adjacent blades to prevent heat transfer damage during the welding process. Grind off the existing hard surfacing and clean the work area. Remove moisture by following the pre-heat instructions below. The surface should be pre-heated to 350°F (177°C) 8" out and around area to be welded. This temperature should be maintained throughout the rest of the welding procedure. **DO NOT** exceed interpass temperature of 450°F (232°C).

In the jaw area, it is important to grind and weld parallel to the blades on the upper and lower jaws. Peen each weld pass to relieve residual weld stress. A welding pass should not be started or stopped directly above a blade bolt hole or in the apex of the shear jaw.

Once the welding maintenance is complete, cover the welded area with a heat blanket. The shear should not be placed back into service until the welds have been allowed to cool slowly, which could take up to 8 hours.

#### Pre-heat Process

Remove the moisture from the base material by pre-heating the general surrounding area to a minimum of 350°F (177°C) 8" out and around area to be welded. It is important to maintain the pre-heated temperatures uniformly throughout the material thickness until all welding has been finished. Cyclic heating and large temperature changes should be avoided. The pre-heating process can be performed using localized gas torches, or thermal strip blankets.

### NOTICE

***Before ANY thermal process is applied to the shear steel, including welding, tack welding, torch cutting, and air-arcing, preheat the area within 8" (200mm) of the local area to a minimum of 350°F (177°C). Do not exceed interpass temperature of 450°F (232°C).***

#### Post-heat Process

Should the pre-heated temperature drop below 350°F (177°C) within 8" (200mm) of the weld area, it should be post-heated to 350°F (177°C) and wrapped with a heat blanket. This will allow the steel to cool slowly to the ambient temperature. Allow enough time for the welds to cool before placing the shear back into operation.

#### Handling & Storage of Weld Materials

Refer to the weld manufacturer's handling and storage instructions for proper storage. Ensure the electrodes or wire are free of moisture, as moisture has the potential to cause cracks and porosity in the material beneath the weld.

#### Weld Quality

The life of the shear greatly depends on attention to detail and the quality of the welds used. Connect Work Tools strongly recommends that only qualified and certified welders perform this work. The base material should be free of dirt, grease, paint and any other foreign substance that could alter the weld and all weld consumables and parent materials should be clean and dry.



## 8.0 CWT Shear Welding Maintenance

### NOTICE

*Warranty coverage may be affected if pre-heat and post-heat instructions are not followed exactly.*

### 8.2 General Guidelines for Wear Guard Maintenance

During the daily machine walk around it is important to check the Wear Guard welds for wear or cracking. Any cracked or heavily worn welds must be repaired to prevent peeling of the Wear Guard. High wear areas to pay close attention to are highlighted in Fig.WM1.

Cracked or worn welds should be ground and re-welded using E7018 rod or equivalent. Pre-heat the area to be welded to 350°F (177°C), not to exceed interpass temperature of 450°F (232°C). Lay down one core pass bead, needle peen weld to reduce stress, and then lay down a cover pass over the core bead, needle peen again to reduce weld stress. See Wear Guard Kit instructions in the Parts manual for replacement of Wear Guard Plates.

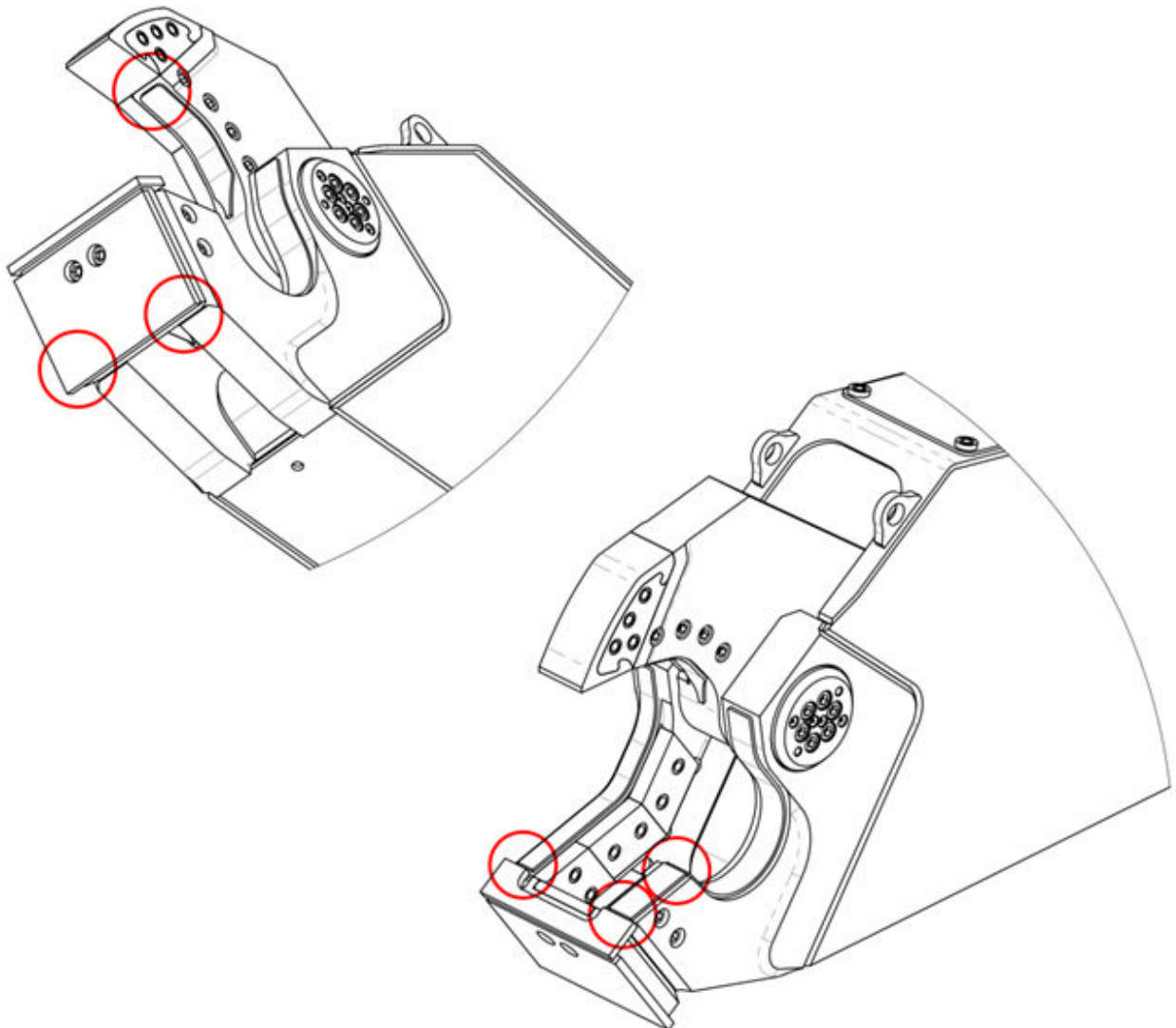


Fig.WM1 Wear Guard Maintenance



## 8.0 CWT Shear Welding Maintenance

### 8.3 General Guidelines for Build-up & Hard-Surfacing

Build-up and hard surfacing are welding procedures that protect the base material of your CWT Shear. The build-up process restores the upper and lower jaws to their original shape while protecting the blades and ultimately increasing the life of your CWT Shear. The hard surfacing process adds welded material over the build-up material creating a wear-resistant surface.

CWT recommends maintaining the factory installed wear guard on the upper and lower jaws to prevent the jaw wear and hard surfacing is optional for other high wear areas of the shear. If the Wear Guard is not maintained and the jaw wears, the stress in the jaw will be significantly increased causing shortened shear life. If the jaw wears down lower than the height of a new blade the shear must be taken out of operation immediately to perform the build-up and either wear guard replacement or hard-surfacing.

Maintain the factory machined seat radius when welding around the blade seats. Structural stress is absorbed through these radii. Structural cracking will eventually occur should one of these edges be left squared. A die grinder and a carbide tool can be utilized to reshape these areas to their original shape.

Blade Protection Strip maintenance is critical to the life of the blades, the area shown in images below should be built back up slightly less than flush to the blade face, within 1/64".

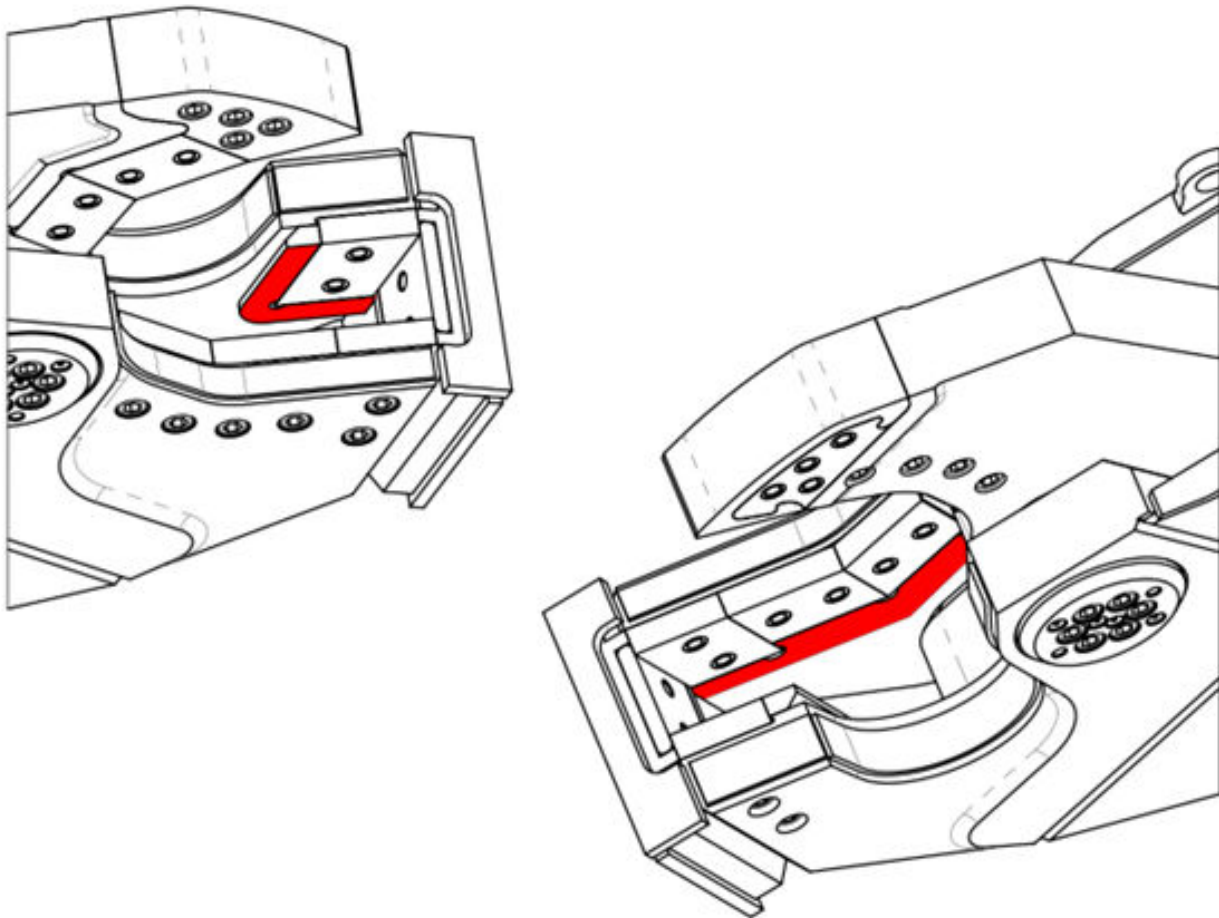


Fig.WM2 Blade Protection Strip Maintenance

## 8.0 Fortress Shear Welding Maintenance

### 8.4 Build-up Recommendations

Build-up reduces the chances that the hard-surfacing will crack by acting as a bonding or underlayment for the hard surfacing. For build-up, CWT recommends **E7018 rod or equivalent**. If E7018 is not readily available, please refer to the list of AWS classifications below to choose a suitable build-up material for your CWT Shear.

Weld products within these classifications meet the necessary requirements for ductility, strength, and toughness that are required in these applications.

AWS Classifications Chart			
MMA (STICK)	MAG (SOLID WIRE)	MAG (FLUX CORED WIRE)	MAG (METAL CORED WIRE)
E7018	ER 70S-6	E7XT-1	E70C-6M
E8018	ER 80S-6	E8XT-1	E80C-NI1

### NOTICE

*The use of improper build-up and hard surfacing products could cause premature wear or result in cracking. Failure to use recommended products may compromise warranty coverage.*

### 8.5 Hard-Surfacing Recommendations

For hard surfacing, CWT recommends **Amalloy 814H rod or equivalent**. To prevent cracking during hard-surfacing, it is important to use a weld material that contains less than 10 percent of chromium and that has a severe impact-resistance rating. If you have questions about what hard surface material to use, please contact the Connect Work Tools Customer Service Department. It is beneficial to weld a buffer layer of E7018 between the welded joint or plate and the hard surface. The hard-surfacing should be applied directly on top of these build-up or buffer layer welds. Contact welding suppliers if further assistance is required locating products that meet these AWS classifications.

### NOTICE

*DO NOT use stainless hard surface rod. Major structural failure of your shear jaws will occur as it will crack the base metal.*

### 8.6 Shear Build-up Procedure

Follow the General Welding Guidelines in section 8.1. Determine which area needs to be built up using a square and a new blade or a straight edge. Shear jaws must not wear below the height of a new blade. Build up the shear jaw to slightly higher than the original parent material profile with E7018 rod or equivalent. Welding parallel to the blades is always good practice particularly in high stress areas such as the lower jaw. Apply single layer build-up passes, stringer beads, follow filler metal manufacturer directions. Peen after each and every pass. For the jaw, once build-up is complete, the material should be ground to be flush with a new blade and then Wear Guard should be installed.

### CAUTION

*Ground the lower shear BEFORE performing any welding to prevent the possibility of electric shock and arcing through the cylinder or main pivot components.*

## 8.0 CWT Shear Welding Maintenance

### 8.7 Shear Hard-Surfacing Procedure

All edges of the lower jaw should be kept square and flush with the blades to maximize performance and longevity of the shear. Check the lower shear every 80 hours and perform maintenance when necessary. All blade maintenance must be done before starting to build-up and hard-surface the lower shear. CWT recommends that this maintenance be conducted at the end of the work day, this allows the shear to cool before releasing it back into service.

- Clean all dirt and grease from area to be maintained
- Determine how much build-up is necessary by using a straight edge. Place the straight edge across the top of the blades in the lower shear. All edges should be square.
- Never weld over existing hard-surfacing.
- Remove moisture by preheating the area surrounding the area to be worked on to about 350°F (177°C).
- Preheat the area within 8" (200mm) of the weld location to a minimum of 350°F (177°C) **DO NOT** exceed interpass temperature of 450°F (232°C). Maintain 350°F (177°C) throughout the entire process.
- Welding with the grain of the parent material, apply build-up to the low areas in single passes, side-by-side. Peen each pass to relieve weld stress and remove slag.
- If necessary, build-up the area under the edge of the secondary blade until it is flush with the blade. The blade should not stick out beyond the edge of the seat in this area.

### NOTICE

***Do not apply hard surfacing directly to the parent material.***

- CWT recommends maintaining all of the factory Wear Guard on the upper and lower jaw surfaces, this will properly protect the parent material of the upper and lower jaw from wear and increased stress. If extra hard surfacing is desired, establish a 45 degree diamond pattern of approximately 1" (25mm). Use the build-up rod to lay down the pattern and use the hard surface rod over the top create the pattern with three or four passes of build-up first, this will establish the hard-surfacing pattern and act as an underlayment.
- Apply a bead of hard-surface rod over each of the underlayment beads. Peen each and every pass to relieve the stress and remove slag.
- The ends of the weld should be staggered and should not end adjacent to a blade bolt hole.
- Grind the ends of each weld and taper down to the parent material. Always grind with the grain of the parent material and make sure not to undercut the ends of the weld with the grinder.

### NOTICE

***Verify the temperature regularly during this procedure. Maintain 350°F (177°C); however, do not exceed 450°F (232°C).***

- Should the temperature within 8" (200mm) of the weld area drop below 350°F (177°C) during the weld process, post-heat this area to 350°F (177°C).
- Once complete, wrap with a heat blanket. This allows the welded area to cool slowly to the ambient temperature. DO NOT return the shear into operation until it has cooled completely.

### NOTICE

- ***A 1/4" (6 mm) distance should be maintained between the outer passes and the blade seat and outer edges.***
- ***The ends of the weld should be staggered and should not end adjacent to a blade bolt hole.***
- ***Grind the ends of each weld and taper down to the parent material. Always grind with the grain of the parent material and make sure not to undercut the ends of the weld with the grinder.***



# CS Series Shear

*Hydraulic System General Maintenance*  
*Regeneration Valve*  
*Rotation Circuit*  
*Hydraulic Fittings Installation & Torque*

## Hydraulic System Maintenance

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## 9.0 CWT Shear Hydraulic System Maintenance

### 9.1 Hydraulic System General Maintenance

Follow the instructions below to safely perform hydraulic system maintenance on your CWT Shear.



***System pressure must be relieved before disconnecting any hydraulic lines. All connections must be tightened to the correct torque specs before applying any system pressure to avoid injury. Pressurized fluid can penetrate the skin and cause severe injuries or death. Seek immediate medical attention if any fluid is injected into the skin.***

1. Excavator hydraulic pressure should always be relieved before working on any hydraulic component, including hydraulic reservoir back pressure. Refer to excavator maintenance manual for procedure to relieve pressure.
2. Every 80 hours, all hydraulic components should be inspected (fittings, hoses, mounting hardware, split flanges, etc.).
3. Hoses must be capped and ports must be plugged when the hydraulic lines are disconnected. This prevents contamination of the hydraulic system.
4. Periodically test the hydraulic system pressure. Two 6,000psi (41MPa) hydraulic test gauges must be installed on the hydraulic port blocks mounted on the sub-head. A properly maintained operating pressure will provide the best cutting performance out of your shear. Performing this quick test ensures the excavator is performing at its specifications.



***Pressure relief valves should NEVER be adjusted to get higher operating pressures. Abiding by the manufacturer's recommended pressures provides the best performance with the longest life.***

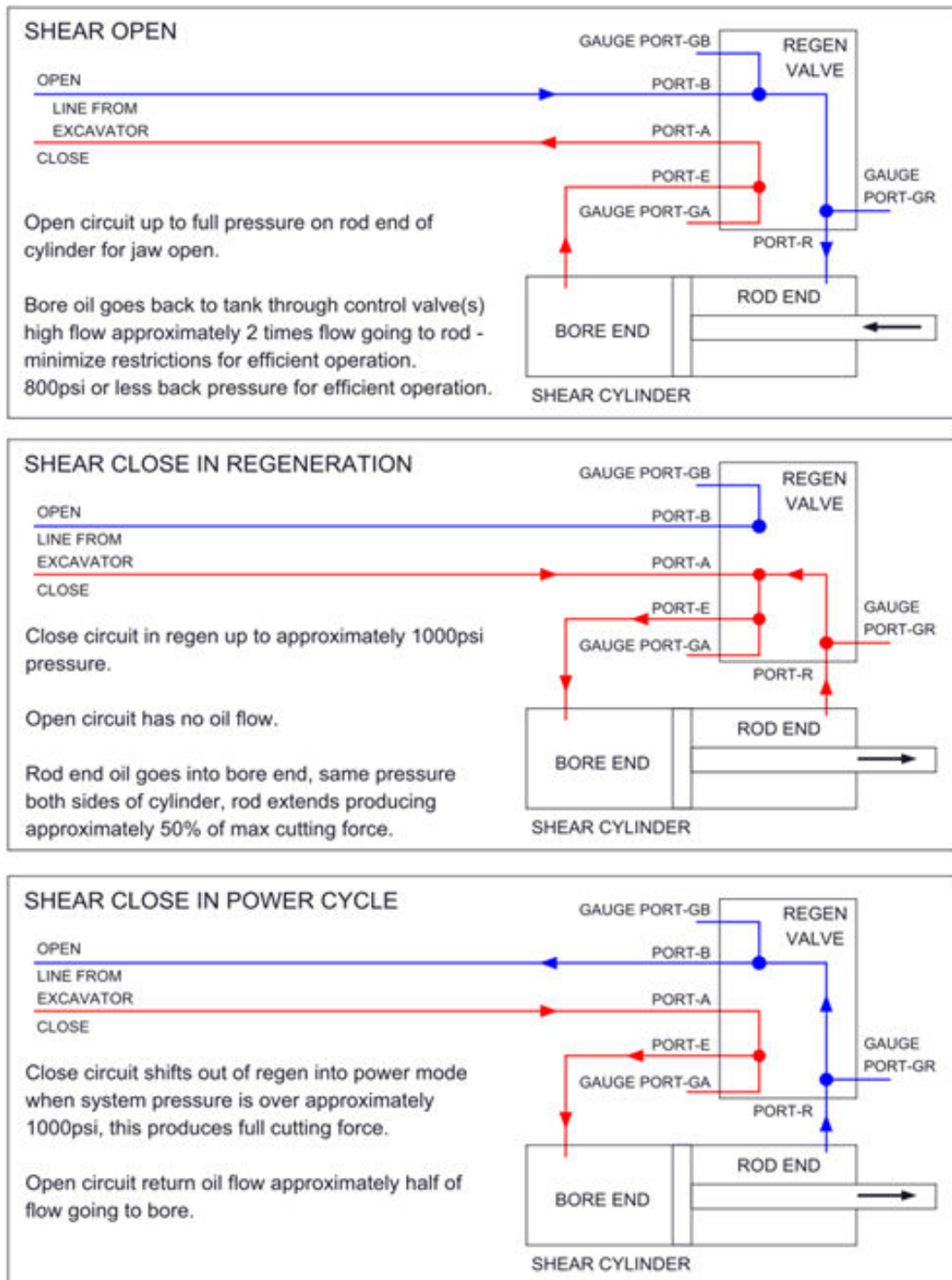
### 9.2 Regeneration Valve

#### Regeneration Valve Operation

The regen function affects only the closing of the shear. With no load on the cylinder or no material in the shear it will close in regen. Regen increases the extend speed by diverting the fluid from the rod side of the cylinder to the bore side where it is combined with the flow from the excavator. The shear closing will stay in regen until approximately 1000psi (7MPa) is reached on the bore side of the cylinder. When the force for closing the shear causes the pressure in the bore side of the cylinder to exceed approximately 1000psi (7MPa) the regen valve shifts to normal operation, slowing the closing speed and then the full system pressure is able to act on the full bore diameter giving the maximum force for cutting with the shear. The regen valve is factory set for optimum performance, and should not be adjusted in the field.



## 9.0 CWT Shear Hydraulic System Maintenance



### 9.3 Rotation Circuit

The rotate function operates from the auxiliary circuit from the excavator. The Rotate Control Valve acts as a hydraulic brake to maintain the shear rotational position during operation, by maintaining hydraulic pressure in both motor ports, but will relieve and allow rotation to prevent damage if forced. The Rotate Control Valve also provides controlled rotation of the shear during operation, preventing over speed rotation of the shear if the shear were forced during rotation.



## 9.0 CWT Shear Hydraulic System Maintenance

### 9.4 Hydraulic Fittings Installation & Torque

4-Bolt Flange Code 61 - Dry Fasteners				
Flange Size	Dash Size	Bolt Size Class 10.9	Initial Torque (ft-lbs) / (N-m)	Final Torque (ft-lbs) / (N-m)
1	-16	M10	30/41	37/50
1 1/4	-20	M10	30/41	37/50
1 1/2	-24	M12	54/73	68/92
2	-32	M12	54/73	68/92

4-Bolt Flange Code 62 - Dry Fasteners				
Flange Size	Dash Size	Bolt Size Class 10.9	Initial Torque (ft-lbs)/(N-m)	Final Torque (ft-lbs)/(N-m)
1	-16	M12	54/73	68/92
1 1/4	-20	M12	54/73	68/92
1 1/2	-24	M16	125/169	155/210
2	-32	M20	220/298	295/400

#### 4-Bolt Flange Installation Method

Torque bolts in a diagonal pattern, following the tightening sequence



#### Tightening Sequence

Tighten Bolt 1 to initial torque specification

Tighten Bolt 2 to initial torque specification

Tighten Bolt 3 to initial torque specification

Tighten Bolt 4 to initial torque specification

Tighten Bolt 1 to final torque specification

Tighten Bolt 2 to final torque specification

Tighten Bolt 3 to final torque specification

Tighten Bolt 4 to final torque specification

## 9.0 CWT Shear Hydraulic System Maintenance

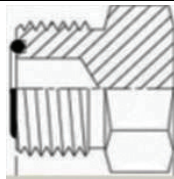
### 9.4 Hydraulic Fittings Installation & Torque - *continued*

#### Straight Thread O-Ring (STOR)



Flange Size	Dash Size	Thread Pitch	Adapters Torque (ft-lbs) / (N-m)	Plugs Torque (ft-lbs) / (N-m)
1/8	-2	5/16 -24	9/13	9/13
1/4	-4	7/16-20	22/30	29/40
3/8	-6	9/16-18	41/55	43/60
1/2	-8	3/4-16	74/100	74/100
5/8	-10	7/8-14	103/140	96/130
3/4	-12	1 1/16-12	162/220	162/220
7/8	-14	1 3/16-12	192/260	192/260
1	-16	1 5/16-12	258/350	258/350
1 1/4	-20	1 5/8-12	295/400	295/400

#### O-Ring Face Seal (ORFS)



Flange Size	Dash Size	Thread Pitch	Plugs Torque (ft-lbs) / (N-m)
1/4	-4	9/16-18	20/27
3/8	-6	11/16-16	33/45
1/2	-8	13/16-16	50/165
5/8	-10	1-14	81/110
3/4	-12	1 3/16-12	103/140
1	-16	1 7/16-12	162/220
1 1/4	-20	1 11/16-12	221/300



# CS Series Shear

*Performance Troubleshooting Guide*  
*Rotation Circuit Troubleshooting Guide*  
*Regeneration Valve Troubleshooting Guide*

## Troubleshooting

Connect Work Tools - [www.connectworktools.com](http://www.connectworktools.com) - 920.238.6657

## 10.0 CWT Shear Troubleshooting Guide

### 10.1 Performance Troubleshooting Guide

The information contained in this troubleshooting guide pertains only to CWT Shears. Any references to the excavator will be made only to give some suggestions as to where a problem could exist. Contact the Original Equipment Manufacturer of the excavator for specific maintenance or troubleshooting information. Contact CWT directly if a question arises regarding the operation or maintenance of the shear.

Performance Troubleshooting Guide		
PROBLEM	PROBABLE CAUSE	REMEDY
Upper shear jaw does not move	Shear is jammed	* Consult ShearCore Customer Service department for instructions.
	No hydraulic oil flow to shear	* Check the hydraulic pressure at the hydraulic port block on the shear sub-head. * Check excavator hydraulic circuit for pressure.
Upper shear jaw drifts	Shear hydraulic cylinder seal bypass	* Check for seal bypass; replace seals if necessary.
	Shear hydraulic swivel bypass (if rotator)	* Check for seal bypass (consult ShearCore service Department for instructions). Install new seal kit if necessary.
	Excavator sending flow to shear when not commanded	* Refer to excavator maintenance manual for troubleshooting.
Cutting speed slow	Excavator hydraulic oil flow is low	* Record time to close shear - record time to open shear. Total and see section 3.6 to estimate flow to shear. Compare to excavator specifications. * Check flow to shear and compare with recommended flow. * Check for excessive back pressure. * Check excavator hydraulic system.
	Shear hydraulic cylinder seal bypass	* Check for cylinder seal bypass; replace seals if necessary.
	Shear hydraulic swivel seal bypass (if rotator)	* Check for seal bypass (consult ShearCore service Department for instructions). Install new seal kit if necessary.
	Regen not shifting	* If same flow is provided in both directions, jaw should close faster than open. If not, troubleshoot regen.
Jaws move too fast	Hydraulic oil flow to attachment is too high	* Reduce flow to the attachment, compare to recommended flow.
Material jams	Excessive blade gap	* Check blade gap. Replace with ShearCore approved blades, or shim (refer to shimming procedure).
	Worn Tip Boot	* Replace Tip Boot.
	Worn blades	* Rotate or replace blades per maintenance manual instructions.
	Blades not within ShearCore specifications	* Replace blades with ShearCore approved blades.
	Excessive cutting blade or guide blade wear	* Rotate or replace per maintenance manual instructions.

## 10.0 CWT Shear Troubleshooting Guide

### 10.1 Performance Troubleshooting Guide - *continued*

Performance Troubleshooting Guide		
PROBLEM	PROBABLE CAUSE	REMEDY
Does not shear material	Too heavy of material for size of shear	* Check material size and type then consult ShearCore.
	Worn blades	* Rotate or replace blades per maintenance manual instructions.
	Excessive blade gap	* Check blade gap. Replace with ShearCore approved blades, or shim (refer to shimming procedure).
	Excavator hydraulic oil pressure is too low	* Compare with ShearCore recommended operating pressure. * Check the excavator hydraulic system.
	Regen not shifting	* See Regen Troubleshooting.
	Shear hydraulic cylinder seal bypass	* Check for seal bypass; replace seals if necessary.
	Shear hydraulic swivel seal bypass	* Check for seal bypass (consult ShearCore service Department for instructions). Install new seal kit if necessary.
	Excessive back pressure in return oil circuit	* Check for damaged lines on the return side (rod). * Check the size of the lines for rated flow. * Check the return filter, replace if necessary. * Check the excavator control valve.
Blade gap is uneven	Non-ShearCore blades being used	* Replace with ShearCore approved blades.
	Debris in blade seat behind blades or adjustment plates from blade seats	* Remove blades and adjustment plates and clear all debris.
	Inconsistent amount of blade shims between primary and secondary blades	* Re-shim blades for consistency (refer to blade shimming procedure).
	Excessively worn blades rotated into blade pocket	* Replace with ShearCore approved blades.
	Adjustment Plates installed in wrong location	* Install adjustment plates with factory chamfered edge to the back bottom of the blade pocket.

The regeneration valve has two operating conditions that could have a negative effect on your CWT Shear's performance and would require troubleshooting, possible adjustment and/or repair. The first operating condition happens when the regenerative valve does not slide into the speed mode, resulting in the shear closing slowly. The second operating condition occurs when the regenerative valve does not slide out of the speed mode at the correct time, resulting in a decrease in shear cutting force. Please contact Connect Work Tools Customer Service Department prior to making any of these adjustments.

Refer to page Section 9.2 for Regen schematics

## 10.0 CWT Shear Troubleshooting Guide

### 10.2 Rotation Circuit Troubleshooting Guide

The information contained in this troubleshooting guide pertains only to CWT Shears. Any references to the excavator will be made only to give some suggestions as to where a problem could exist. Contact the Original Equipment Manufacturer of the excavator for specific maintenance or troubleshooting information. Contact CWT directly if a question arises regarding the operation or maintenance of the shear.

Rotation Circuit Troubleshooting Guide		
PROBLEM	PROBABLE CAUSE	REMEDY
Shear will not rotate	Damaged hydraulic rotate motor	* Rebuild or replace the hydraulic motor.
	Internal leakage in manifold block on motor	* Check cartridge valve seals for damage. * Replace manifold block on motor.
	Damaged Gearbox	* Rebuild or replace the gearbox.
	Excavator hydraulic oil flow is low	* Check flow to shear rotation and compare to recommended flow. * Check for excessive back pressure. * Check excavator hydraulic system.
	Excavator hydraulic oil pressure is low	* Check pressure to shear rotation and compare to recommended flow. * Check for excessive back pressure. * Check excavator hydraulic system.
Rotation is slow	Damaged hydraulic rotate motor	* Rebuild or replace the hydraulic motor.
	Internal leakage in manifold block on motor	* Check cartridge valve seals for damage. * Replace manifold block on motor.
	Damaged Gearbox	* Rebuild or replace the gearbox.
	Excavator hydraulic oil flow is low	* Check flow to shear rotation and compare to recommended flow. * Check for excessive back pressure. * Check excavator hydraulic system.
	Excavator hydraulic oil pressure is low	* Check pressure to shear rotation and compare to recommended flow. * Check for excessive back pressure. * Check excavator hydraulic system.
Rotation speed is high	Rotate valve is out of adjustment	* Contact factory
Rotation erratic	Excavator hydraulic oil flow is erratic	* Check for excessive back pressure. * Check excavator hydraulic system.
	Damaged hydraulic swing motor	* Rebuild or replace hydraulic motor.
	Damaged manifold block on motor	* Check cartridge valve seals for damage. * Replace manifold block on motor.
	Damaged Gearbox	* Rebuild or replace gearbox.
Rotation drifts	Damaged hydraulic swing motor	* Rebuild or replace the hydraulic motor.
	Damaged manifold block on motor	* Check cartridge valve seals for damage. * Replace manifold block on motor.
	Damaged Gearbox	* Rebuild or replace the gearbox.
	Excavator sending flow to shear rotation when not commanded	* Refer to excavator maintenance manual for troubleshooting.





# CS Series Shear

*CWT Shear Warranty Document*  
*CWT Shear Warranty Reimbursement*  
*CWT Shear Limited Warranty*

## Warranty

*Connect Work Tools - [www.connectworktools.com](http://www.connectworktools.com) - 920.238.6657*

## 11.0 CWT Shear Warranty

### 11.1 Connect Work Tools Shear Warranty Document

Connect Work Tools warrants that your new CWT Shear is free from defects in material and workmanship for the period noted below under "Warranty Description". The warranty period begins at the time of delivery from CWT to the customer. For shears sold by dealers, and not rented or delivered immediately to the customer the warranty registration card must be filled out and submitted to CWT to register a delayed in-service date.

Hydraulic Warranty expires on unused product 2 years after date of shipment to customer or dealer. For the Hydraulic Warranty to be reinstated after 2 years on unused product, CWT will require that the product be completely resealed at the owner's expense, by an authorized or approved Connect Work Tools Representative.

If a defect in material and/or workmanship is found, CWT will cover the cost of the materials and/or parts needed to perform the repair as well as the associated labor which will be paid at our specified labor rate. Any claim against this warranty must be made within the warranty period and within 30 days of repair completion.

Lack of proper maintenance voids this warranty if it is determined to have caused or contributed to the failure. It is the customer's responsibility to perform and document proper maintenance. In the case of a claim against this warranty, the customer may be required to provide documentation of proper maintenance. Misuse of your CWT Shear invalidates this warranty. The machine may only be used for its intended purposes as outlined in the Operator's Manual.

The customer and selling representative shall sign and return the warranty document. Please sign below, to indicate that you agree to and accept the terms of this warranty. Please contact the CWT team if you have any questions and thank you for purchasing a CWT Shear.

Please note, wear items such as blades and wear guard are not covered under the 1 Year Full Machine Warranty other than for defects in material or workmanship.



**Warranty Description:** 1 year Full Machine

**Serial Number:**

**In-Service Date:**

**Warranty Expiration Date:**

**Excavator Make & Model:**

**Hours on Meter:**

**Company:**

**Customer Representative (print & sign):**

**CWT Representative:**

## 11.0 CWT Shear Warranty

### 11.2 CWT Shear Warranty Reimbursement

**Parts:** Warranty parts are sent on a “no charge” order. Failed parts must be available to be returned to Connect Work Tools for no less than 30 days from issue of Warranty Authorization number, this is for review and analysis of failed part upon CWT request.

**Labor:** Labor will be paid using the straight time method (unless otherwise stated) and the rate will be equal to the prevailing CWT warranty labor rate.

**Warranty Authorization (WA):** It is required that the servicing technician obtain a WA number for reimbursement and tracking purposes for each job. WA numbers are obtained by contacting the Connect Work Tools Customer Service Department at 920-238-6657, or via email at [service@connectworktools.com](mailto:service@connectworktools.com). Please have the following information available when requesting a WA:

1. Shear Serial Number
2. Base Machine Engine Hour Meter
3. Reported issue with Shear

#### **Warranty Claim Submittal**

1. The servicing technician should attach invoices and service reports and submit via email (preferred) or Fax as indicated on Warranty Reimbursement Form
2. Please submit all documents pertaining to the WA # as one package, to streamline the billing process
3. Upon submittal, WA#s must be included and match original request for a WA

*Note: If this is not done, the reimbursement process may be delayed or denied*

4. Warranty claims must be submitted within 30 days of work being completed
5. Payment will be sent within 45 days of receipt of request for reimbursement

## ***11.0 CWT Shear Warranty***

### **11.3 CWT Shear Limited Warranty**

Connect Work Tools warrants its manufactured products against deficiency in material or workmanship for a period of 1 year or 2,000 hours on tool and all components, whichever comes first, from the date of first use, rental, or sale.

#### ***Limitations***

- Used products, re-manufactured products and service repairs are not included in this Limited Warranty.
- Products that are altered, improperly maintained, serviced by an unauthorized representative, abused, misused, or contaminated by the base machine are not covered under the Limited Warranty.
- This Limited Warranty is the exclusive warranty. CWT makes no representations, expressed or implied, of merchantability or qualification for a specific purpose.
- Representatives of CWT have no authority to provide representations beyond those contained herein.
- Wear items, such as blades & wear guard, are not covered under this limited warranty.

#### ***Exclusive Remedy***

The exclusive remedy for a product Connect Work Tools determines deficient in material or workmanship is repair or replacement at CWT's discretion. The following procedure governs a repair or replacement warranty claim:

1. All warranty claims must be authorized with a claim number provided by the Connect Work Tools Customer Service Department.
2. Any returned parts must be accompanied by a factory-issued Return Goods Authorization number (RGA).
3. Returned products found deficient by CWT will be repaired or replaced at no charge to the Customer or will be credited to account balance.
4. Authorized repair is possible at the CWT factory. Warranty repair labor will be billed out using rates determined by CWT.

CWT is not liable for consequential or incidental costs or losses incurred by the product, purchaser or user.

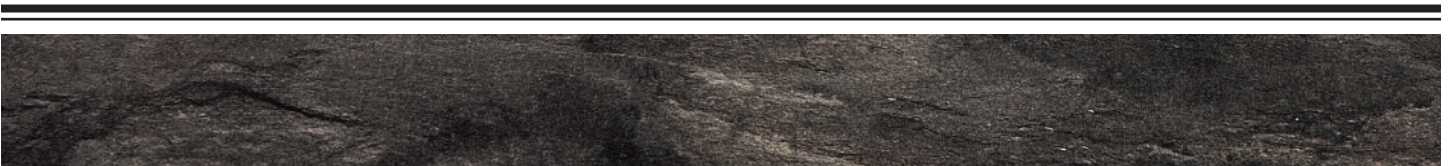
#### ***Limited Warranty***

A completed warranty certificate and delivery inspection report must be returned to CWT to validate the Limited Warranty. Prohibited operation and/or unauthorized adjustments or assembly will void this Limited Warranty.

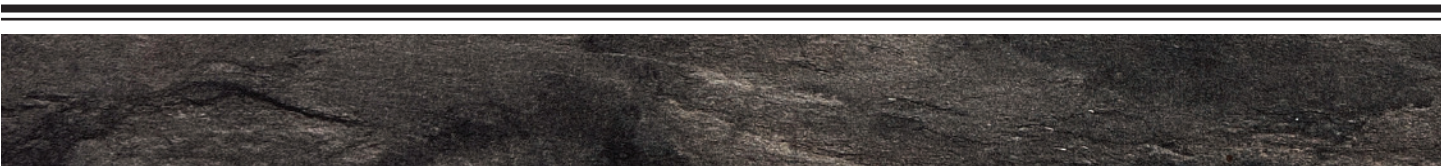
#### ***Contact Information***

For warranty questions, contact the Connect Work Tools Customer Service Department at (920) 238-6657. Have the model and serial number available for all requests for information, service or spare parts orders.

## Notes

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## Notes

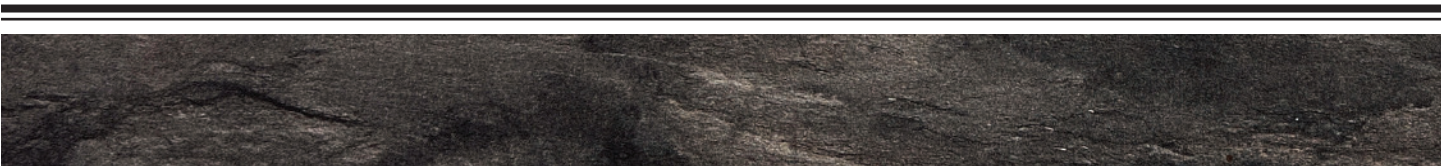
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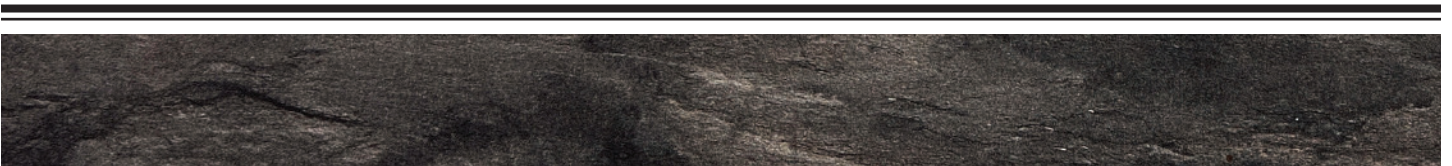
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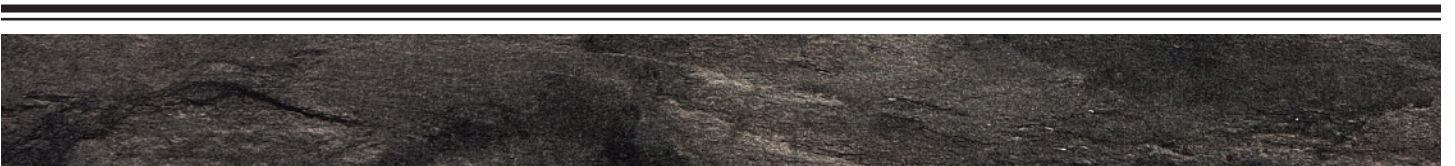
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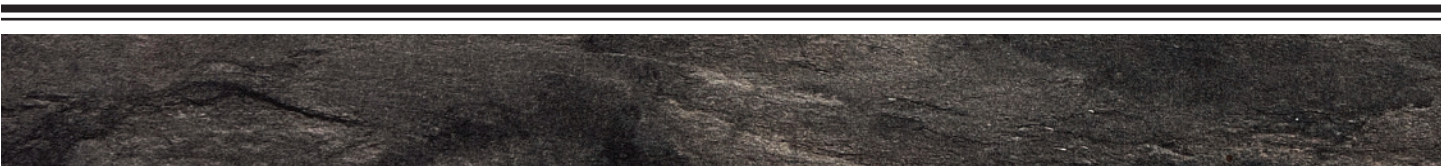
## Notes

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**920.238.6657**

*[www.connectworktools.com](http://www.connectworktools.com)*

