

ATTACHMENT J-1502000-01
REFERENCES, INSTRUCTIONS, AND DIRECTIVES

<u>ITEM</u>	<u>AVAILABLE FROM</u>
OSHA Safety & Health U.S Standards (29 CFR 1910)	U.S. Government Printing Office
BO 5512.1C w.Ch 1, 2, and 3 Lejeune Identification Card Center	http://www.mcieast.marines.mil/
Appendix A of EM 385-1-1	http://publications.usace.army.mil/publications
Public Law 91-596 Occupational Safety and Health Act (OSHA)	https://www.house.gov/legcoun/comps/OSHA70
National Fire Codes & Standards	https://www.nfpa.org/codes-and-standards

ATTACHMENT J-1502000-02

WEEKLY BULLET TRAP INSPECTION FORM

MCB, Camp Lejeune, NC

Range _____

Contract No. _____

Date: _____

Power: ON / OFF	
Comments:	
Mag Gauge Level	
Settings: Low -	High - Running -
Air Compressor	
Regulator Pressure: /	Tank Pressure: / Drain Tank: YES / NO
Oil Level: FULL / Added Oil: YES / NO	Leaks: YES / NO
Comments:	
Dust Collection Unit	
Drum: Empty	1/8 1/4 3/8 1/2 5/8 3/4
Comments:	
Chamber Area	
Collection Buckets: Empty	1/8 1/4 3/8 1/2 5/8 3/4
Secure - ALL / Hanging - / Off -	
Bucket Condition: Good / Fair / Poor	Replace:
Comments:	
Overall	
Condition of Baffling:	Good / Fair / Poor
Condition of Baffle Supports:	Good / Fair / Poor
Condition of Chambers:	Good / Fair / Poor
Condition of Chamber Legs:	Good / Fair / Poor
Condition of Compressor Housing:	Good / Fair / Poor
Condition of Steel Plating:	Good / Fair / Poor
Condition of Target Stands:	Good / Fair / Poor
Condition of Target Walls:	Good / Fair / Poor
Comments:	

Operation and Maintenance Checklist

MCAS, CHERRY POINT North Carolina

Date: _____

Power:						
Comments:						
Mag Gauge Level						
Settings:	Low-	High-	Running-			
Air Compressor						
Regulator Pressure:	/Tank Pressure:	/Drain Tank:	Yes / No			
Oil Level:	Full / Added Oil:	Yes / No	Leaks:	Yes / No		
Comments:						
Dust Collection Unit						
Drum:	Empty	1/8	1/4	3/8	1/2	5/8 3/4
Comments:						
Overall						
Condition of Baffling:	Good / Fair / Poor					
Condition of Baffle Supports:	Good / Fair / Poor					
Condition of Chambers:	Good / Fair / Poor					
Condition of Chamber Legs:	Good / Fair / Poor					
Condition of Compressor Housing:	Good / Fair / Poor					
Condition of Steel Plating:	Good / Fair / Poor					
Condition of Target Stands:	Good / Fair / Poor					
Condition of Target Walls:	Good / Fair / Poor					
Comments:						

Complete Berm Trap Package Operations And Maintenance Manual



PO Box 636, Provo, UT 84603, 801-377-8033

Use and Operation Complete Berm Trap Package

The data contained herein is disclosed for the sole purpose of assisting the user in the operation of Action Target equipment. All data and specifications are subject to change without notice. This data is applicable only to the part name/number identified. Some products may be customized for specific use, so your product may differ from that described herein.

Assembly: @:A_bermtrap
Version: 1.00
Printed: 2006-Nov-28



Table of Contents

1. Rubber Trap - General Information	3
2. Rubber Trap Maintenance	3
2.1. As Needed	3
2.2. Every 100,000 Rounds Per Lane	3
3. Adhesion Compound	4
3.1. Saturated Solution	4
4. Applying the Solution	4
5. Limited Warranty	4



1. Rubber Trap - General Information

The Rubber Trap consists of a two foot layer of chopped rubber spread over a steel framework designed to stop and contain spent bullets. The rubber creates an absorption layer that provides an extremely clean environment because it produces very little airborne lead dust. The Rubber Trap provides you with a very quiet solution to collecting bullets.

When shooting on the Bullet Trap you may shoot across lanes and at very close distances because there is virtually no ricochet hazard. You will find that there is very little maintenance involved in the up-keep of the Rubber Trap. Although, after about 80,000 rounds per lane the trap will need to undergo a major time-consuming cleaning process. This involves removing the spent bullets from the rubber and then replacing the rubber. This becomes a labor-intensive process because the bullet fragments are sometimes small and, bullets usually migrate to the top of the trap. Over time the rubber granules will break down and more will need to be ordered to fill in thin portions of the trap. It is also important to note that bullets may ricochet upwards, directly above the Bullet Trap. For this reason baffles should be used directly above the trap in conjunction with the Bullet Trap.

All types of calibers can be used with the Bullet Trap. NOTE: Action Target advises users not to use tracer rounds on any type of Rubber Trap. The potential fire risk is high.

2. Rubber Trap Maintenance

2.1. As Needed

The Rubber Trap is effective because of the thick absorption layer created by the chopped rubber. For the Rubber Trap to remain effective the owner must maintain a minimum thickness of two feet. This is particularly important in areas directly behind the target. As parts of the Rubber Trap become thin the chopped rubber needs to be raked from the thick portions back to the thin parts. This is easily done with the use of an ordinary rake.

Over time the rubber granules will break-down and thus decrease the thickness of the rubber layer. When this happens more rubber can be ordered through Action Target. To order call Action Target at 1-800-377-8033.

#5428 -Chopped Rubber

If the rubber trap gets too thin then the steel plate supporting the rubber may be penetrated. If this happens contact Action Target's Customer Service Department at 1-800-377-8033. If the fins are penetrated do not be alarmed. They have been designed to let the bullet pass through them. The fins purpose is to keep the rubber from sliding off of the Rubber Trap. If they have become too damaged to perform this function, then contact Action Target's Customer Service Department at 1-800-377-8033.

2.2. Every 100,000 Rounds Per Lane

At approximately 100,000 rounds per lane the rubber on the Rubber Trap will become saturated and will need to be cleaned. There are three ways to clean your Rubber Trap. The first way is to fish the spent bullets out by hand. The second way is to dump the rubber/bullet mixture onto a large grate and sift the bullets out. These two methods are very labor intensive, create extensive down time for your range, present hazardous health situations for personal, and is simply a pain. The third option is to have Action Target clean your range for you using a large vacuum/separator system. This is the easiest and fastest way to clean your Rubber Trap. If you choose this option, contact Action Target's Customer Service Department at 1-800-377-8033.



3. Adhesion Compound

After the spent bullet have been cleaned out of the Rubber Trap a saturated solution needs to be applied. Again, you can do this yourself or you can call Action Target and they will apply the solution for you.

3.1. Saturated Solution

If you choose to apply the solution yourself you will need to order the following additives from Action Target.

#5436 -Adhesive

#5435 -Fire retardant

Mix water, the adhesive and the fire retardant together in the following portions.

2 gallon -Water

1 pint -Adhesive

2 pounds -Fire retardant

This will cover about 3.5 lanes for one 6" layer of rubber or just under 1 lane 24" thick.

4. Applying the Solution

Before applying this mixture to the Rubber Trap the rubber on the trap must first be sprinkled with water. The rubber should be damp (like dew) but not soaked. The mixture should not go onto the rubber dry. Use a paint sprayer to apply the saturated solution evenly over the entire trap. The proper procedure for applying the mixture is as follows: first, cover the entire surface of the plates with 6 inches of chopped rubber. Second, mix the solution mentioned above using the proportion given and third, apply (spray) to the entire area. Place a second 6 inches of chopped rubber to the Berm Trap and again apply the clumping solution. Continue this process until a 2 feet of rubber have been laid. Do not over wet the rubber so that it runs off the trap. Do not miss areas either! make sure the solution covers the rubber all the way to the metal plates. If you have left over solution after one covering let the application dry then re-apply.

- * _____ All the solution applied.
- * _____ All the rubber wetted with solution.
- * _____ Not more than 6" deep of rubber wetted at a time.
- * _____ Rubber not over wetted.

The Bullet Trap also needs a surface treatment every 6 months. This surface treatment consists of applying the same solution as mentioned above but only a top coat.

5. Limited Warranty

Warning

Any activity using firearms is inherently dangerous and should only be carried out with the greatest of care and seriousness. This equipment is intended for professional use—not for consumer or amusement activities. It should only be used under the strict supervision of qualified firearms training personnel. Action Target will assume no responsibility whatsoever for persons or organizations who use Action Target equipment in a manner which is unsafe and/or which poses a threat to human life, property, or the environment. Never place a target in a location which can be seen from anywhere other than the area where the intended shooter will be firing from. Keep hands and clothing clear of any moving parts, actuators, motors, etc. Always use proper armament in front of actuators, air lines, controllers, fixtures, and any other parts of the system which might be damaged by gunfire. Action Target's warranty will not cover equipment which has been improperly



Action Target is not responsible for contamination, environmental damage, or any other consequences of range operation.

REPAIR OF DAMAGED TARGET COMPONENTS

If you require repair for damaged components, please call Action Target to obtain a Return Authorization (RA) number. Then ship the return items to the address shown below. Unless you have been explicitly instructed otherwise, you are responsible for the cost of shipping returned materials back for service.

ACTION TARGET INC. 1281 West 220 North Provo, UT 84601 (801)-377-8033

If the returned item is covered by warranty, it will be returned to you without charge. Otherwise, you may be charged for the repair. If you wish to be advised of any possible repair costs before the repair is done, please specify this when obtaining your return authorization.

Action Target reserves the right to repair or replace, at its option, any part of an Action Target system or component in the course of servicing that system or component.

ACTION TARGET LIMITED WARRANTY

Action Target Inc. will repair or replace, at its option, any product which does not function correctly due to faulty components or workmanship for a period of 90 days from date of purchase. Action Target Inc. reserves the right to not warranty any product which falls into any of the following categories:

A product which has been modified or altered by anyone other than an authorized Action Target service person.

A product which has been damaged due to improper armoring (A bullet hole in a product is a good indication of improper armoring.)

A product which has been damaged due to user negligence or failure to perform the recommended maintenance procedures.

A product which has been damaged due to acts of nature or chance (earthquake, lightning, flood, fire, etc.)

An extended warranty or a service contract may extend your coverage over that stated herein but does not exist unless explicitly stated in writing and as part of a specific, single purchase. Action Target makes no other warranties, expressed or implied.

ATTACHMENT J-1502000-04
COMPLETE BERM TRAP PACKAGE OPERATIONS & MAINTENANCE MANUAL

APPENDIX C

ATTACHMENT J-1502000-04
 COMPLETE BERM TRAP PACKAGE OPERATIONS & MAINTENANCE MANUAL

Operation and Maintenance Checklist

MCB CAMP LEJEUNE, NC
 DATE:

RANGE:

Power:			
Comments:			
Mag Gauge Level:			
Settings:	Low-	High-	Running-
Air Compressor:			
Regulator Pressure:	Tank Pressure:	Drain Tank:	Yes/No
Oil Level:	Full/Added Oil: Yes/No	Leaks: Yes/No	
Dust Collection Unit:			
Drum: Empty	1/8	1/4	3/8
	1/2	5/8	3/4
Comments:			
Overall:			
Condition of Baffling	Good	Fair	Poor
Condition of Baffle Supports	Good	Fair	Poor
Condition of Chambers	Good	Fair	Poor
Condition of Chamber Legs	Good	Fair	Poor
Condition of Compressor Housing	Good	Fair	Poor
Condition of Steel Plating	Good	Fair	Poor
Condition of Target Stands	Good	Fair	Poor
Condition of Target Walls	Good	Fair	Poor
Condition of Chopped Rubber	Good	Fair	Poor
Comments:			

DCU Range Package

Operations Manual



P.O. Box 636 Provo, UT 84603 801-377-8033

Use and Operation

The data contained herein is disclosed for the sole purpose of assisting the user in the operation of Action Target equipment. All data and specifications are subject to change without notice. This data is applicable only to the part name/number identified. Some products may be customized for specific use, so your product may differ from that described herein.

DCU Range Package

Assembly: @:dcu_r
Version: 1.00
Printed: 2006-Apr-25

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Table of Contents

1. Overview	3
1.1. Scope	3
1.2. Warning	3
1.3. General	5
2. Operation	5
2.1. Basic	5
2.2. Differential Pressure	6
3. Maintenance	6
3.1. Daily	7
3.2. Weekly	8
3.3. Every 2000 Hours	8
3.4. Yearly	8
3.5. Filter Changing	9
3.6. Loading New Filter	9
4. Debugging	9
4.1. System Won't Turn On	10
4.2. Pressure Too Low	10
4.3. Pressure Too High	10
5. Weekly Maintenance Log Sheet	10

1. Overview

1.1. Scope

This manual will aid the user in maintaining, checking, and adjusting the Action Target Dust Collection Unit (DCU). Sizing, installation, and repair questions should be directed to Action Target for more detailed technical assistance. If you have specific questions about environmental contamination or other environmental issues, please direct them to a local, qualified professional environmental consultant.

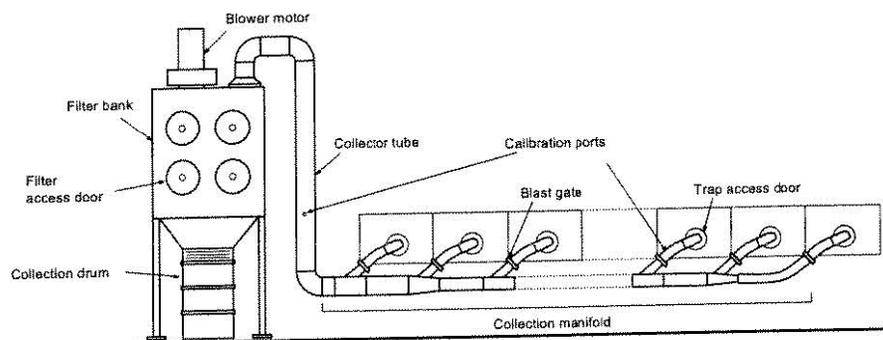


Figure 1. Duct Collection Unit (DCU) Components

1.2. Warning

Action Target is not responsible for contamination, environmental damage, or any other consequences of range operation regardless of whether or not a DCU is in use. The mere presence of the DCU is no guarantee that lead or other environmental contamination will not occur. The DCU is designed to reduce particulate emissions—not eliminate them. The effectiveness of the filtration system is largely dependent upon the type of filters used, the material loading on the filters, the integrity of the filters, and the particular environment in which the DCU is used. See figure 2 for the technical specifications of the filters provided by Action Target.

The DCU is normally furnished as a primary containment system only. Failsafe circuitry is provided which, when properly maintained, will shut the system down within seconds of a filter breach. This will minimize any resulting contamination, but will not eliminate it. This potential hazard can be virtually eliminated by the addition of a final, redundant HEPA filter stage (available from Action Target). However, it should be noted that in the case of a filter breach, the HEPA filter will be destroyed and must be replaced prior to continuing operation.

The filter cartridges in the DCU are designed to last for several years. However, the actual effective life will vary from one site to the next. The cleaning procedures outlined herein describe a method whereby the filters can be changed without excessive human contact with lead particulates. This should not be construed to mean that no contact with lead will occur. If you require absolute isolation from lead particulates, you must employ secondary measures such as protective clothing, respirators etc. while servicing the DCU and associated components.

You should obtain replacement filters only from Action Target. The mere fact that a replacement cartridge *fits* into the collector housing does **not** mean that the filter will perform to the specifications shown in figure 2.

1.3. General

The DCU consists of several components (see figure 1): the blower unit, the filter bank, the collection drum, and the collection manifold. The collection manifold consists of a main collector tube which is fed by individual tubes which connect to each bullet trap chamber module. The number of individual chambers varies from one range design to the

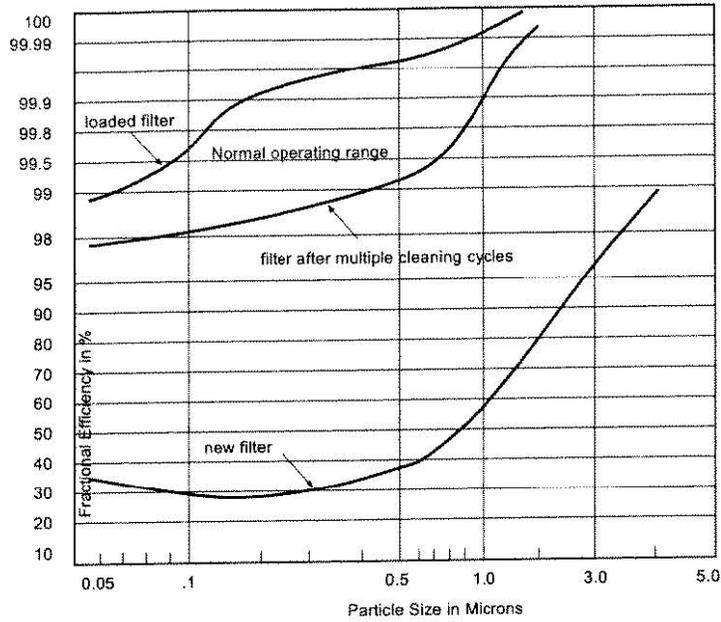


Figure 2. Filter Efficiency

next, so the main collector tube, the filter bank, and the blower will be sized accordingly.

A blast gate is provided where each individual tube enters the main collection tube. These gates are adjustable to vary the amount of air flow drawn off each bullet trap chamber. They are adjusted at the time of installation by a factory installer using a flow sensing device which is inserted at the calibration ports shown. Generally, these gates should not require adjustment by the user.

Inside the filter bank, air is passed through a group of filter cartridges. These filters are designed to process dry air only. If water is introduced into the filtration system by any means, the filters may be destroyed. Such damage will manifest itself either as a broken filter or a clogged filter. The user should maintain a supply of replacement filters on hand in case of a filter failure. If no failures occur, such spare filters can be used at the next regular replacement cycle. Replacement filters are available from Action Target and are not necessarily provided as a part of your original system.

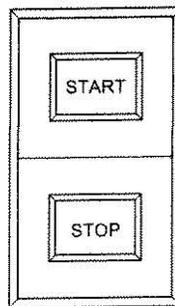


Figure 3. Figure of Start/Stop

2. Operation

2.1. Basic

The user controls for the DCU consist of two buttons: "start" & "stop" as shown in figure 3. Note that the exact location of these controls may be different for each installation. In installations where the operation of the DCU can not be detected audibly, there may also be an optional "power-on" indicator light on the user control panel.

To begin operation, press the start button and hold it down. The low-pressure alarm will sound for several seconds while the blower is coming up to speed. When proper operating pressure has been achieved, the alarm will go silent. When this happens, you may release the start button. If the start button is released before the alarm goes silent (by itself) the DCU will enter a shutdown state and will not operate properly until the start sequence is executed properly.

If the low-pressure alarm does not automatically turn off after a few seconds, this is an indication of a filter breach. The DCU should not be operated further until the filters have been examined (see section 4 on debugging). When the DCU is in operation, you should be able to clearly hear the sound of the blower. If at any time, the blower turns off or if the alarm sounds, cease operation immediately until the unit has been thoroughly checked.

When use of the DCU is concluded, press the stop button momentarily. This will remove power to the unit. The unit may be safely left in this state overnight or for extended periods of time. If it is desired that the unit be unusable for a period of time, remove power to the system by turning off the main breakers (120V control voltage and 3 phase motor voltage) or turn off and lock the local disconnect.

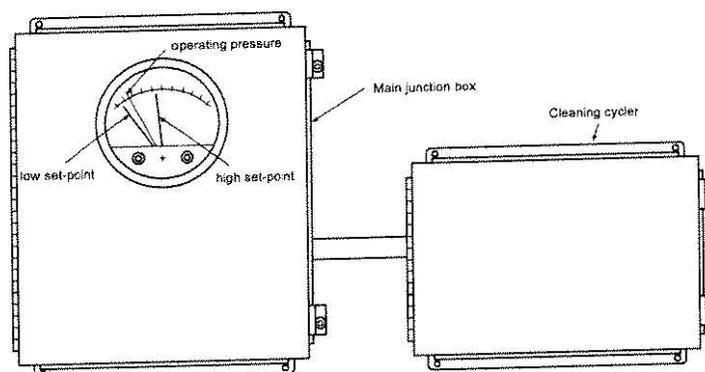


Figure 4. Main Junction Boxes with timers

2.2. Differential Pressure

Figure 4 shows the front view of the main junction box. This box should be located somewhere between the control panel and the DCU. It contains the control circuitry which starts and stops the DCU as well as timer(s) to control the cleaning cycles of the filters.

This same figure also shows the cleaning cyclor control box which should be somewhere close to the main junction box. This box contains circuitry which, under control of the main cleaning timer, energizes the cleaning system. This cleaning cycle occurs, one filter at a time, at timed intervals. See figure 5 for a technical schematic of this main junction box and proper location of the timers.

The gauge on the front of the main junction box shows the current operating pressure of the DCU. This is an indication of the difference between the pressures on each side of the filters (inlet side and outlet side). When the filters are properly loaded, there should be a normal operating pressure of about 1 to 2 inches (in-H₂O).

There are two knobs on the front of the gauge. One sets a high pressure set-point and the other sets a low pressure set-point. If the operating pressure rises above the high set-point, this is an indication that the filters are clogged. The control circuitry should sense this and begin a cleaning cycle. If the operating pressure falls below the low set-point,

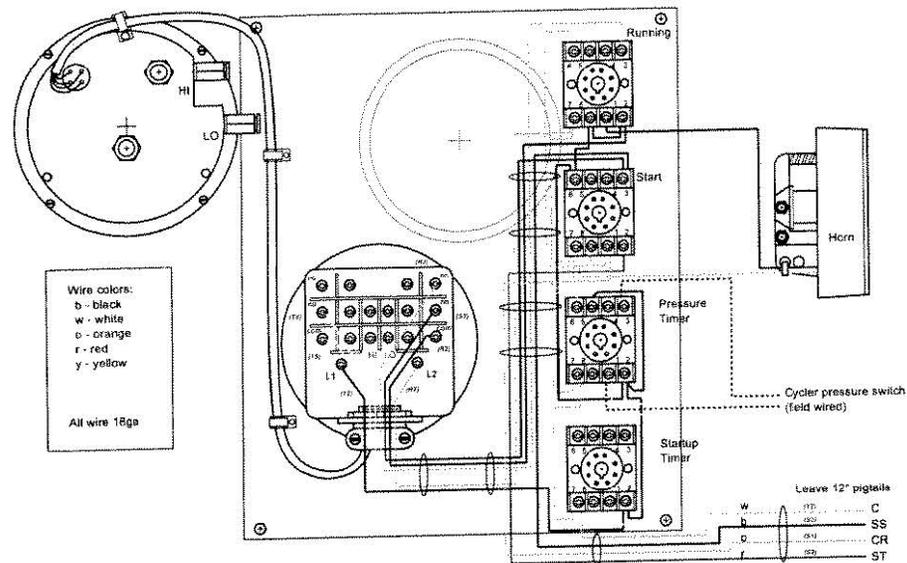


Figure 5. Main Control box harness with timer placement

this may be an indication that a filter has broken. The control circuitry should sense this and shut the system down so no particulates can escape through the broken filter.

Some systems are equipped with a second timer called the Startup Timer. This timer turns on each time power is applied to the system and runs a single cleaning cycle regardless of the pressure settings. If the timer module is missing (inside the junction box), the controller is not equipped with this option.

It should also be noted that new filters might register a pressure which is below the normal low set-point. This is simply a result of them being "too clean." In addition to causing a lower operating pressure, a filter which is "too clean" will not filter as well (see figure 2). Rather, it will allow larger particulates through than it will once it has been used for some time. As a result, there may be slightly increased particulate emissions from a system which has just recently had the filters changed.

In order to remedy this, there is a procedure called "loading" in which a powdery substance is introduced into the filtration system. This powder clings to the filters just as would the regular lead particulates during normal operation. This "cake" of powder on the filter surface increases the efficiency of the filter (as well as the operating pressure) to the proper specifications.

3. Maintenance

The DCU requires regular maintenance in order to ensure long life and reliability. A system which is operated with clogged filters or with an improper operating pressure can easily be damaged.

For this reason, it is required that you keep a log of all weekly maintenance sessions which records the date of the inspection, the type of procedures performed, and the readings observed on the equipment. If this log is not kept, the warranty for your DCU may be invalidated.

To prepare a log, simply make copies of the example log sheet in the back of this manual. Keep a book of these pages together. As each weekly maintenance procedure is executed, write in the appropriate information on the applicable sheet. (Note that the weekly procedure includes a daily procedure.) If service is required on your DCU these log sheets may be instrumental in determining the cause of the problems.

3.1. Daily

Each time the DCU is used, the differential pressure gauge on the main junction box should be checked. When the power is off, the gauge should read 0. During operation, the operating pressure should generally be about 1 to 2 inches. (This

“proper operating pressure” may vary from one system to the next. Check with Action Target at the time of installation to get the proper operating pressure for your system and enter it below.

Also check to see that the set-point knobs are properly set. The high point is generally set just above 2 inches and the low point is generally set just below 1 inch. Again, these settings may be site dependent. Enter the proper site pressures here:

- * _____ proper operating pressure
- * _____ low set-point pressure
- * _____ high set-point pressure

If either setting has been moved by anyone, return it to its proper setting at once. If the operating pressure is higher than the high set-point pressure, see section 4.3. If the operating pressure is lower than the low set-point pressure, see section 4.2.

There is generally an air compressor which provides pressure for the filter cleaning cycle. Check to see that the air pressure is in the range of 90 to 100 psi. There should be a purge valve on the bottom of the compressor, somewhere in the air line, or both. Each day, prior to use of the system, open this purge valve momentarily to see that compressed air blows out. If water comes out, continue purging until all water has been blown out.

3.2. Weekly

Perform the Daily procedure outlined in section 3.1. Record the results of today's Daily checks and Weekly checks in the log as shown in section 5.

3.2.1. Automatic Breach Detection

First, test the automatic breach detection circuitry. (Wear ear protection during this procedure.)

Second, turn the DCU power on. Test the automatic breach detection circuitry by slowly moving the low set-point knob to move the set-point up toward the normal operating pressure. When the low set-point reaches the operating pressure, the alarm should sound and the blower should turn off. After resetting the low set-point pressure to its proper value (see section 3.1), turn the entire system off and then back on again.

If the unit fails the breach-detection test, the sensor circuitry is malfunctioning. The malfunction may not pose an immediate threat. However, if a filter breaks, the surrounding environment will be contaminated with lead particulates. Therefore, this malfunction should be corrected immediately. Contact Action Target immediately for technical assistance.

3.2.2. Automatic Cleaning

Next, test the automatic cleaning circuitry. If your system is equipped with the Startup Timer, you will have to wait after power-on until the startup cleaning cycle has finished.

With the power on to the system, open the cover to the cleaning cyclor box and the main junction box (see figure 4). Do not touch any connections inside these boxes or electrical shock may occur.

With the system running, slowly move the high set-point knob to move the set-point down toward the normal operating pressure. When the high set-point reaches the operating pressure, the "R" light on the Pressure Timer module (inside the main junction box) should come on. Then, the red lights inside the cyclor box should begin to flash on very briefly and one at a time. (There are several seconds of delay from one light to the next.) Each time a light comes on in the cyclor box, this indicates a cleaning cycle on one of the filter cartridges.

If the unit fails this test, the automatic cleaning feature is malfunctioning. While this may not pose an immediate threat, before long, the filters will become clogged. This will impair the units effectiveness, it will increase environmental contamination, and may cause damage to the DCU. Therefore, this malfunction should be corrected immediately. Contact Action Target immediately for technical assistance.

Place a new filter in to replace the old one. Push the filter in firmly to make sure it is securely seated in its place. Repeat the procedure for the remaining filters. (If a single filter is being replaced because it is broken, the entire bank of filters should probably be replaced.) Replace the filter access doors, making sure the doors close tightly.

Make a note in maintenance logs of the date the filters were changed. This log must be kept in a place where future maintenance personnel will have access to it several years in the future as they perform the annual service routine (see section 3.4).

Proceed to section 3.6 to load the new filters.

3.6. Loading New Filter

As mentioned, new filters are not fully functional until they accumulate a coating of particulates on them. This can be accomplished quickly by "loading" the filter. Use the loading compound supplied by Action Target for this procedure.

Note all safety warnings on the bag containing the loading compound. You must take appropriate steps such as (gloves and a respirator) to avoid inhaling or ingesting the compound during this procedure.

Turn the system on. If the operating pressure is too low to keep the system running, turn the low set-point down enough that the system will stay on. Disconnect one of the tubes on the end of the collection manifold farthest away from the filter bank. Slowly sprinkle about 1 cup of loading compound into the pipe at a time while monitoring the operating pressure. As you add more compound, the operating pressure should slowly rise until it comes into the range of acceptable pressure (see section 3.1). It may take about 1/2 gallon of compound for each filter in the system. If the operating pressure is not affected by the loading procedure, stop the procedure and check the filters again to make sure they are properly seated. If any significant amount of the loading compound blows out the blower outlet, stop the procedure and locate the leak before continuing.

Once the proper operating pressure has been achieved, replace the tube on the collection manifold. If your system is using the Startup Timer, you should remove this timer as described in section 4.2. The timer should be replaced once the first automatic cleaning cycle has been generated. This may take several days to several weeks depending on the usage. If there are any questions, please call Action Target.

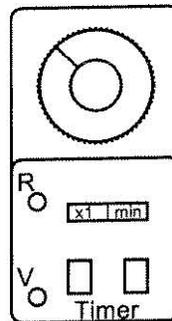


Figure 6. Timer and Adjustment

4. Debugging

4.1. System Won't Turn On

If the system will not turn on, first check to see that the main circuit breakers are turned on. There should be a 120V line which operates the control circuitry in the main junction box. When this voltage is on, there should be a "V" light on on the timer module inside the this box. There should also be a breaker which operates the motor voltage. This is probably 3 phase power at 208V or 408V.

4.2. Pressure Too Low

If the system has stopped automatically with an alarm sounding, or if the alarm never goes off during the startup procedure, this may indicate one of several problems.

If the filters are relatively new, you should check the cleaning cycle. Each cleaning cycle should run long enough to pulse the cleaning valve on each filter only about 1 time. If the cleaning cycle is excessively long, the filters may become unloaded and will not function properly.

If your system consistently operates at a pressure which is too low, check to see if the junction box is equipped with a Startup Timer. This timer cleans the filters once each time the unit is turned on regardless of operating pressure. To disable this function, simply remove the timer (pull it out of its socket). Without this timer, the system will only clean when the filter pressure rises over the high set point. In some installations, the DCU can be operated in this mode indefinitely. If you have questions about your site, please call Action Target.

The other timer is the Pressure Timer (both timers are as shown in figure 6). In a normal cleaning cycle, cleaning will continue until the operating pressure drops below the high set-point. From that time, the timer will begin running for the amount of time set on the dial (should generally be 2 - 3 minutes). This time should be sufficient to bring the operating pressure back into the acceptable region, but not so long that the natural loading of the filter is removed.

If the filters are older, or you think that water may have recently been introduced into the system, it is likely that a filter is broken. Follow the procedure in section 3.5 for changing the filters.

If the alarm has not sounded, but an examination of the pressure shows it is too low, the procedures listed earlier in this section are still valid. However, you have the added problem that the low-pressure detection circuitry is malfunctioning. Contact Action Target immediately for technical assistance.

4.3. Pressure Too High

If a routine examination of the system shows that the operating pressure is too high, this indicates that the filters may be clogged. Open the door to the cleaning cyclor box (see figure 4) and see if the indicator lights for the cleaning valves are coming on in sequence as described in the maintenance section. If the lights are not coming on, there is a malfunction in the cleaning circuitry. Contact Action Target immediately for technical assistance.

If the lights are coming on in sequence, check to see if there is air pressure present in the air compressor. This can easily be done by opening a purge valve momentarily. If air pressure is present, then either the cleaning valves are not functioning properly, or the filters are uncleanable.

Listen to the cleaning valves on the side of the filter bank during the cleaning cycle. As the cyclor lights flash on, you should be able to hear a burst of air as the valve fires. If the cyclor lights are flashing, but the valves are not operating, contact Action Target for technical assistance.

If you know that water has been introduced into the system recently, follow the procedure in section 3.5 for changing the filters. If the cleaning valves do not seem to be working properly or if the system quickly clogs again after filter replacement, contact Action Target immediately for technical assistance.

5. Weekly Maintenance Log Sheet

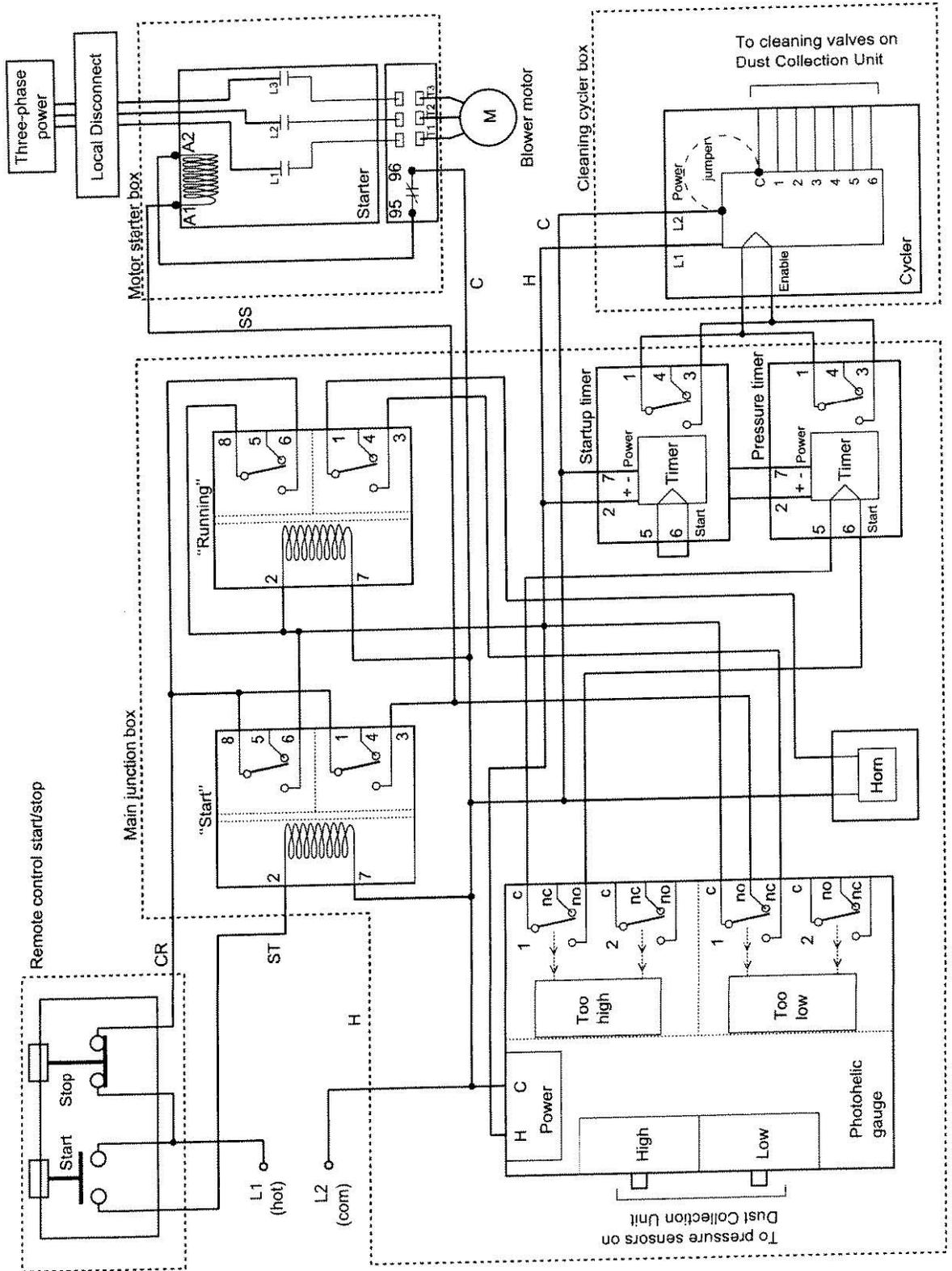


Figure 7. Control Schematic

Weekly Maintenance Log Sheet

Inspection Date	Off Pressure Value	On Pressure Value	Low Needle Setting	High Needle Setting	Auto Breach	Auto Clean	Lead Accum.	Compr. Oil	Compr. Pressure Value
					OK	OK	OK	OK	
Actions Taken:									
Actions Taken:									
Actions Taken:									
Actions Taken:									
Actions Taken:									
Actions Taken:									
Actions Taken:									

Figure 8. Weekly log sheet

Complete TCT-2 System Operations And Maintenance Manual



PO Box 536, Provo, UT 84603, 801-377-8033

Use and Operation

Complete TCT-2 System

The data contained herein is disclosed for the sole purpose of assisting the user in the operation of Action Target equipment. All data and specifications are subject to change without notice. This data is applicable only to the part name/number identified. Some products may be customized for specific use, so your product may differ from that described herein.

Assembly: @: B_tc2

Version:

Printed: 2006-Nov-28



Table of Contents

1. Overview	3
1.1. The TC2	3
1.2. Warning	3
1.3. Lead Particulates	4
1.4. Other Sources of Lead Particulates	5
1.5. Range Design Considerations	5
2. Operation	8
3. Maintenance	8
3.1. Damage	8
3.2. Deflector	8
3.3. Deceleration Chamber	8
3.4. Cannister Inspection	9
3.5. Cleanup	10
3.6. Lead Removal Using Containment Cannisters	10
3.7. Lead Removal With No Containers	11
3.8. Dry Lead Cleanup Procedure	11
4. Wet Lead Cleanup Procedure	12
4.1. Painting	12
5. ACTION TARGET LIMITED WARRANTY	13



1. Overview

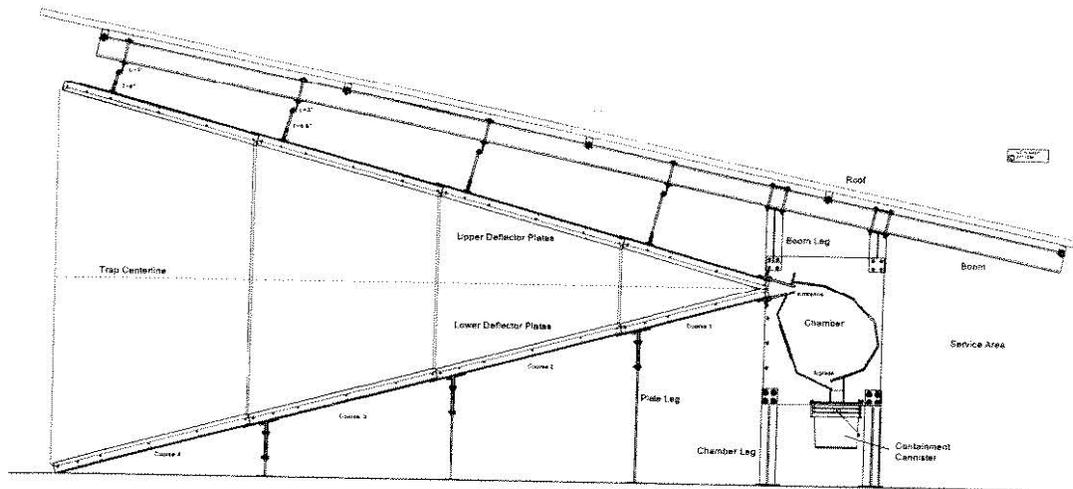


Figure 1. Typical Side View

1.1. The TC2

The TC2 is the second generation in the family of Total Containment Traps. It differs from the first generation of Total Containment Traps primarily in that its containment chamber is fabricated as a single unit. Its impact surfaces are also optimized for a more efficient deceleration of projectiles. And its lead collection system is greatly improved.

The TC2 is one of the most innovative and safe steel bullet traps available for any firing range - indoor or outdoor. Unlike many traps of the past, the TC2 is a projectile "containment system." This means that it not only stops bullets, but also collects them in a containment cannister where they will be permanently stored until they are transported for disposal or recycling. The low impact angles and sealed, enclosed chamber design of the TC2 greatly reduce emissions of lead particulates associated with traditional, open-frame steel traps. The addition of an optional dust collection unit virtually eliminates airborne particulate emissions. The heavy steel design is long-lasting and rugged to assure years of reliable use.

The TC2 uses hardened steel deflector plates oriented at low angles of impact to direct projectiles through a small aperture and into a containment chamber (see figure 2). Once inside the chamber, the bullet is broken up and decelerated by a series of impact plates oriented at increasing angles of incidence. Once stopped, bullet fragments fall downward through the base of the chamber where they are collected in a cannister. (Some other collection options are available.)

1.2. Warning

The TC2 is designed to virtually eliminate bullet splatter back in the direction of the shooter. However, bullet splatter is not entirely predictable. Some rounds fragment in a regular manner, while others can throw off pieces in unexpected directions. If you are in the vicinity of any surface where bullets are impacting, it is only a matter of time until you will be struck by some small fragment of a bullet. While this is not likely to be life-threatening, it can cause damage to eyes or other exposed areas of the body.

For this and other reasons, eye and ear protection must be mandatory on any shooting range. Long pants and shirt sleeves help reduce the chance of discomfort due to the impact of bullet splatter.

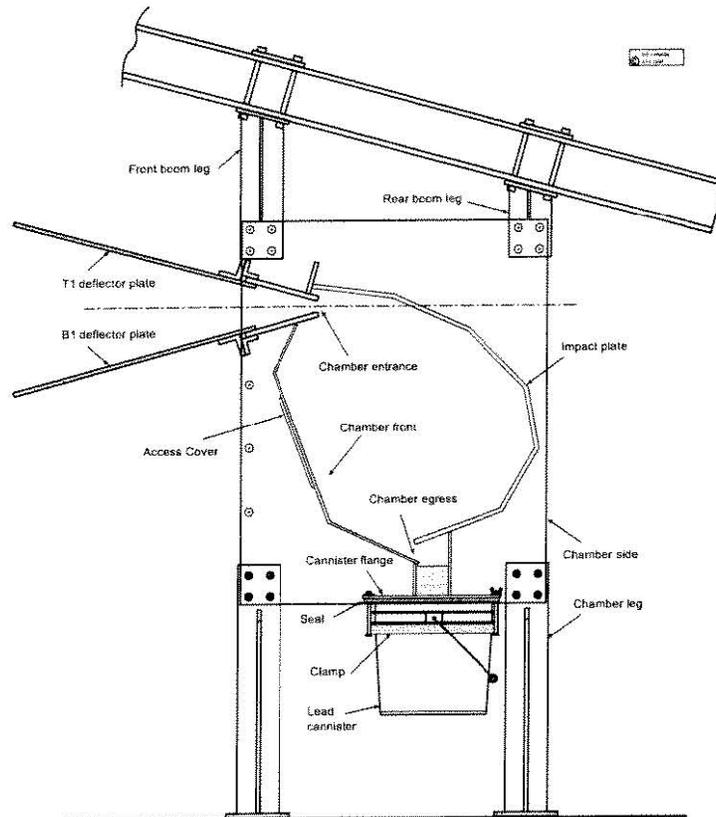


Figure 2. Trap Chamber Side View

Action Target will not accept responsibility for damages due to bullet splatter, environmental contamination or any other consequence of the use of a TC2. Action Target makes no representation whatsoever that the TC2 or any other bullet catching device will contain 100 percent of the potential splatter or contaminants present on a shooting range. The TC2 is a primary containment system only. Secondary containment or other redundant means may be required in order to assure operation compliant with local, federal or other environmental standards.

The cleanup procedures outlined herein are not represented by Action Target to be inherently safe nor 100 per cent effective. These procedures are given for reference only and outline the absolute minimum safety standards that should be considered. Therefore, these procedures may need to be combined with redundant precautions such as respirators or other protective precautions to isolate the operator from lead and/or other contaminants.

1.3. Lead Particulates

As the bullet is decelerated inside the containment chamber, it becomes fragmented. The resulting particulates range from large, heavy fragments down to "micron-size" dust. In most lower volume applications, the great majority of these particulates eventually make their own way down into the collection cannisters at the base of each chamber. The small portion of the particulates which don't make it into the containment chamber eventually settle on the lower deflector plates or on the ground in the surrounding area. On indoor ranges, this dust can easily be collected as part of a regular cleaning procedure with a HEPA vacuum.

In installations which are outdoors, or where there are a large volume of high velocity rounds fired, it is generally not acceptable to allow such lead emissions since wind and rain can carry the contaminants away from the trap area and into the surrounding environment. In such cases, a secondary containment system is



highly recommended.

A further device for minimizing lead emissions from the containment chamber is the "Dust Containment Unit" (DCU) from Action Target. The DCU is a high volume, high pressure vacuum system which evacuates air and particulates from the bullet containment area where the majority of lead particulates are created. This system creates a "net negative pressure" inside the containment chamber, causing air to flow into the chamber entrance, carrying lead and other particulates as it goes. The DCU then filters particulates from the air, depositing the collected matter in a canister for recycling or disposal. The clean, filtered air is expelled into the atmosphere. Please see the DCU operations manual for more specific information.

1.4. Other Sources of Lead Particulates

The lead collection mechanisms of the TC2 can only be expected to deal with lead and projectiles which successfully reach its containment chamber. Some errant projectiles strike walls, the ground, or other solid objects prior to coming in contact with the bullet trap. All projectiles experience slight deformation on initial contact with the bullet trap deflector plates. And many types of ammunition expel lead particulates and other contaminants directly from the barrel of the gun.

All these are additional, potential sources of contaminants and must be addressed in addition to the use of the TC2. Perhaps the most effective way to prevent the spreading of such contaminants into the surrounding environment is to perform a regular cleaning procedure with a HEPA vacuum of all effected surfaces such as the mouth of the bullet trap, the surrounding ground, the walls and ground surrounding the shooter, and the area behind the bullet trap.

Some ranges successfully utilize a wet wash-down procedure to control particulate matter. For such a procedure, the range must be equipped with a catch basin or reservoir of some type to contain the runoff water. This water can not be released into the environment until it is purified in some way either by evaporation, filtration, or settling. Section 1.5 goes into more detail on this subject. Note that a wet cleanup procedure is not recommended on ranges which utilize the DCU since the direct introduction of water into the collection unit can destroy the filters and necessitate their replacement.

1.5. Range Design Considerations

1.5.1. Lane Placement

The TC2 consists of a number of modules placed side by side to form a complete bullet trap (see figure 3). Normally these joint strips are not as resilient as the deflector plates which form the shooting lanes so heavy shooting on the modules joints should be avoided where possible. In most cases, each trap module should correspond with a shooting lane. In other words, orient the targets so that the majority of rounds hitting the target will impact in the center section of a trap module rather than on the joints. The TC2 can optionally be provided with special hardened joint strips for high power applications or applications where heavy shooting on the joints can not be avoided.

Depending on the angle, cross directional shooting can radically reduce the effectiveness of the TC2. For example, never shoot from lane 1 into the trap at lane 20. The angle of impact on the trap may cause damage or injury. As might be expected, this problem is more acute when using high velocity projectiles and much less significant with pistol fire. In the case of rifle fire, the trap may be damaged or completely penetrated. In any case, the splatter coming off the round can be dangerous to observers or other shooters in the area.

It is not recommended that the shooter stand directly in the mouth of the trap while firing. The range should be designed so the shooter is not required to stand any closer than 20 ft. from the front aperture of the trap. The probability of being struck by small fragments of bullet splatter will dramatically decrease as the distance from the trap is increased.

It is also recommended that the range be oriented so that the majority of projectiles enter the trap on a flat, horizontal trajectory. The closer the point of impact is to the opening of the containment chamber, the less the chances will be of producing particulates which do not make it into the chamber.

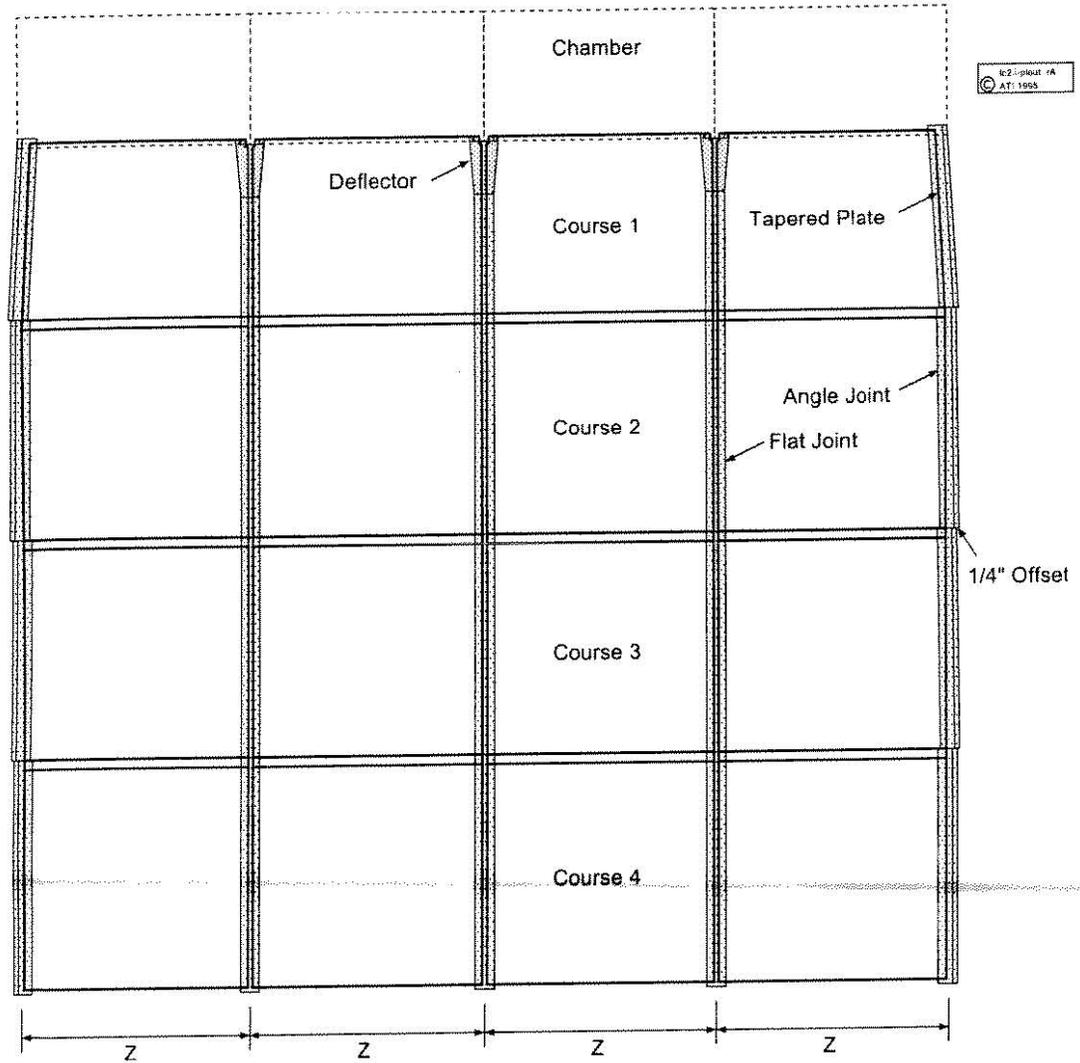


Figure 3. Figurative Top View

1.5.2. Roof Option

It is not recommended that rainwater be allowed to pass into the containment chamber in any installation. In fact, on installations which use the Dust Collection Unit, any significant volume of water which enters the system can solidify the particulates accumulated on the filters. This renders them useless and requires replacement of all filters in the system.

The TC2 can be installed inside a building or outdoors. When installed inside a building, it is most efficient if the upper portions of the trap can be supported by the roof structure inherent in the building. The trap structure adds about 15 psf to the average roof load in the area of the trap.

The TC2 is also available as a totally self-supporting system, requiring only a 6", 4000psi concrete pad under the area of the trap and no overhead support (see figure 1). When this system is employed, it is possible to add an optional roof system which covers the area of the trap, about 24" on each side, and about 36" on the back. While this does not keep all of the rain off the bullet trap, it does keep the chambers dry as well as the vast majority of lead particulates which might be present on the ground underneath the trap.

However, if the range is designed in such a way that the runoff from other parts of the range drains toward



enough capacity to contain the likely rainfall for your particular region (check with a local engineer for local rainfall projections).

Evaporation pools are generally very wide and very shallow. They should be as deep as necessary to contain the desired runoff, but should be as wide as possible to speed the evaporation process. As with the walls around the range, walls around the pond should be as high as possible to keep lead in the pond area.

2. Operation

The TC2 itself is a passive device so it does not require any power to operate. However, if a conveyor option or the dust collection unit is used, they must be turned on prior to use of the system. Please refer to the DCU manual for specific operational details.

3. Maintenance

The TC2 requires regular maintenance. The most important procedure is the regular removal of lead from the collection cannisters or other accumulation area. Since there are a variety of possible configuration, see the subsection which best matches your installation.

When accessing the trap area, do not kneel or otherwise contact the ground with areas other than the bottom of your shoes. After handling portions of the trap, accessing the trap area, or performing maintenance and cleaning procedures, always wash hands and face with soap and water or shower if possible. Launder clothing at the soonest opportunity.

3.1. Damage

If the trap is struck by a round of higher power than it can withstand or which impacts at an improper angle, some damage may occur. This may be a crater or a complete hole through a plate or joint.

Such damage creates a further safety hazard by providing a source of increased bullet splatter. If any component of the trap is damaged in this way, repair or replace the part before using the trap further. All components and replacement parts are available from Action Target.

3.2. Deflector

A Deflector is located in between every chamber (Shown in figures 5 and 6). Frequently inspected this part. With repeated bullet impact, the tip of the deflector will become damaged. Figure 7 shows a deflector that needs replacing. When a deflector is not replaced the potential of returned splatter increases dramatically. Call Action Target's Customer Service Dept. at 1-801-377-8033 to purchase replacements as needed.

TC2 Plate Thickness Part Number

1/4"	1212
3/8"	1212
1/2"	1217

3.3. Deceleration Chamber

The first likely place of wear on the Total Containment Trap is at the bottom of the deceleration chamber. See figure 2. After excessive wear is experienced, this portion of the chamber may eventually breach and allow bullets to escape. It is important that this part of the trap be inspected as a part of regular service each time the lead cannister buckets are removed. If any bulging is noticed, please contact Action Target immediately. If repairs are required, Action Target will perform these repairs according to the schedule in section 5.

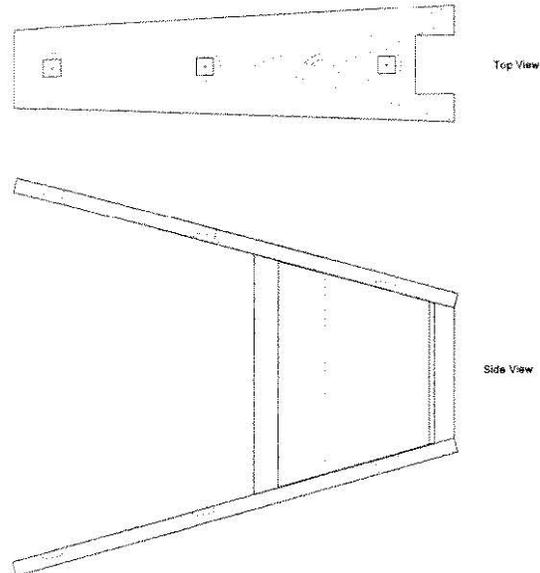


Figure 5. TC2 Deflector

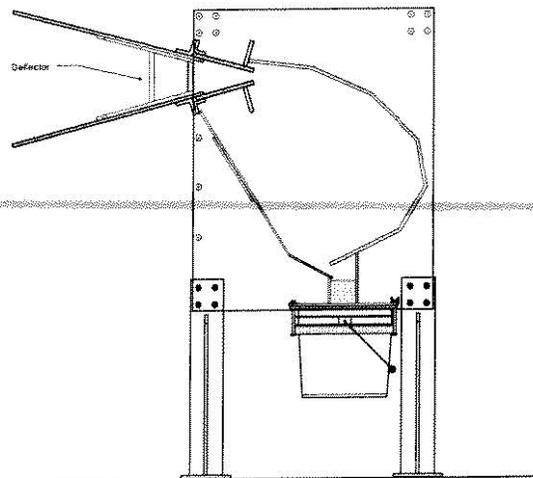


Figure 6. Deflector on the TC2

Incidence of bullets breaching the trap in this location are extremely rare and have not proposed safety risks. However, frequent inspections will insure that this is not a problem for you.

3.4. Cannister Inspection

Make a weekly inspection of the bullet trap. Inspect the top of each collection cannister to see that it is firmly seated against the gasket and will not leak out lead dust. If necessary, tighten the clamping nuts on the appropriate side of the cannister (there are 4 clamping nuts) to pull the cannister up firmly, but not too tight, against the gasket.

Make a note of the level of lead in the cannisters. Compare this level with the previous week's level. If there is little or no lead accumulating in the cannisters, you may have a clogged chamber. This condition must be checked immediately before it becomes a larger problem!.

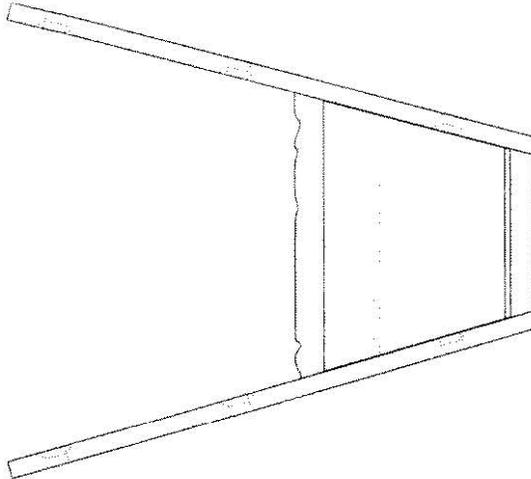


Figure 7. A Deflector Needing Replacement

To inspect the chamber, first remove the cannisters along the bottom and look up into the chamber with a flashlight. You should be able to see if there is a lead clog at the base of the chamber.

If this method is not satisfactory, remove the access cover on the front of the chamber (where the air is drawn out for the DCU). Examine the inside of the chamber to determine if lead is accumulating inside. If any large chunks of lead are present which will not fit through the normal outlet, remove them through the access hole.

To clean a clogged chamber, reach through the front access port with a HEPA vacuum hose and draw out all the lead material into the vacuum.

If you have a clogged chamber, it is important to determine why. The chamber outlet is designed to pass any object larger than about 1 1/4" diameter. If you shoot a large volume of shotgun rounds at the trap, it is possible for the plastic wads to aggravate a clogging problem. But generally, even shotgun wads should pass through the chamber without much problem. If you have a persistent clogging problem, please contact Action Target for further assistance.

3.5. Cleanup

A Dust Collection Unit will greatly reduce lead emissions at and around the bullet trap. However, it will not eliminate the need for periodic lead cleanup procedures around the trap. Therefore two types of cleaning are discussed:

Normal Lead Removal from the Container or Collection Area

Lead Cleanup in the Surrounding Area

If you need help obtaining equipment such as a HEPA vacuum cleaner contact Action Target for assistance. Remember that there will generally be some airborne lead in the area surrounding the bullet trap. So before entering the trap area, you should wait for 15 minutes after shooting is concluded and collection or ventilation systems have been turned off. This will allow lead dust to settle on the ground where it is more easily dealt with.

3.6. Lead Removal Using Containment Cannisters

If your trap is equipped with containment cannisters, you can monitor the accumulation of lead in each cannister very easily. Since the cannisters are somewhat translucent, the accumulation level can be viewed from the outside.

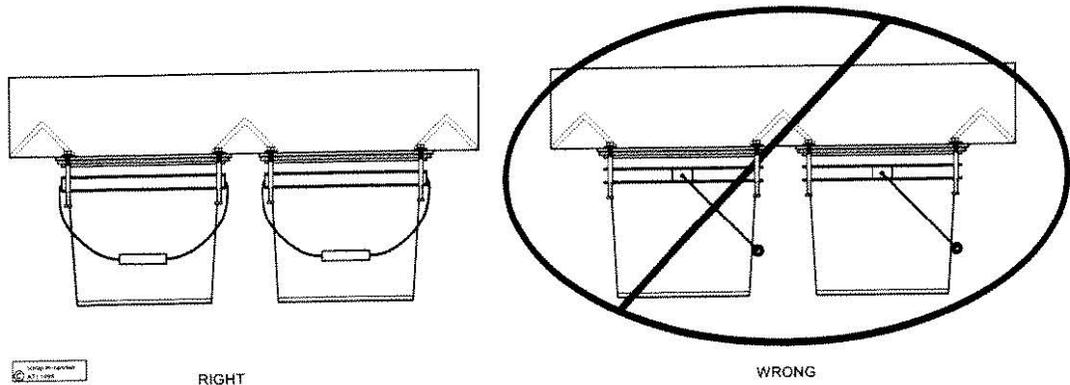


Figure 8. Cannister Attachment

The user can wait until some cannisters are nearly full and then change out the entire system. Or, each cannister can be changed individually as it becomes full. The latter method distributes the work load over time, making the process easier for a single maintenance person to accomplish. For example, if one or two cannisters are changed each day, the process is much less difficult than if the entire process is attempted at one time.

Each cannister is designed to be small enough that it can be lifted even when completely full of lead. However, even with the relatively small cannister size, it can be quite heavy. It is recommended that the operator use a lifting belt, a hand truck or other lifting apparatus where possible.

When it is time to change a cannister, slide a board or some other support underneath the cannister which is tall enough to leave just a slight gap (1/4" or so) between the support and the bottom of the cannister. Loosen the two nuts on the cannister clamps which are visible from the access area. (Do not loosen the nuts on the opposite (front) side of the chamber.)

As you loosen the nuts, the cannister will drop down away from the gasket. Slide the cannister out away from the trap and immediately install a lid by pounding it into place with a hammer until sealed tight. Do not attempt to carry or transport the cannister without the lid in place.

Replace the cannister with an empty one. Reinstall the clamps, making sure that the clamps lock in under the portion of the rim of the cannister where they are reinforced (where the handle ring attaches). See figure 8 for an example of this. Tighten the clamps to pull the new cannister tightly up against the flange. If the clamps are not tight, the seal will not be maintained as the cannister becomes heavy under the weight of the lead.

3.7. Lead Removal With No Containers

For this type of installation lead removal is, in essence, the same as lead cleanup since all captured lead is simply dropped onto the ground under the trap. Refer to the applicable cleanup section below.

3.8. Dry Lead Cleanup Procedure

If there is a significant accumulation of lead dust in the trap area, it should be visible as a fine, black dust on the ground. Begin vacuuming as you enter the area. If you enter through a door, vacuum the door off first. Vacuum the floor and any flat areas where dust may accumulate. Do not proceed past a point which you have not yet cleaned.

Never use a broom, a shovel, compressed air or any other means to move dry lead dust as this will lift the dust into the air where it can become a health hazard. Do not use a vacuum cleaner with a beater brush. The vacuum should rely solely on suction to pull in the dust.

If your system has no container system, you may be able to vacuum all lead fragments right up off the floor. However, if the volume of lead is greater than the capacity of your HEPA vacuum, you should consider the



containment cannister option or a bigger HEPA vacuum.

4. Wet Lead Cleanup Procedure

Wet cleanup should only be used on ranges which have a secondary containment trough or some other mechanism to prevent contaminated wash-down water from entering the surrounding environment prior to being purified. See section 1.5 above for more information on this.

Unlike the dry cleanup procedure, this procedure may more easily be used for lead removal from a trap with no lead container system. Or it can simply be used to clean up the area surrounding the bullet trap of any smaller amounts of lead which might have escaped other collection means.

Again, begin by allowing a settling time to pass so all airborne particulates have settled down to the ground. Use a hose with a nozzle capable of spraying a fine mist or a concentrated stream. Start by setting the nozzle to a fine mist. Spray down the surrounding areas with the mist so that all lead particulates become completely wet, but be careful not to disturb the dust and make it airborne.

If the primary collection area is on the floor, there will be large piles of lead directly under the containment chambers. When these piles are completely saturated with water, turn off the hose and use a flat bottom shovel to pick up the lead and deposit it in a collection bucket. As you scoop up the lead, allow excess water to drain back off to the floor. Again, if you see any dry lead, stop immediately and wet it down with a fine spray before continuing. When the major portion of lead has been collected in this way, proceed to use the water stream to direct the remaining small portion into the collection trough.

If the trap is equipped with cannisters or a conveyor, the bulk of the lead will already have been collected. In either case, the only thing left now on the floor should be a very small amount of fine particulates. With all surrounding areas sufficiently wet, turn the nozzle to a concentrated stream and use this stream to direct the dirt and particulates into the secondary containment trough. You must be careful that you not use so much water as to overflow the trough. So do your work quickly, using only the water necessary to do the job.

Eventually the collection trough will become full of dirt and lead particulates. At any time when this matter is completely saturated with water, it can simply be shoveled out into a container. It is generally not necessary to remove every last bit of lead. Rather, just remove enough so that you can continue to use the trough for catching cleanup water. If you ever do need to completely clean out the trough, shovel out all the lead that you effectively can, allow the remaining water to completely evaporate, and then vacuum out the remaining lead particulates with a HEPA vacuum.

4.1. Painting

All outside surfaces of the trap should be kept painted to prevent rusting. The TC2 comes with base coat of rust inhibiting primer. In time this finish may degrade, particularly in those areas of most intense impact from bullets. The shock of the impacts on the plates may cause the paint finish to gradually flake off (on both sides), exposing the underlying steel.

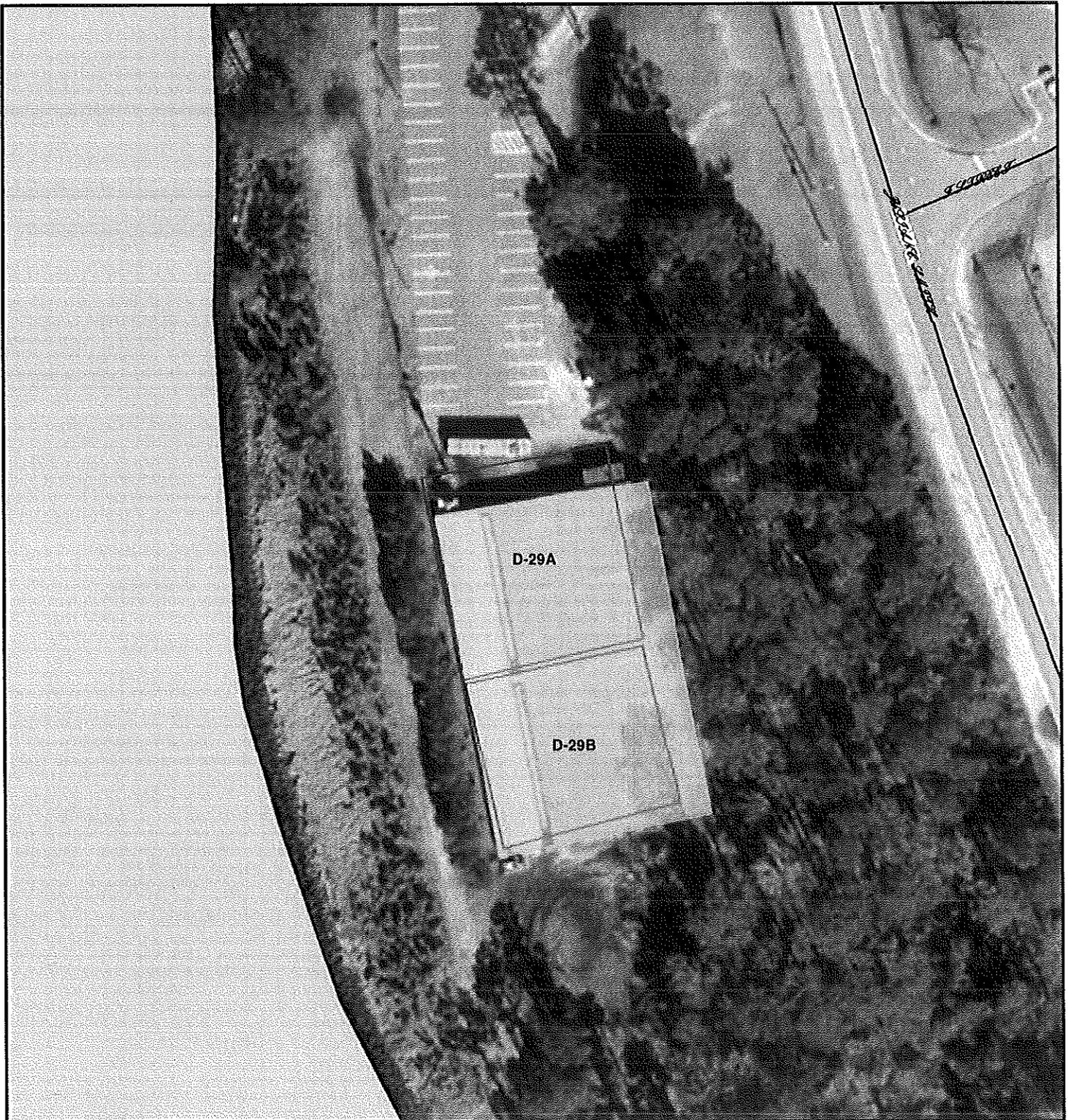
The hardened armor plate is somewhat resistant to rusting. However, in most cases, the joint components are not. On the side where the bullets strike, the lead coating left on the plate tends to help reduce problems from rust. But as flaking occurs on the opposite side of the plate, these areas should be spot painted to ensure a long useful life of all components.

In areas where corrosion is an increased problem, an epoxy paint offers increased life. However, epoxy paint is no more resistant to flaking than less expensive alternatives. So a moderately priced, zinc based industrial coating may be the overall best alternative.

Unlike some other bullet trap designs, the steel plates do not need to be oiled. While application of oil is an acceptable method for preventing corrosion on the steel plates, the introduction of oil into recovered lead may complicate the recycling process, rendering the lead less valuable than it might otherwise be. Furthermore, if oil is introduced into the dust collection unit, the filters may be damaged or destroyed.

ATTACHMENT J-1502000-07
BULLET TRAP LOCATIONS

Range Name	Locations	No. of Lanes	No. of Buckets	Dumping Frequency	No. Drums Per Dump
F-11A	Piney Green Road, MCBCL	16	70	2 to 3 months	8 to 9
F-11B	Piney Green Road, MCBCL	16	70	Quarterly	8 to 9
D-29A	Julian C. Smith Road, MCBCL	14	62	Quarterly	6 to 8
D-29B	Julian C. Smith Road, MCBCL	14	62	Quarterly	6 to 8
B-12	Curtis Road, MCAS-NR	10	46	Quarterly	2 to 3
SR-11	Little Shakling Road, off HWY 17	14	62	Quarterly	1
A-1	Camp Johnson, Off Harding Rd	14	62	Quarterly	1
I-1	Courthouse Bay – Demo Range	16	70	Quarterly	1
RR104	Stone Bay Walk Down	50	Auger Conveyor System	2 to 3 months	2 to 3
SRR19A	Stone Bay Walk Down	50	Auger Conveyor System	2 to 3 months	2 to 3
RR-16	Stone Bay, near Steam Plant	30	Rubber Berm Trap	Semi-Annual	
RR501	MARSOC Complex	16	Auger Conveyor System	2 to 3 months	8 to 9
MCASCP	MCAS Cherry Point	25	75	2 to 3 months	4 to 7



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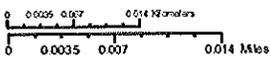
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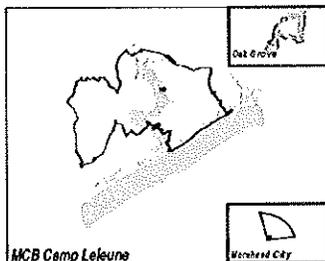
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SCALE 1:800



Legend	
	Building
	Range Area
	Road
	Water Features



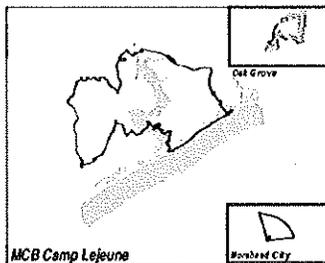
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Wentworth City



0 0.003 0.006 0.012 Miles

Legend	
	Building
	Range Area
	Road
	Water Features



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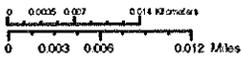
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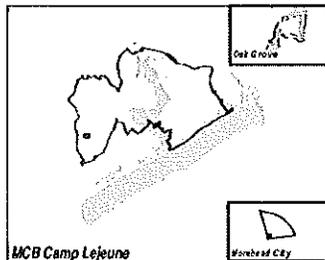
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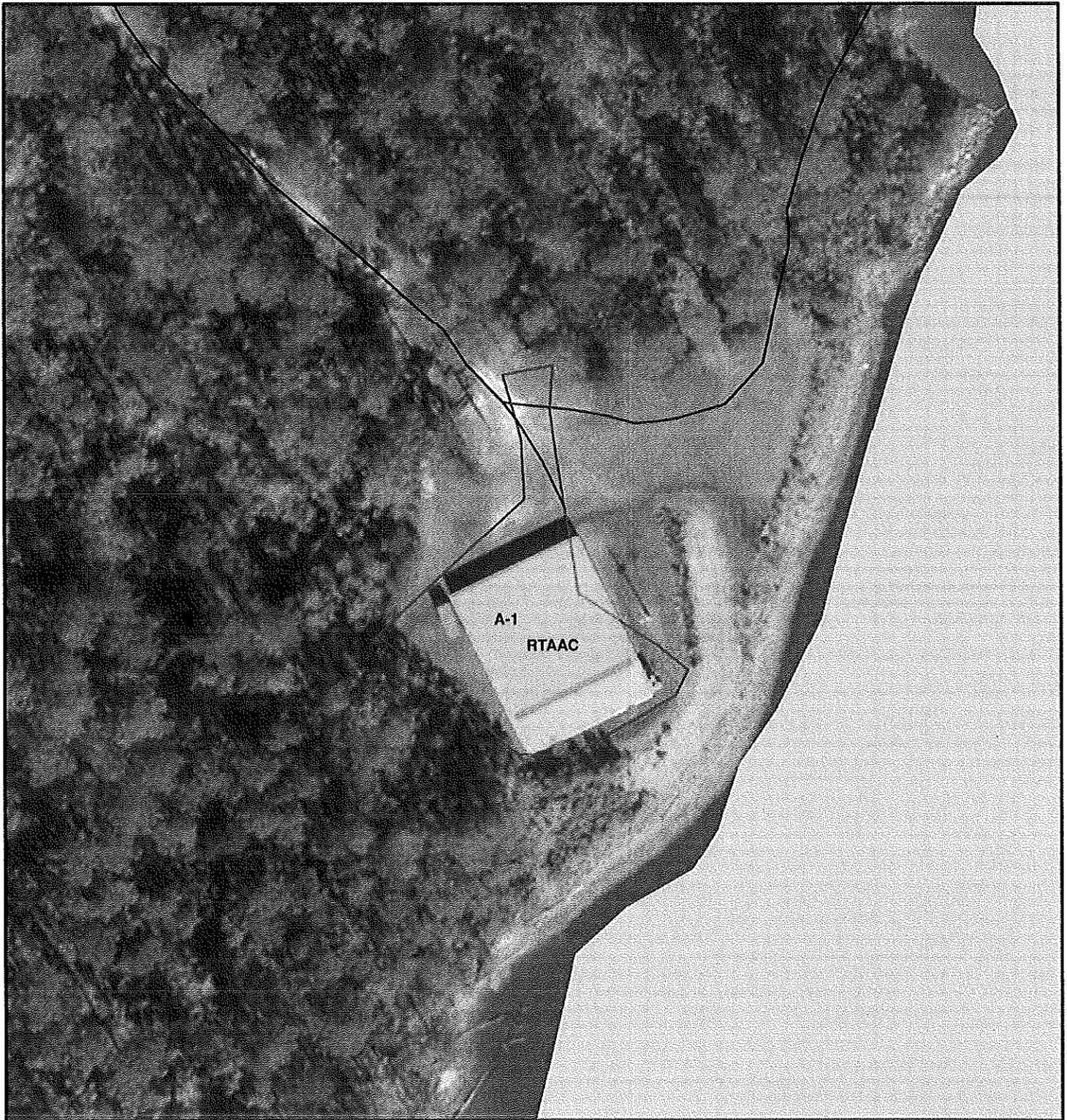
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U 
SCALE 1:800



Legend	
	Building
	Range Area
	Road
	Water Features





EDITION **CLJN**, SERIES **0000**, SHEET **0013**
MCB CAMP LEJEUNE

SPHEROID GEODETIC REFERENCE SYSTEM 1980
PROJECTION UNIVERSAL TRANSVERSE MERCATOR
HORIZONTAL DATUM NORTH AMERICAN DATUM 1983
CONTROLLED BY USGS, NATIONAL GEODETIC SURVEY POINTS
GRID 1000-METER UTM ZONE 18

Map generated using the Geographic Information System Managed by the Installation Geospatial Information & Services Office Regional Geospatial Information & Services Division, GF, Marine Corps Installations East - Marine Corps Base Camp Lejeune

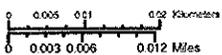
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Disclaimer:

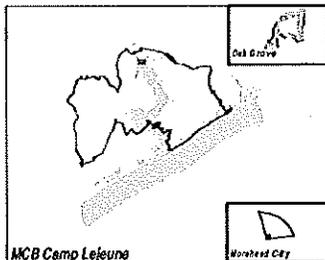
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U 
SCALE 1:1,000



Legend	
	Building
	Range Area
	Road
	Water Feature





EDITION **CLJN, SERIES 0000, SHEET 0013**
MCB CAMP LEJEUNE

SPHEROID: GEODETIC REFERENCE SYSTEM 1983
PROJECTION: UNIVERSAL TRANSVERSE MERCATOR
HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983
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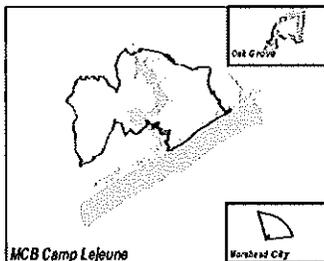
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U 
SCALE 1:800

0 0.003 0.006 0.012 Kilometers
0 0.003 0.006 0.012 Miles

Legend	
	Building
	Flange Area
	Road
	Water Features

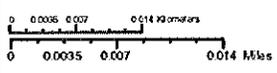


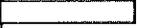
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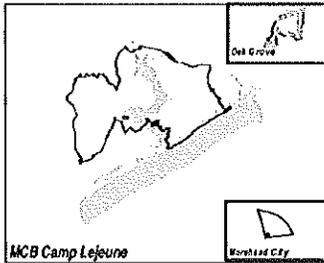
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U 
SCALE 1:800



Legend	
	Building
	Range Area
	Road
	Water Features



EDITION CLJN, SERIES 0000, SHEET 0013
MCB CAMP LEJEUNE

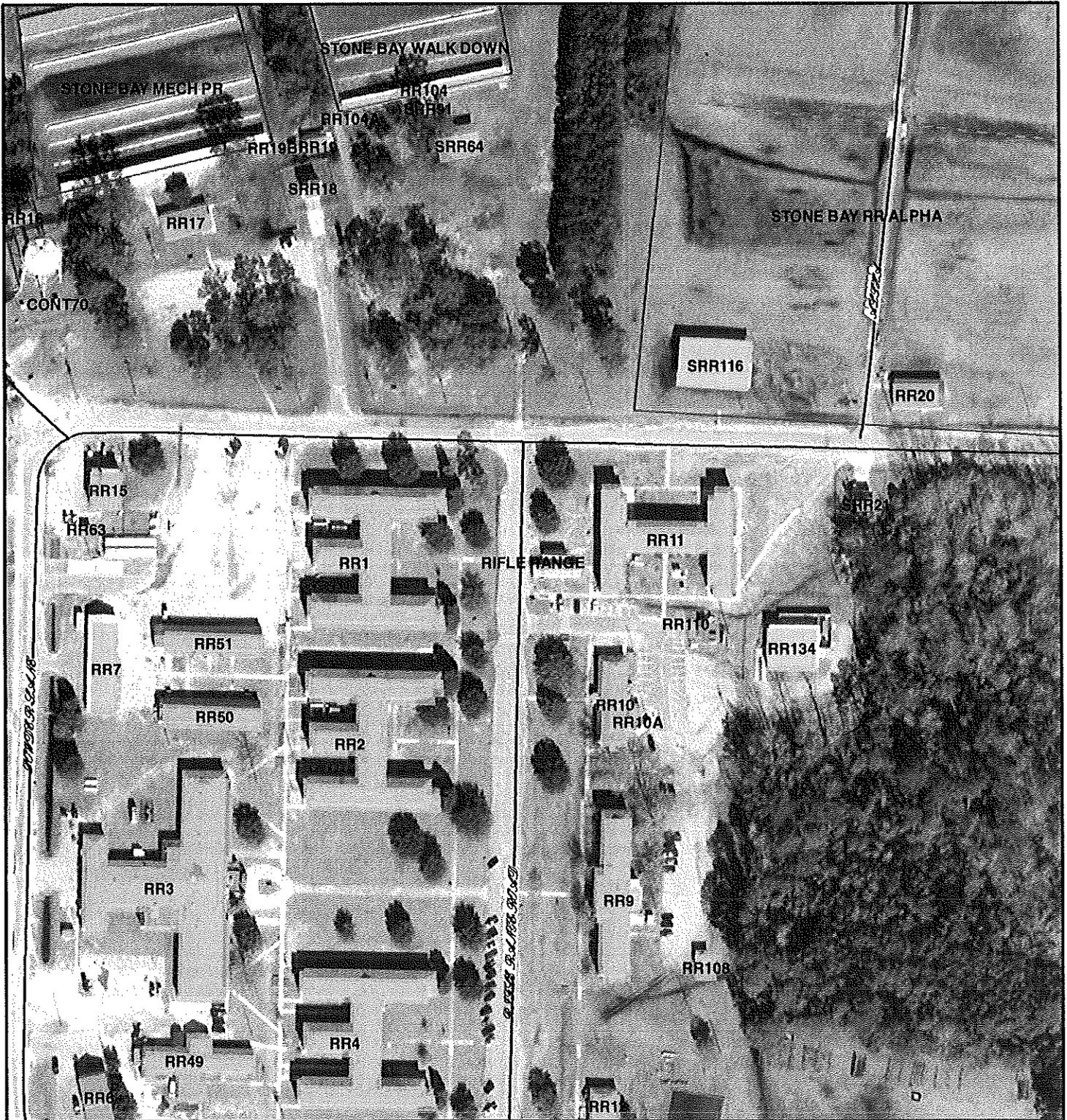
SPHEROID..... GEODETIC REFERENCE SYSTEM 1983
PROJECTION..... UNIVERSAL TRANSVERSE MERCATOR
HORIZONTAL DATUM..... NORTH AMERICAN DATUM 1983
CONTROLLED BY..... USGS, NATIONAL GEODEIC SURVEY POINTS
GRID..... 1000 - METER UTM ZONE 18

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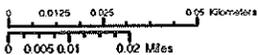
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MCB CAMP LEJEUNE

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HORIZONTAL DATUM NORTH AMERICAN DATUM 1983
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GRID 1000 - METER UTM ZONE 18

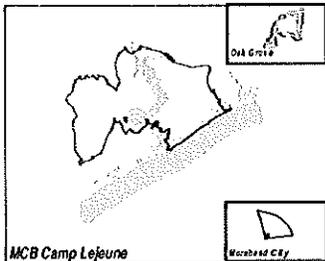
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U
SCALE 1:2,000



Legend	
	Building
	Range Area
	Road
	Water Feature



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EDITION **CLJN**, SERIES **0000**, SHEET **0013**
MCB CAMP LEJEUNE

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PROJECTION..... UNIVERSAL TRANSVERSE MERCATOR
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CONTROLLED BY..... USGS, NATIONAL GEODETIC SURVEY POINTS
GRID..... 1000- METER UTM ZONE 18

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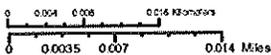
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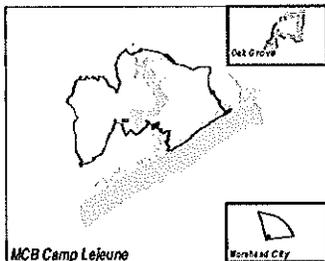
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SCALE 1:800



Legend	
	Building
	Range Area
	Road
	Water Features





EDITION **CLJN, SERIES 0000, SHEET 0013**
MCB CAMP LEJEUNE

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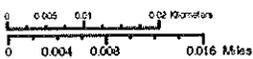
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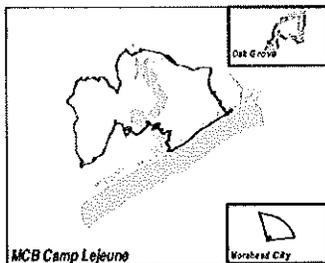
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 Sept. 2013



SCALE 1:1,000

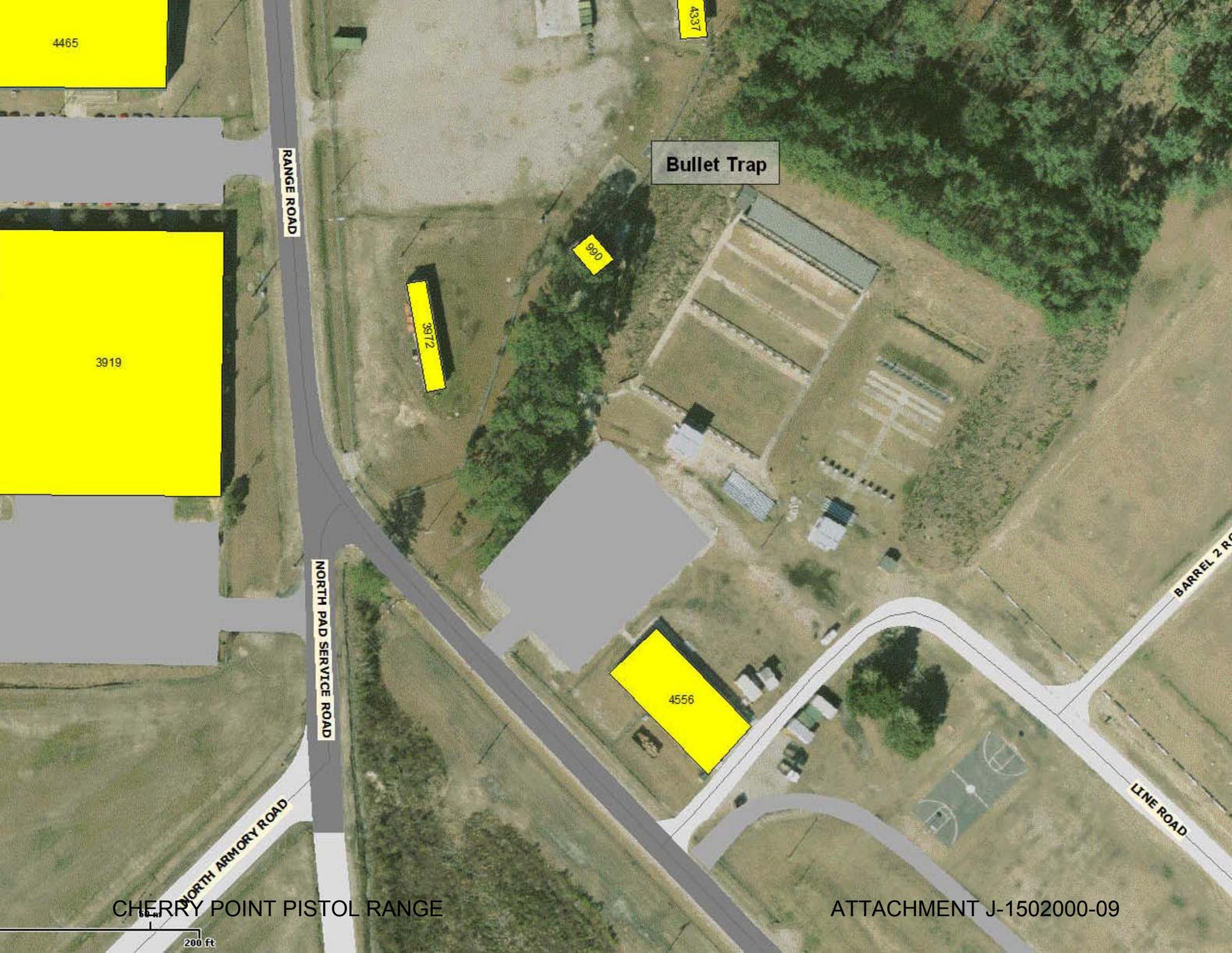


Legend	
	Building
	Range Area
	Road
	Water Features



MCB Camp Lejeune

Worland City



4465

4337

Bullet Trap

990

3972

3919

RANGE ROAD

NORTH PAD SERVICE ROAD

NORTH ARMORY ROAD

BARREL 2 ROAD

LINE ROAD

4556

CHERRY POINT PISTOL RANGE

ATTACHMENT J-1502000-09

200 ft

ATTACHMENT J-1502000-10
SCREW CONVEYOR OPERATIONS MANUAL
**SERVICE AND
INSTALLATION MANUAL**

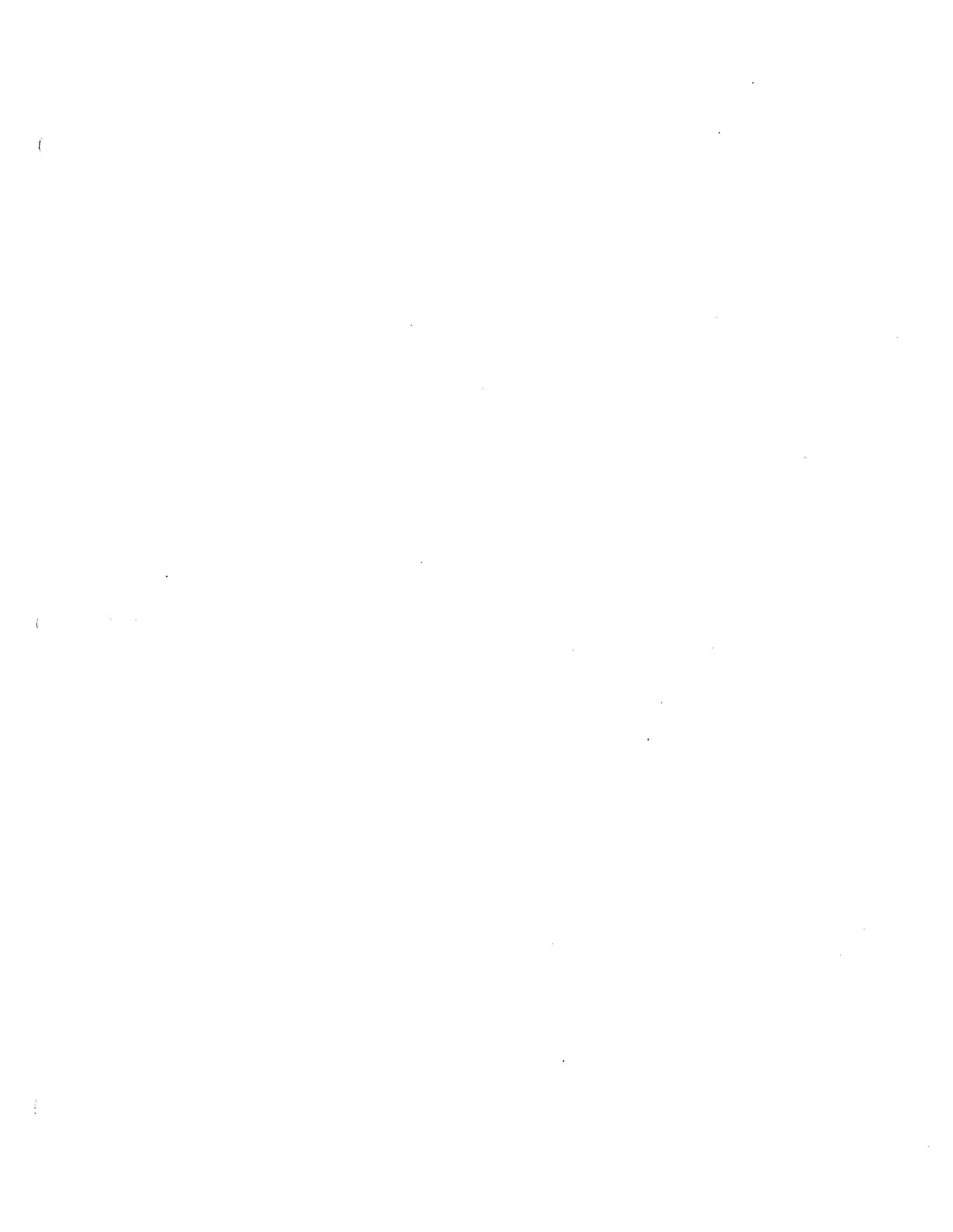
- (1) 6" Dia. x 69'- 0" Lg. Screw Conveyor Assy.
- (1) 6" Dia. x 10'- 0" Lg. Screw Conveyor Assy.

SAVAGE RANGE SYSTEMS – WESTFIELD, MA
M12-8275794
08/21/2009



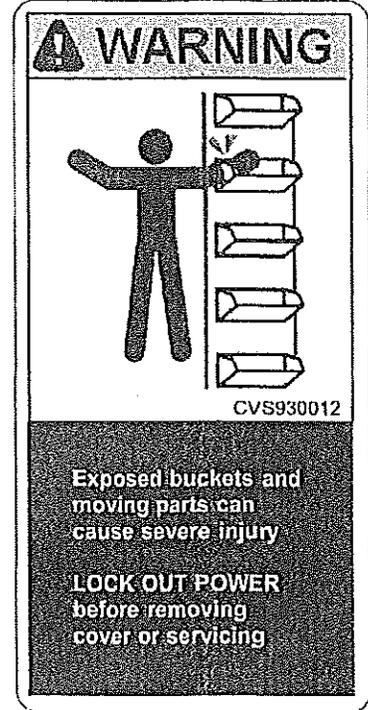
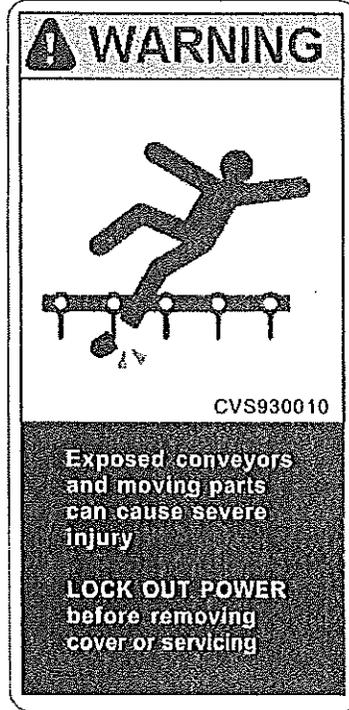
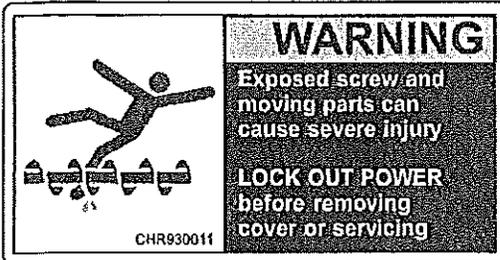
MARTIN SPROCKET & GEAR, INC.

SAFETY
AND
INSTALLATION



CEMA Safety Labels

The CEMA safety labels shown below should be used on screw conveyors, drag conveyors, and bucket elevators. Safety labels should be placed on inlets, discharges, troughs, covers, inspection doors & drive guards. See CEMA Safety Label Placement Guidelines on CEMA Web Site: <http://www.cemanet.org/safety/guidelines.html>



PROMINENTLY DISPLAY THESE SAFETY LABELS ON INSTALLED EQUIPMENT

SEE OTHER SIDE FOR SAFETY REMINDERS

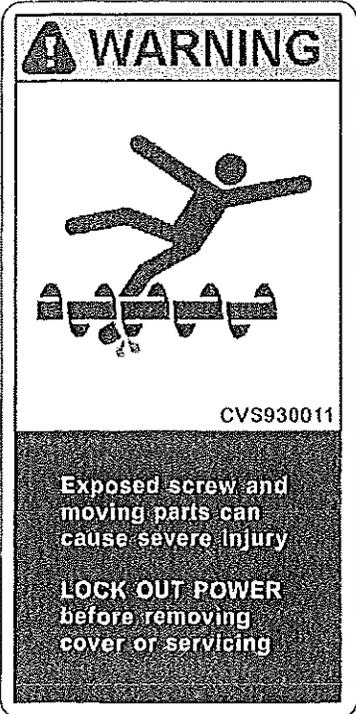
Note: Labels alone do not substitute for a thorough in-plant safety training program centered on the hazards associated with operating your installed equipment.

Contact CEMA or Your Equipment Manufacturer for Replacement Labels

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

6724 Lone Oak Blvd., Naples, Florida 34109

239-514-3441





THESE CEMA SAFETY LABELS CAN HELP MAKE YOUR CONVEYING EQUIPMENT OPERATIONS SAFER



CHR930001
(5" Wide x 2 1/2" High)



CHR930008
(5" Wide x 2 1/2" High)



CHR930011
(5" Wide x 2 1/2" High)



CHR930017
(5" Wide x 2 1/2" High)



CHR930002
(5" Wide x 2 1/2" High)



CHR930007
(5" Wide x 2 1/2" High)



CHR930015
(5" Wide x 2 1/2" High)



CHR930016
(5" Wide x 2 1/2" High)



CHR930003
(5" Wide x 2 1/2" High)



CHR930006
(5" Wide x 2 1/2" High)



CHR930014
(5" Wide x 2 1/2" High)



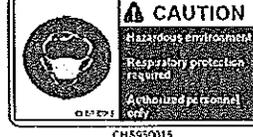
CHR930021
(5" Wide x 2 1/2" High)



CHR930004
(5" Wide x 2 1/2" High)



CHR930005
(5" Wide x 2 1/2" High)



CHR930015
(5" Wide x 2 1/2" High)



CHR930022
(5" Wide x 2 1/2" High)



CHR930005
(5" Wide x 2 1/2" High)



CHR930010
(5" Wide x 2 1/2" High)



CHR930016
(5" Wide x 2 1/2" High)



CHR930023
(5" Wide x 2 1/2" High)



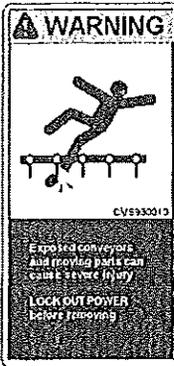
CHR930025
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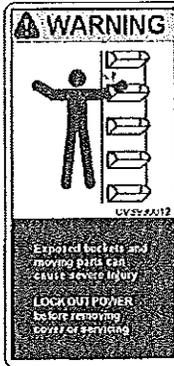
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CHR930027
(5" Wide x 2 1/2" High)



CVS930010
(3" Wide x 6" High)



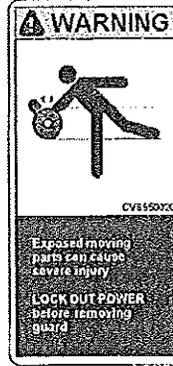
CVS930012
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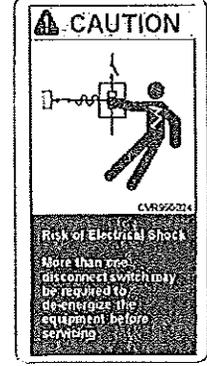
CVS930011
(3" Wide x 6" High)



CVR940019
(3" Wide x 6" High)



CVS950023
(3" Wide x 6" High)

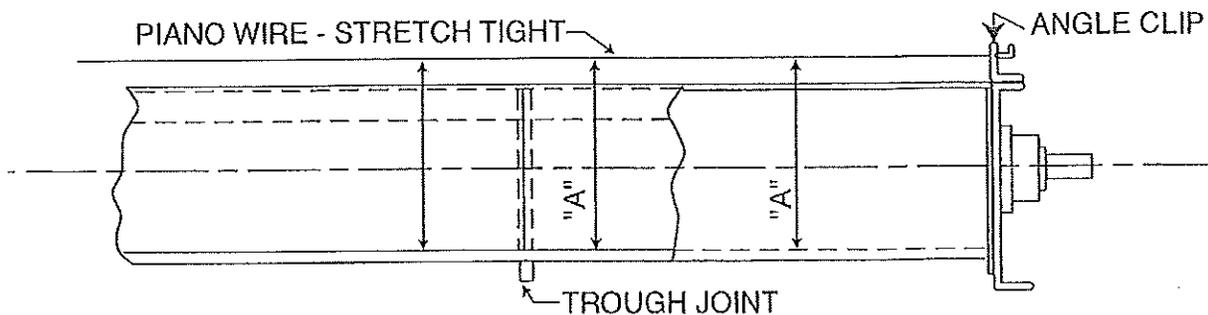


CVR950024
(3" Wide x 6" High)

Installation

For shop assembled Conveyors, Units are match marked, and shipped in longest sections practical for shipment. Field assembly can be accomplished by connecting marked joints and in accordance with packing list and or drawing if applicable. In field erection, the mounting surfaces for supporting the conveyor must be level and true so there is no distortion in the conveyor. Shims or Grout should be used when required. Check for straightness as assembly is made.

For Conveyor assemblies purchased as parts or merchandise, assemble as follows: Place conveyor troughs in proper sequence with inlet and discharge spout properly located. Connect the trough flanges loosely. Do not tighten bolts. Align the trough bottom center-lines perfectly using piano wire (or equivalent) then tighten flange bolts. Tighten all anchor bolts.



Assembly of conveyor screws should always begin at the thrust end. If the thrust end is not designated, assembly should begin at the drive end. If a thrust end is designated, assemble trough end and thrust bearing. Insert the end, or drive shaft, in the end bearing. Do not tighten set screws until conveyor assembly is completed.

1. Place the first screw section in the trough, slipping the end or drive shaft into the pipe end. Secure tightly with coupling bolts. Install so that conveyor end lugs are opposite the carrying side of the flight.
2. Place a coupling shaft into the opposite end of conveyor pipe. Tighten coupling bolts.
3. Slide hanger with bearing over coupling shaft and clamp hanger to trough.
4. Assemble alternately, conveyor screws, couplings and hangers until all screws are installed repeating steps 1, 2, and 3.
 - a) With Hangers: Assemble screw section so that flighting at each end is approximately 180° from ends of flighting of adjacent sections. Also, adjust conveyor screw and thrust unit so that hangers are equally spaced between adjacent screws. After each hanger is installed, rotate the conveyor by hand to insure that no binding occurs. Remove hanger clamps and bolt hanger to trough with the bearing centered between conveyor screws.
 - b) Without Hangers: (close coupled) Assemble screws so that flighting at adjoining ends of screw sections align to produce a continuous helix surface. (Note coupling holes have been drilled in assembly to allow for flight alignment.)
5. The end shaft should be inserted through the trough end bearing/seal into the terminal screw section. Install and tighten coupling bolts. The bearing and seal should be adjusted to be true and concentric on the shaft and bolts tightened. If packing gland type seals are used, they should be tightened only enough to prevent leakage. Check waste pack type seals to insure packing is loose but sufficiently tight to prevent leakage.

Operation

Lubricate all bearings and drives per service instructions. Gear reducers are normally shipped without lubricant. Refer to service instructions for lubrication.

Check conveyor to insure all tools and foreign materials have been removed.

Check conveyor to insure all covers, guards, safety devices and controls are installed and operating correctly.

In start-up of the conveyor, operate several hours empty as a break in period. Observe for bearing heat up, unusual noises or drive misalignment. Should any of these occur, check the following and take necessary corrective steps. (non-lubricated hanger bearings may cause some noise)

- 1) When anti-friction bearings are used, check for proper lubrication. Insufficient or excess lubricant will cause high operating temperatures.
- 2) Misalignment of trough ends, screws, hangers and trough end can require excessive maintenance and cause poor life expectancy.
- 3) Check assembly and mounting bolts; tighten if necessary.

After the conveyor has been run per the above instructions, stop the conveyor. **LOCK OUT/TAG OUT ALL POWER**, and check discharge to insure it is clear and material flow through the discharge will not be impeded in any way.

Restart the conveyor and gradually begin to feed material. The feed rate should be gradually increased until the design capacity is reached.

Do not overload conveyor. Do not exceed conveyor speed, capacity, material density, or rate of flow for which the conveyor and drive were designed.

Cut off feed and allow the conveyor to empty. **LOCK OUT/TAG OUT ALL POWER SUPPLY**. Check all bolts and all alignments. Realign as necessary and tighten all bolts.

If the conveyor is to be inoperative for a prolonged period of time, operate conveyor until cleared of all material. This is particularly important when the material conveyed tends to harden or become more viscous, or sticky if allowed to stand for a period of time.

It may be necessary to re-center hanger bearings after running material in conveyor.

Check motor amperage frequently.

It is extremely important the following precautions be followed to prevent personal or property damage:

- 1) Only persons properly trained and familiar with screw conveyors be permitted to operate or maintain the unit.
 - 2) **LOCK OUT/TAG OUT ALL POWER** prior to any inspection or maintenance, refer to ANSI Standard ANSI Z244.1.244.1.
 - 3) Periodically run the conveyor empty for a few minutes to check for excessive vibration, loose fasteners, security of covers and guards, noise, and bearing and drive temperature.
 - 4) **ALWAYS** operate the conveyor with covers, guards, safety labels in place.
 - 5) **NEVER** walk on or cross conveyor covers, guards, or grating.
 - 6) **DO NOT** place hands, feet, or clothing in conveyor openings.
 - 7) **DO NOT** poke or prod the conveyor or material in the conveyor.
- B) Always practice good housekeeping and keep a clear view of the conveyor loading and discharges.

Problem Cause/Remedy Chart

PROBLEM	CAUSE	REMEDY
MOTOR/HEATERS OVERLOAD	Amp demand excessive for motor	Recheck horsepower calculations. Check material characteristics. Check capacity. Regulate feed.
INLET TROUGH END BEARING FAILURE	A) Material getting into bearing B) Insufficient lubrication C) Shaft slope	B) Lubricate properly C) Align screw. Check for excessive screw deflection and for bent screw.
DISCHARGE TROUGH END BEARING FAILURE	A) Material getting into bearing	A) 1. Add or upgrade seal. 2. Change to outboard bearing. 3. Cut off flight at center of discharge.
HANGER BEARING FAILURE	A) Incorrect alignment B) Heat due to hot material being conveyed C) Heat due to insufficient lubrication D) Thrust due to pipe pressing on bearing insert E) Improper material causing premature wear	A) Align hanger. B) Use appropriate bearing material. C) Properly lubricate D) Check coupling bolts and holes for elongation and wear. Replace as necessary. Readjust screw/ hanger assembly to get proper clearances. E) Consult catalog for proper material due to temperature, trough loading, and speed. Check to insure coupling shaft material and bearing material are compatible.

Extended Shutdown/Storage

If the conveyors are to have an extended shutdown or storage (beyond one month) the following should be performed:

- 1) Insure all foreign material is removed from the conveyor and surface coatings are in good order.
- 2) All bearings and drives are lubricated and protected per manufacturer's instructions.
- 3) Screws are rotated every two weeks.
- 4) The conveyor is protected from weather, moisture, and extreme temperatures. Do not use plastic or other coverings which promote condensation under the covering.
- 5) All exposed metal surfaces are coated with a rust preventative oil that is applied per instructions.
- 6) Prior to start-up, inspection and service instructions contained in this manual must be performed.

Vendor Contact

Please use the following list of contacts concerning maintenance or troubleshooting questions associated with components not manufactured by *Martin*, but supplied on your conveyor equipment.

GEAR REDUCERS			
SUPPLIER		PHONE NUMBER	ALTERNATE CONTACT
DODGE		803-297-4800	Fax: 864-281-2381
FALK		414-342-3131	Fax:414-937-4359
NORD		608-849-7300	www.nord.com
SUMITOMO		757-485-3355	Fax: 757-485-3075
DORRIS		800-325-2520	Intbtedorrisco.com
EURO-DRIVE		905-639-7873	Fax: 905-639-4895
MOTORS			
SUPPLIER		PHONE NUMBER	ALTERNATE COMNTACT
RELIANCE		803-297-4800	Fax:864-281-2381
BALDOR		501-646-4711	www.baldor.com
SIEMANS		800-964-4114	www.sea.siemens.thomasrcgistr.com
U.S.		414-251-7724	Fax:414-251-2748
TOSHIBA		800-663-3117	Fax: 847-593-1616
BEARINGS			
SUPPLIER		PHONE NUMBER	ALTERNATE CONTACT
DODGE		803-297-4800	Fax: 864-281-2381
SKF		800-275-5416	Fax:219-546-0448
COOPER		757-460-0925	Fax: 757-464-3067
MISCELLANEOUS			
SUPPLIER	EQUIPMENT	PHONE NUMBER	ALT. CONTACT
MILTRONICS	MOTION SENSOR	817-277-3543	www.milltronics.com
ALAN BRADLEY	MOTION SENSOR	414-382-2000	Fax: 414-382-4444
CONTROL CONCEPTS	MOTION SENSOR	800-745-6551	Fax: 860-928-9450
ELECTRO-SENSORS	MOTION SENSOR	800-328-6170	www.electrosensors.com
ALLEN AIR	AIR CYLINDERS	516-747-5450	Fax:516-747-5481

If you cannot find the information required with the above listing of contacts, please contact your local *Martin* service center.

Bolt Torque

General Bolt Tightening Torque

Thread	Tensile Stress Area	SAE Grade 2		SAE Grade 5		SAE Grade 8	
Size	Tsa	75% Yield Strength (PSI) - 43000		75% Yield Strength (PSI) - 69000		75% Yield Strength (PSI) = 98000	
		Plain	Zinc Plated	Plain	Zinc Plated	Plain	Zinc Plated
	Square Inches	Ft.Lb.	Ft.Lb.	Ft.Lb.	Ft.Lb.	Ft.Lb.	Ft.Lb.
1/4-20.	0.0318	6	6	9	10	13	14
1/4-28.	0.0364	7	7	10	12	15	16
5/16-18.	0.0524	12	13	19	21	27	29
5/16-24.	0.0580	13	14	21	23	30	33
3/8-16.	0.0775	21	23	33	37	47	52
3/8-24.	0.0878	24	26	38	42	54	59
7/16-14.	0.1063	33	37	53	59	76	83
7/16-24.	0.1187	37	41	60	66	85	93
1/2-13.	0.1419	51	56	82	90	116	127
1/2-20.	0.1599	57	63	92	101	131	144
9/16-12.	0.1820	73	81	118	129	167	184
9/16-18.	0.2030	82	90	131	144	186	205
5/8-11.	0.2260	101	111	162	179	231	254
5/8-14.	0.2560	115	126	184	202	261	287
3/4-10.	0.3340	180	197	288	317	409	450
3/4-16.	0.3730	200	221	322	354	457	503

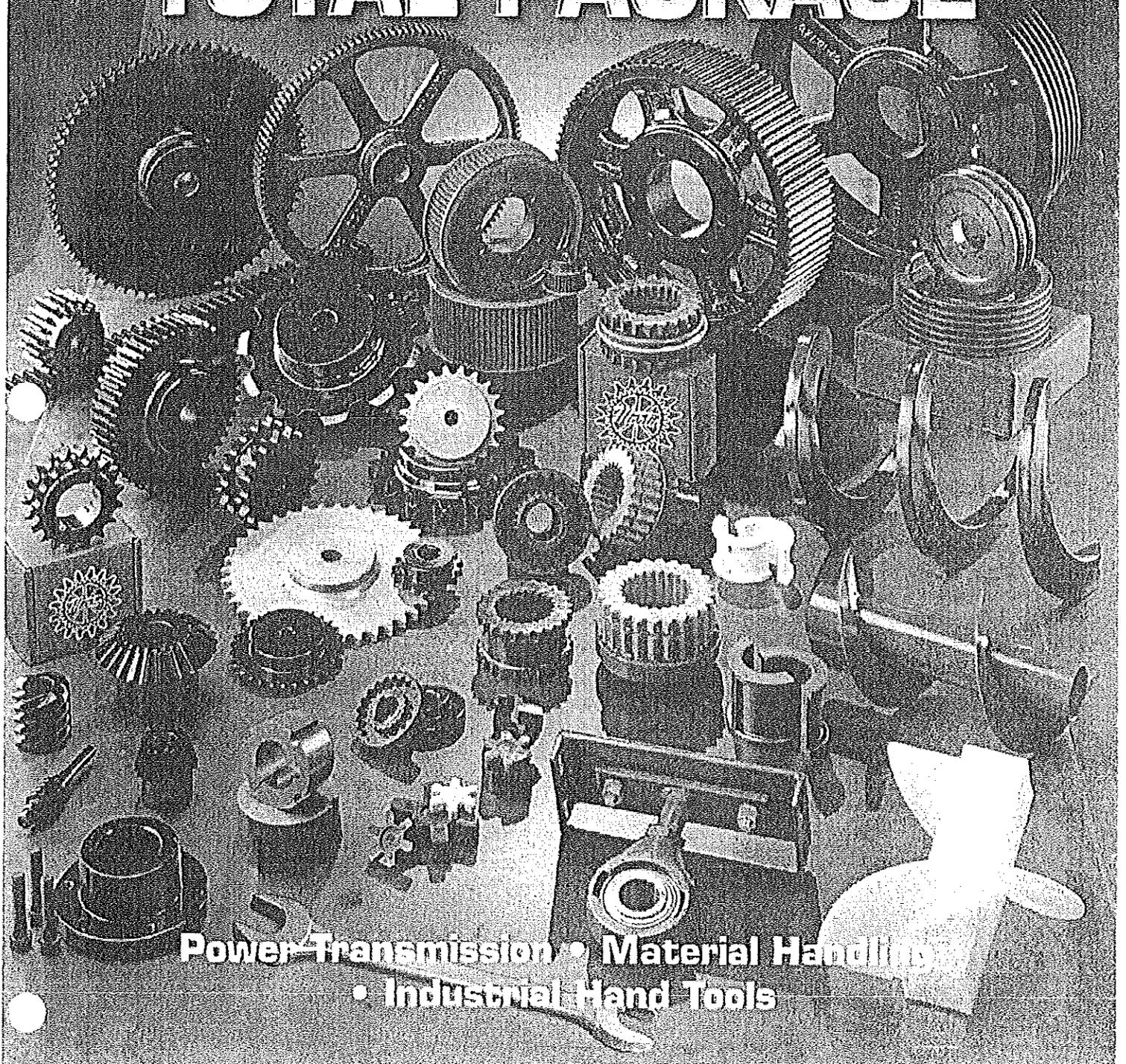
The reason all applications should be evaluated to determine the optimum tightening torque is that the K factor in this formula is always an estimate.

The most commonly used bolting K factors are 0.20 for plain finished bolts, 0.22 for zinc plated bolts, and 0.10 for waxed or highly lubricated bolts

Formula: $T = K \times D \times P$

- T Target tighten torque (the result of this formula is in inch pounds, dividing by 12 yields foot pounds)
- K Coefficient of friction (nut factor), always an estimation in this formula
- D Bolts nominal diameter in inches
- P Bolt's desired tensile load in pounds (generally 75% of yield strength) - [P(lbs) = (75%) Yield Strength * Tensile Stress Area]

Martin offers you the
TOTAL PACKAGE



**Power Transmission • Material Handling
• Industrial Hand Tools**

MATERIAL HANDLING COMPONENTS

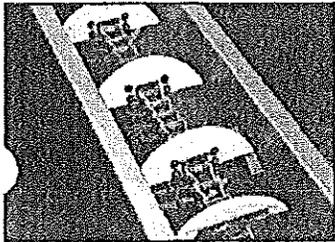
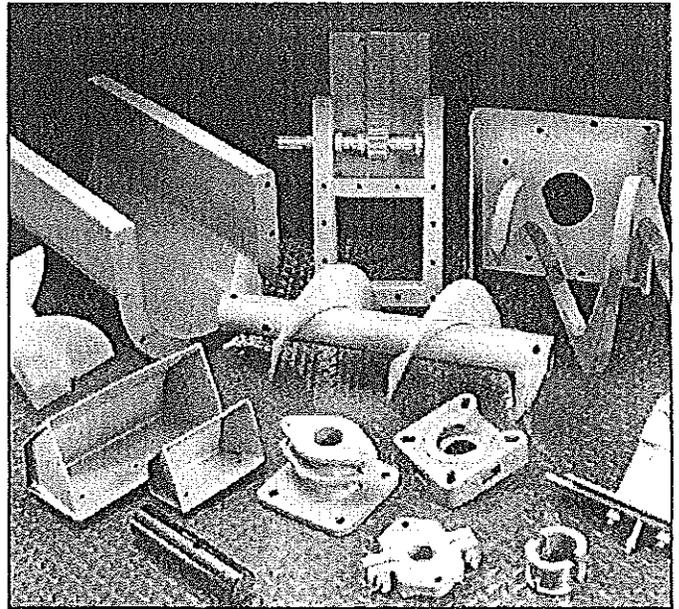
Martin's Material Handling Division manufactures all standard CEMA Screw Conveyor and larger made-to-order sizes. Screw Conveyors are available in many materials of construction, including standard carbon steel, abrasive resistant steels, and other specialty steels per your request.

Martin manufactures and stocks many standard screw conveyor components at several regional facilities located through North America. Conveyors are available as loose components or shop tested assembled.

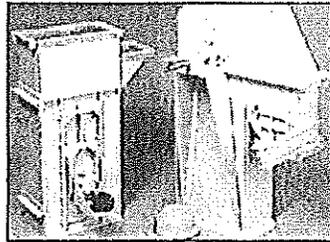
ISO 9001

The ISO 9001 Certification directs our Conveyor Division to continually improve by emphasizing:

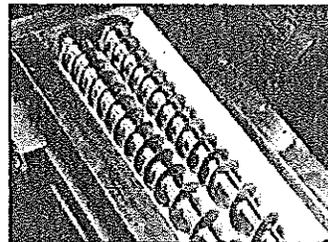
- Customer satisfaction
- Product design
- Employee safety
- Employee training
- Process efficiencies



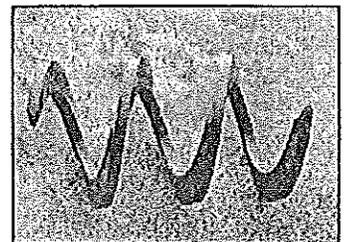
DRAG CONVEYOR



BUCKET ELEVATORS



SCREW CONVEYORS



SHAFTLESS SCREW TECHNOLOGY

* Conveyors shown without covers for illustration purposes. Please follow manufacturing safety guidelines when operating.

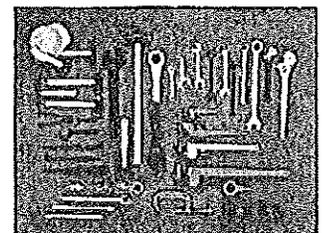
INDUSTRIAL HAND TOOLS & FORGINGS

In continuing the unsurpassed *Martin* tradition of serving industry with the utmost in service and the finest in product quality, *Martin* expands its vast manufacturing capabilities to produce industrial hand tools and custom commercial forgings.

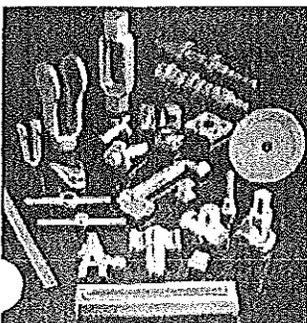
STOCK AND MADE-TO-ORDER INDUSTRIAL HAND TOOLS

Wrenches, hammers, tools, all available from stock. Most items are available in convenient sets and in either chrome or industrial black finish. Additionally, made-to-order custom hand tools are also available.

Martin tools are manufactured domestically in strict compliance with exacting industry standards.



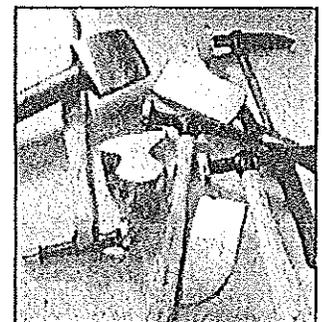
INDUSTRIAL HAND TOOLS



CUSTOM COMMERCIAL FORGINGS

CUSTOM COMMERCIAL FORGINGS

Martin's Tool & Forge Division located in Fort Worth, Texas features a complete forging operation under one roof to assure total control of all parts, components and products for ultimate fast delivery on a nationwide basis. *Martin* supplies closed impression die commercial forgings to the industrial, automotive, O.E.M., mining, agricultural, oil, gas and material handling industry. *Martin* can handle all phases of your custom forging work, including die design forging, coining, and heat treating. *Martin* employs state-of-the-art forging and die sinking equipment. Hammers vary in size from 1000 pounds to 6500 pounds.

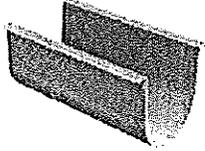


BODY & FENDER TOOLS

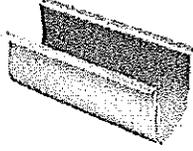
Martin

Stock & MTO Screw Conveyor Components

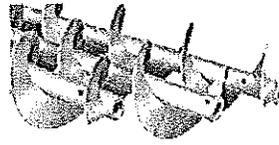
Screw Conveyor Components and Accessories



ANGLE FLANGED "U" TROUGH



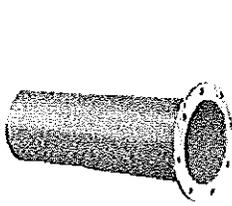
FORM FLANGED "U" TROUGH



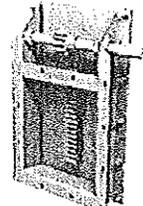
SECTIONAL SCREWS



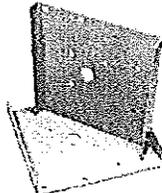
SPECIALS



TUBULAR HOUSING



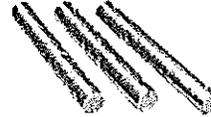
FLAT RACK AND PINION DISCHARGE GATE



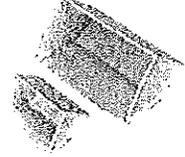
TROUGH ENDS WITH AND WITHOUT FEET



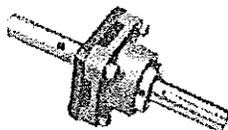
SECTIONAL FLIGHTS



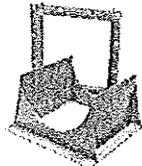
COUPLING SHAFTS



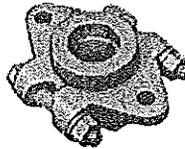
ELEVATOR BUCKETS



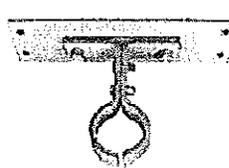
THRUST ASSEMBLY TYPE E WITH DRIVE SHAFT



INLETS AND DISCHARGE SPOUTS DISCHARGE



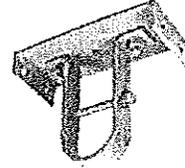
SPLIT GLAND



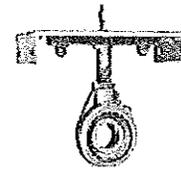
HANGER STYLE 220



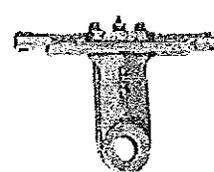
HANGER STYLE 226



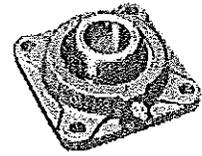
HANGER STYLE 216



HANGER STYLE 70



HANGER STYLE 198



TROUGH END BEARINGS BALL AND ROLLER



PACKING GLAND SHAFT SEAL COMPRESSION TYPE



WASTE PACK SHAFT SEAL

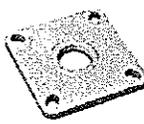
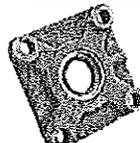


PLATE SHAFT SEAL



DROP-OUT SHAFT SEAL FLANGED PRODUCT

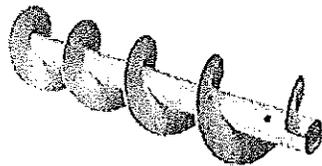


HANGER BEARINGS STYLE 220/226

Martin HARD IRON
Martin BRONZE
NYLATRON
WHITE NYLON
WOOD
CERAMIC



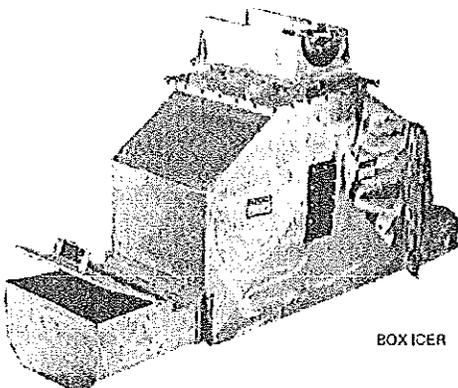
SADDLES AND FEET



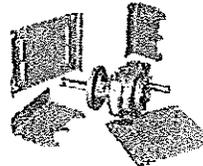
HELICOID SCREWS



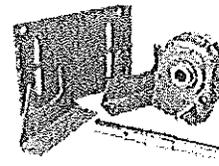
HELICOID FLIGHTING RIGHT HAND AND LEFT HAND



BOXICER



SCREW CONVEYOR DRIVE WITH ACCESSORIES



SPEED REDUCER SHAFT MOUNTED WITH ACCESSORIES.



FLANGED COVER WITH ACCESSORIES

Martin manufactures the most complete line of stock components in the industry. We stock mild steel, stainless, galvanized, and many other items that are "special order" from the others in the industry.

CONVEYORS



Conveyor Division

(1) 6" DIA x 59'-0" LG CONVEYOR w/ DRIVE

BY: DDS



RACK# 3

Entered: 8/21/09

Ship Date: 6/21/10

ORDER NO: 12-8275794-1

CUSTOMER: SAVAGE RANGE- WESTFIELD

NO.	QTY.	DESCRIPTION	LOCATION	CARD
01	6	6CTF10 10'-0" LG U-TROUGHS	FS	
02	1	6CTF10 9'-0" LG U-TROUGH w/ 7" SQ DISCH @ 24°	MTO	1,1A
03	1	MSP4 SEAL	FS	04Q19
04	1	TEB4BB END BEARING	FS	04N10
05	LOT	LATEX CAULK FLANGE GASKET	FS	
06	1	6TE5-BB-P-MTO 1/2" THK END PLATE LESS FEET	MTO	2
07	1	6TE4-BB-P 1/4" THK END PLATE LESS FEET	MTO	3
08	5	6S412-R 9'-10" 6" DIA, 6" PITCH, 3/16" THK, MILD STEEL SECTIONAL FLIGHTS WELDED TO 2 1/2" SCH 40 PIPE, 3-BOLT DRILLING, STD WELDS	MTO	4,4A
09	1	6S412-R 9'-10" SAME AS ABOVE EXCEPT w/ 8" BARE PIPE & (2) LEFT HAND FIXED PADDLES	MTO	5,5A
10	1	6S412-R 8'-10" SAME AS #8 EXCEPT LENGTH	MTO	6
11	42	CCB4 COUPLING BOLTS w/ LOCKNUTS	FS	04L24
12	1	CE4BB-W-3 END SHAFT	MTO	7
13	6	6CH2264 EXPANSION HANGER FRAME	MTO	8
14	6	CHB2204W HANGER BEARING	FS	04S12
15	6	CC4-3-H COUPLING SHAFT	MTO	9
16	12	3/8" SQ x 6" LG MILD STEEL BAR (2 @ EACH HANGER)	RQ	
17	LOT	3" HIGH SPACERS (SEE GENERAL NOTES FOR LENGTHS)	RQ	
18	1	6TCF16 5'-0" LG FORMED FLANGE COVER 3 HP @ 20 RPM DRIVE PACKAGE	MTO	10
19	1	GEARMOTOR- NORD XK4282SCP-100LH4 90.52:1 RATIO, 2 7/16" SHAFT		
		ASSEMBLY HARDWARE		
20	72	3/8-16 x 1 1/4" LG HHCS w/LFN	FS	
21	4	5/8-11 x 2 1/2" LG FHCS w/ LFN	FS	
22	4	5/8-11 x 3 1/2" LG FHCS w/ LFN	FS	
23	180	3/8-16 x 1" LG HHCS w/ LFN	FS	

INSTRUCTION MANUAL FOR DODGE® SETSCREW, ECCENTRIC COLLAR, D-LOK, H, H-E SERIES & EZ-KLEEN MOUNTED BALL BEARINGS

INSTALLATION

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

Under certain operating conditions it is possible for a static electric charge to build-up on E-Z KLEEN® Polymer Housings. Do not operate these bearings in any environment where a sudden static discharge may cause either an operating hazard or personnel discomfort.

1. Clean shaft and bearing bore thoroughly. Measure and confirm shaft size and tolerance. File flats on shaft at setscrew locations to permit easy removal of bearing.
2. Slip bearing into position. Be sure that bearing is not on a worn section of the shaft. For tighter fits, tap inner ring face only with soft driver. DO NOT HAMMER ON HOUSING.
3. The bearing outer ring OD is spherical and swivels in the housing to accommodate misalignment. Snug hold-down bolts and use shaft to swivel each bearing until its final position is in the center of free movement top to bottom as well as side to side. Pass shaft through both bearings without forcing. This will prevent preloading of the bearings. Housing slippage depends on the mounting hold-down bolt tightening torque, number of bolts and friction characteristics between mounting surfaces. Auxiliary load carrying devices such as shear bars are advisable for side or end loading of pillow blocks and radial loads for flange units where normal to heavy loading or shock loading is encountered.

NOTE: On coated and non-metallic housings, hold-down bolts should be tightened carefully with flat washers to prevent damage to the coating. Coated housings have reduced friction characteristics, so auxiliary load carrying devices are even more important in those applications.

4. Tighten hold-down bolts to proper torque (Table 1). Turn shaft by hand. Resistance to turning should be the same as before full tightening of hold-down bolts.
5. For setscrew mounted bearings: After final alignment of the shaft, tighten both setscrews hand tight, then the setscrews should be tightened alternately and in small increments to the torque specified in Table 1. After 24 hours operation, the setscrews should be retightened to the torque in Table 1 to assure full locking of the inner race to the shaft. Care should be taken that the socket key or driver is in good condition with no rounded corners and the key is fully engaged in the hole provided in the collar, tap collar smartly in the direction of shaft rotation. Tighten setscrews when applying maximum torque. Do not drill through the setscrew holes for spot drilling of the shaft. (Some inner rings have tempered setscrew threads and can be damaged by a drill.) If spot drilling is required, locate bearings on the shaft and center punch through the setscrew hole. Remove bearing and spot drill the shaft, then reassemble over the spot drilled position and assemble as above. Milled or filed flats are preferable to spot drilling.

NOTE: On all SC Product the setscrews can be re-torqued many times without damage to the bearing system. To achieve maximum shaft holding power it is highly recommended that setscrews be replaced with new hardware after any disassembly operation.

6. For eccentric collar mounted bearings, slide collar against cam end of inner race. Use a punch in the hole provided in the collar, tap collar smartly in the direction of shaft rotation. Tighten setscrews to proper torque (Table 1). To remove bearings, loosen setscrew and tap collar in the direction opposite of shaft rotation.
7. For D-LOK mounted bearings, be sure collar is square and tight against shoulder on inner ring. Tighten cap screw to recommended torque shown in Table 1.
8. For expansion bearings (H-E Series), locate inner unit in housing to allow expansion in the desired direction before locking to the shaft.

WARNINGS: Because of the possible danger to personnel or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspectors should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be specified in safety codes should be provided, and are neither provided by Rockwell Automation nor are the responsibility of Rockwell Automation. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a locking device or shear pins must be an integral part of the driven equipment.

Setscrew Size	RECOMMENDED TORQUE				D-LOK				MOUNTING BOLTS						
	Key Housing Access Fits	Setscrew Torque Inch Pounds	Setscrew Torque Foot Pounds	Setscrew Torque Nm	Cap Screw Torque Inch Pounds	Cap Screw Torque Foot Pounds	Cap Screw Torque Nm	Recomm. torque Inch Pounds	Recomm. torque Foot Pounds	Recomm. torque Nm	Recomm. torque Inch Pounds	Recomm. torque Foot Pounds	Recomm. torque Nm		
M10	3/16	20	1.4	19	M10-32	50	3.5	50	3.5	3.5	240	16.4	225	15.2	175
M12	1/8	30	2.1	28	M10-32	60	4.2	60	4.2	4.2	280	19.0	300	20.7	250
M16	5/16	50	3.5	48	M10-32	80	5.6	80	5.6	5.6	400	27.1	500	34.0	400
M20	3/8	75	5.3	72	M10-32	100	7.0	100	7.0	7.0	600	41.3	800	55.0	600
M24	7/16	100	7.0	98	M10-32	120	8.4	120	8.4	8.4	800	55.0	1000	70.0	800

LUBRICATION

High Speed Operation — In the higher speed ranges, too much grease will cause over-heating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience. If excess grease in the bearing causes overheating, it will be necessary to remove grease fitting to permit excess grease to escape. The bearing has been greased in the factory and is ready to run. When establishing a relubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

Lubrication Guide

Use a No. 2 Lithium complex base grease or equivalent.*

Hours	Run	1000	1500	2000	2500
1	251	501	751	1001	1501
2	500	1000	1500	2000	2500
3	750	1500	2250	3000	3750
4	1000	2000	3000	4000	5000
5	1250	2500	3750	5000	6250
6	1500	3000	4500	6000	7500
7	1750	3500	5250	7000	8750
8	2000	4000	6000	8000	10000
9	2250	4500	6750	9000	11250
10	2500	5000	7500	10000	12500

* For H and H-E series bearings, use Exxon Unirex N3 or equivalent suitable to 300° F.

Lubrication recommendations are intended for standard products applied in general operating conditions. For modified products, high temperature applications, and other anomalous applications contact product engineering at 864-284-5700

www.rockwellautomation.com www.plcbase.com www.dodge-rt.com www.rockwell.com www.plcbase.com

Corporate Headquarters: 2500 Douglas Blvd., Milwaukee, WI 53202-3532, USA, Tel: (414) 221-5000, Fax: (414) 221-5001

Rockwell Automation, 500 Packers Dr., Greenville, SC 29615-0777, USA, Tel: (864) 237-4000, Fax: (864) 237-4000

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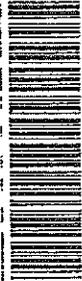
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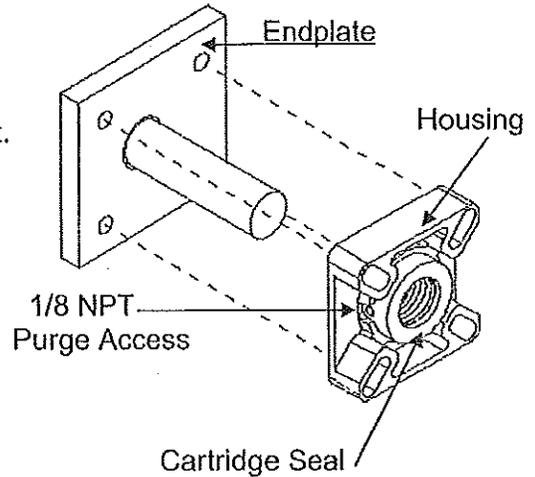
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Martin Super Pac Installation Instructions

- Carefully slip the housing onto the shaft.
 - * Use ONLY mild soapy water for lubrication.
- Align housing flush to Endplate.
 - Housing must be **perpendicular** - normal to the shaft.
 - *Alignment of housing to shaft cannot exceed 2°.
- Check for equal spacing around the shaft and the ID of the seal.
- Tighten mounting hardware to manufacturers recommended torque settings.
- Purge seal before operating.
 - *Operating temperature range: - 30°F to + 450°F

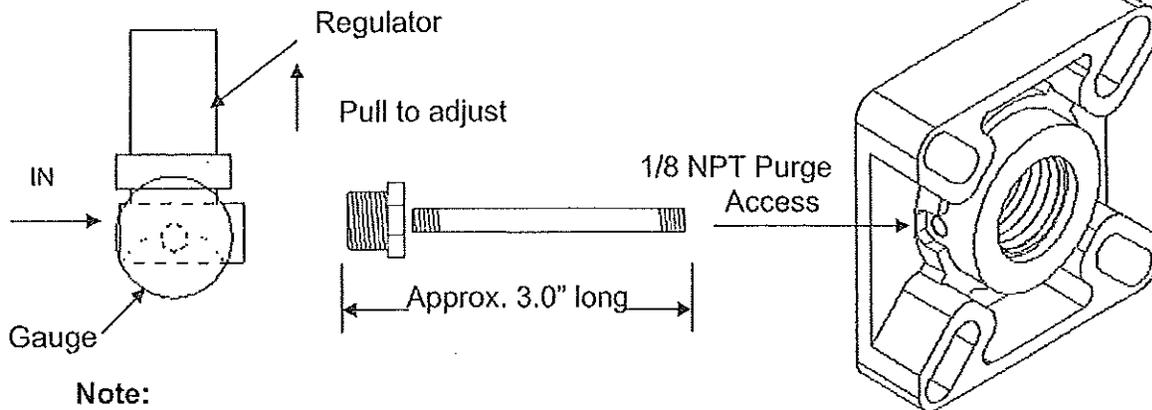


Purge options available:

- Purge option: 1 Air Purge using an Air Regulator.
- Purge option: 2 Silicone Grease Purge.

Option 1: Using an Air Purge with regulator

- Port size: 1/4 * Use bushing provided to mate 1/8 male fitting of cartridge.
- Gauge ports: 1/8 (2 Ports available for orientation convenience)
- *Place small plug provided, in unused 1/8 opening on air regulator.

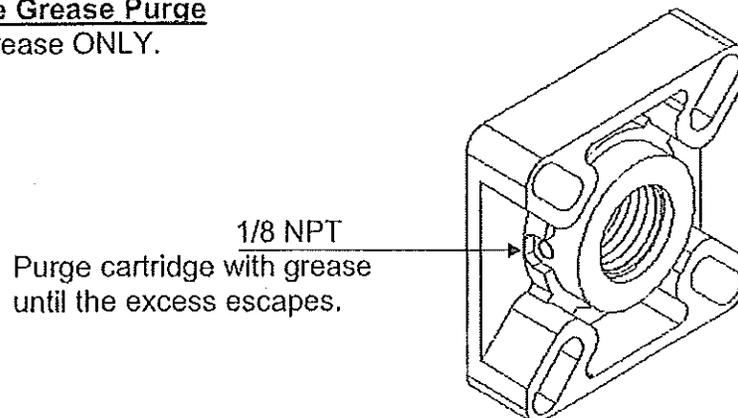


Note:

Airflow to be set 5-10 psi above internal pressure of conveyor. Max air pressure of seal is 50 psi.

Option 2: Silicone Grease Purge

- *Use silicone grease ONLY.



INSTALLATION OF UNIT

To ensure long service and dependable performance, an enclosed gear drive must be rigidly supported and the shafts accurately aligned. The following describes the minimum precautions required to accomplish this end.

FOUNDATION

The responsibility for the design and construction of the foundation lies with the user. The foundation must be adequate to withstand normal operating loads and possible overloads while maintaining alignment to attached system components under such loads.

MOUNTING POSITION

Unless a unit is specifically ordered for inclined mounting, the foundation must be level and flat. The lubrication system may not operate properly if the unit is not mounted in the position for which it is designed. It may be desirable to elevate the foundation to facilitate oil drainage.

CONCRETE FOUNDATION

If a concrete foundation is used, steel mounting pads and bolts of sufficient size to distribute the stress into the concrete should be grouted into the foundation.

STEEL FOUNDATION

If a structural steel foundation is used (i.e. wide flange beams or channels), a base plate or sole plate of suitable thickness should be used and should extend under the entire unit.

FOOT MOUNTED UNITS

Use shims under the feet of the unit to align the output shaft to the driven equipment. Make sure that all feet are supported so that the housing will not distort when it is bolted down. Improper shimming will reduce the life of the unit and may cause failure. Dowel pins may be installed to prevent misalignment and ensure proper realignment if removed for service.

SHAFT MOUNTED UNITS

Shaft mounted drives should be mounted as close to the driven equipment bearing support as possible to minimize bearing loads due to overhung load. Design of the joint connection between the torque reaction arm and the foundation is the user's responsibility.

Hollow Shaft Diameter tolerance

Metric (mm)

$\leq \varnothing 18 = +0.018/-0.000$
$> \varnothing 18 \leq \varnothing 30 = +0.021/-0.000$
$> \varnothing 30 \leq \varnothing 50 = +0.025/-0.000$
$> \varnothing 50 \leq \varnothing 80 = +0.030/-0.000$
$> \varnothing 80 \leq \varnothing 120 = +0.035/-0.000$
$> \varnothing 120 \leq \varnothing 180 = +0.040/-0.000$

Inch

$\leq \varnothing 4.375 = +0.0010 / -0.0000$
$> \varnothing 4.375 = +0.0015 / -0.0000$

Customer shaft diameter tolerances with keyed hollow shafts

Metric (mm)

$\leq \varnothing 18 = +0.000/-0.011$
$> \varnothing 18 \leq \varnothing 30 = +0.000/-0.013$
$> \varnothing 30 \leq \varnothing 50 = +0.000/-0.016$
$> \varnothing 50 \leq \varnothing 80 = +0.000/-0.019$
$> \varnothing 80 \leq \varnothing 120 = +0.000/-0.022$
$> \varnothing 120 \leq \varnothing 180 = +0.000/-0.025$

Inch

$\leq \varnothing 1.500 = +0.000/-0.002$
$> \varnothing 1.500 \leq \varnothing 2.500 = +0.000/-0.003$
$> \varnothing 2.500 \leq \varnothing 7.000 = +0.000/-0.004$

Shaft finish to be 125 micro inches or smoother.

Customer shaft diameter tolerance with Shrink Disc fit h6

Metric (mm)

$\leq \varnothing 18 = +0.000/-0.011$
$> \varnothing 18 \leq \varnothing 30 = +0.000/-0.013$
$> \varnothing 30 \leq \varnothing 50 = +0.000/-0.016$

$> \varnothing 50 \leq \varnothing 80 = +0.000/-0.019$
$> \varnothing 80 \leq \varnothing 120 = +0.000/-0.022$
$> \varnothing 120 \leq \varnothing 180 = +0.000/-0.025$

Inch

$\leq \varnothing 0.750 = +0.0000/-0.0004$
$> \varnothing 0.750 \leq \varnothing 1.125 = +0.0000/-0.0005$
$> \varnothing 1.125 \leq \varnothing 2.000 = +0.0000/-0.0006$
$> \varnothing 2.000 \leq \varnothing 3.000 = +0.0000/-0.0007$
$> \varnothing 3.000 \leq \varnothing 4.750 = +0.0000/-0.0008$
$> \varnothing 4.750 \leq \varnothing 7.000 = +0.0000/-0.0010$

Shaft finish to be 125 micro inches or smoother.

Customer shaft diameter tolerance with Shrink Disc fit f6 (looser fit)

Metric (mm)

$\leq \varnothing 18 = -0.016/-0.024$
$> \varnothing 18 \leq \varnothing 30 = -0.020/-0.029$
$> \varnothing 30 \leq \varnothing 50 = -0.025/-0.036$
$> \varnothing 50 \leq \varnothing 80 = -0.030/-0.043$
$> \varnothing 80 \leq \varnothing 120 = -0.036/-0.051$
$> \varnothing 120 \leq \varnothing 180 = -0.043/-0.061$

Inch

$\leq \varnothing 0.750 = -0.0006/-0.0011$
$> \varnothing 0.750 \leq \varnothing 1.125 = -0.0008/-0.0013$
$> \varnothing 1.125 \leq \varnothing 2.000 = -0.0010/-0.0016$
$> \varnothing 2.000 \leq \varnothing 3.000 = -0.0012/-0.0019$
$> \varnothing 3.000 \leq \varnothing 4.750 = -0.0014/-0.0023$
$> \varnothing 4.750 \leq \varnothing 7.000 = -0.0017/-0.0027$

Shaft finish to be 125 micro inches or smoother

FLANGE MOUNTED UNITS

If a structural steel foundation is used (i.e. wide flange beams or channels), a base plate or sole plate of suitable thickness should be used and should extend under the entire unit. If a bulk head plate is used it should be of proper strength to minimize buckling distortions.

Flange Pilot 'AK' or 'AK1' tolerance

Metric (mm)

$> \varnothing 50 \leq \varnothing 80 = +0.012/-0.007$
$> \varnothing 80 \leq \varnothing 120 = +0.013/-0.009$
$> \varnothing 120 \leq \varnothing 180 = +0.014/-0.011$
$> \varnothing 180 \leq \varnothing 230 = +0.016/-0.013$
$> \varnothing 230 \leq \varnothing 315 = +0.000-0.032$
$> \varnothing 315 \leq \varnothing 400 = +0.000/-0.036$
$> \varnothing 400 \leq \varnothing 500 = +0.000/-0.040$

Inch

$> \varnothing 1.969 \leq \varnothing 3.150 = +0.005/-0.0003$
$> \varnothing 3.150 \leq \varnothing 4.724 = +0.005/-0.0004$
$> \varnothing 4.724 \leq \varnothing 7.087 = +0.006/-0.0004$
$> \varnothing 7.087 \leq \varnothing 9.055 = +0.006/-0.0005$
$> \varnothing 9.055 \leq \varnothing 12.402 = +0.000/-0.0013$
$> \varnothing 12.402 \leq \varnothing 15.748 = +0.000/-0.0014$
$> \varnothing 15.748 \leq \varnothing 19.685 = +0.000/-0.0016$

BOLT STRENGTH

Bolt size, strength and quantity should be verified to insure proper torque reaction capacity whatever the mounting arrangement.

LUBRICATE SHAFTS

Both the hollow shaft and the driven shaft should be liberally lubricated before assembly. The unit must slide freely onto the driven shaft. Do not hammer or force the unit into place. For shrink disc, follow instructions below.

COUPLING ALIGNMENT

Shaft couplings should be installed according to the coupling manufacturer's recommendations for gap, angular and parallel alignment. In many installations, it is necessary to allow for thermal and mechanical shaft movement when determining shaft alignment. The coupling manufacturer's recommendations should be followed.

AXIAL DISPLACEMENT

The gap between shaft ends should be the same as the specified coupling gap unless overhung mounting of the coupling hub is specified. The coupling gap and shaft gap must be sufficient to accommodate any anticipated thermal or mechanical axial movement.

ANGULAR ALIGNMENT

Insert a spacer or shim stock equal to the required coupling gap between the coupling hub faces and measure the clearance using feeler gauges. Repeat this at the same depth at 90-degree intervals to determine the amount of angular misalignment.

PARALLEL ALIGNMENT

Mount a dial indicator to one coupling hub, and rotate this hub, sweeping the outside diameter of the other hub. The parallel misalignment is equal to one-half of the total indicator reading. Another method is to rest a straight edge squarely on the outside diameter of the hubs at 90-degree intervals and measure any gaps with feeler gauges. The maximum gap measurement is the parallel misalignment.

CHECKING ALIGNMENT

After both angular and parallel alignments are within specified limits, tighten all foundation bolts securely and repeat the above procedure to check alignment. If any of the specified limits for alignment are exceeded, realign the coupling.

SPROCKET OR SHEAVE ALIGNMENT

Align the sheaves or sprockets square and parallel by placing a straight edge across their faces. Alignment of bushed sheaves and sprockets should be checked after bushings have been tightened. Check horizontal shaft alignment by placing a level vertically against the face of the sheave or sprocket. Adjust belt or chain tension per the manufacturer's specified procedure.

OUTBOARD PINION ALIGNMENT

Align the pinion by adjusting the gear tooth clearance according to the manufacturer's recommendations and checking for acceptable outboard pinion tooth contact. The foundation bolts may have to be loosened and the unit moved slightly to obtain this contact. When the unit is moved to correct tooth contact, the prime mover should be realigned.

RECHECK ALIGNMENT

After a period of operation, recheck alignment and adjust as required.

1. Properly install unit on a rigid foundation
 - adequately supported
 - securely bolted into place
 - leveled so as not to distort the gear case
2. Properly install couplings suitable for the application and connected equipment.
3. Ensure accurate alignment with other equipment.
4. Furnish and install adequate machinery guards as needed to protect operating personnel and as required by the applicable standards of the Occupational Safety and Health Administration (OSHA), and by other applicable safety regulations;
5. Ensure that driving equipment is running in the correct direction before coupling to reducers with backstops (designed to operate only in a specific direction) or machinery designed to operate only in one direction.

CHANGES IN PERFORMANCE SPECIFICATIONS

Owner has the responsibility to consult with NORD GEAR if such items such as applied loads, operating speeds or other operating conditions have changed.

! WARNING:

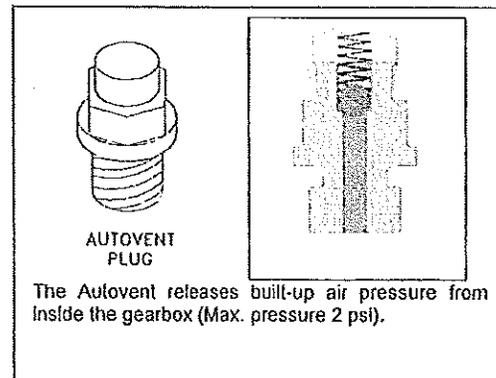
LOCK OUT POWER before any maintenance is performed. Make absolutely sure that no voltage is applied while work is being done on the gearbox.

START-UP

1. Ensure that switches, alarms, heaters, coolers and other safety and protection devices are installed and operational for their intended purpose.
2. Verify that the installed mounting position is the same as the nameplate mounting position. If not, adjust the oil level accordingly and relocate the vent plug, fill plug and drain plug according to the mounting position. See following.

AUTOVENT PLUG

The Autovent plug is brass in color and will be located at the highest point on the gearbox. It operates like a check-valve to allow the reducer to relieve internal pressure while preventing lubricant contamination during cooling. A spring presses a ball or plunger against a machined orifice until pressure exceeds 2 psi. Above 2 psi the air is allowed to escape depressurizing the gearcase. When internal pressure drops below 2 psi, the autovent re-seals closing the unit to the outside environment. After shutdown, the reducer cools along with the air inside the reducer. The unit will temporarily maintain a slight vacuum until normalization occurs. NORD Gear supplies an Autovent as a standard feature.



MAINTENANCE

Mineral lubricant should be changed every 10,000 service hours or after two years. For synthetic oils, the lube should be changed every 20,000 service hours or after four years. In case of extreme operating (e.g. high humidity, aggressive environment or large temperature variations), shorter intervals between changes are recommended.

OIL SPECIFICATIONS

NORD supplies all reducers filled with oil from the factory. Consult the sticker adjacent to the fill plug to determine the type of lubricant installed at the factory. Standard lubricant is ISO VG220 mineral-based oil. However, some units have special lubricants designed to operate in certain environments or to extend the service life of the lubricant. If in doubt about which lubricant is needed, contact NORD Gear.

STANDARD OIL – ISO VG220

Ambient Temperature	Formulation
20 to 104°F (-5 to 40°C)	Mineral

TYPICAL OILS

Viscosity ISO NLGI	Formulation	Service Temperature Range	Mobil®	Shell	Castrol	KLÜBER LUBRICATION	bp	Tribol®
VG 460	Conventional Mineral	20°C to +50°C 68F to +122°F	Mobilgear 634	Omala 460	7EP	Klüberoil GEM 1-460	Energol GR-XP 460	Tribol 1100/460
	Synthetic PAO	-30°C to +80°C -22°F to +176°F	Mobil SHC 634	Omala 460 HD	Isolube EP 460	Klübersynth EG 4-460	N/A	Tribol 1510/460
VG 320	Conventional Mineral	0°C to +30°C 32°F to +86°F	Mobilgear 632	Omala 320	6EP	Klüberoil GEM 1-320	Energol GR-XP 320	Tribol 1100/320
	Synthetic PAO	-35°C to +80°C -31°F to +176°F	Mobil SHC 632	Omala 320 HD	Isolube EP 460	Klübersynth EG 4-320	N/A	Tribol 1510/320
VG 220	Conventional Mineral	-5°C to +40°C +20°F to +104°F	Mobilgear 630	Omala 220	5EP	Klüberoil GEM 1-220	Energol GR-XP 220	Tribol 1100/220
	Synthetic PAO	-34°C to +80°C -30°F to +176°F	Mobil SHC 630	Omala 220 HD	Isolube EP 220	Klübersynth EG 4-220	N/A	Tribol 1510/220
VG 150 & VG 100	Conventional Mineral	-15°C to +25°C 5°F to +77°F	Mobilgear 629	Omala 100	4EP	Klüberoil GEM 1-150	Energol GR-XP 100	Tribol 1100/100
	Synthetic PAO	-37°C to +10°C -35°F to +50°F	Mobil SHC 629	Omala 150 HD	Isolube EP 150	Klübersynth EG 4-150	N/A	N/A
VG 68	Conventional Mineral	-15°C to +25°C 5°F to +77°F	Mobilgear 626	Omala 68	2EP	Klüberoil GEM 1-68	Energol GR-XP 68	Tribol 1100/68
	Synthetic PAO	-40°C to +10°C -40°F to +50°F	Mobil SHC 626	N/A	Isolube EP 68	N/A	N/A	N/A
VG 32	Synthetic PAO	-40°C to +10°C -40°F to +50°F	Mobil SHC 624	N/A	N/A	Klüber-Summit HySyn FG-32	N/A	N/A

PAO = Poly Alpha Olefin

SPECIAL PURPOSE LUBRICANTS

Ambient Temperature	Formulation	Manufacturer	Oil Brand Name
20 to 104°F (-5 to 40°C)	Food Grade Oil - Synthetic	Chevron	FM ISO 220
20 to 104°F (-5 to 40°C)	Food Grade Oil - Synthetic	OilJAX	Magnaplate 85W140-FG
5 to 125°F (-20 to 50°C)	Fluid Grease	Mobil	Mobilux EP023
-30 to 140°F (-35 to 60°C)	Fluid Grease - Synthetic	Mobil	Mobilith SHC 007
-30 to 140°F (-35 to 60°C)	Fluid Grease - Synthetic	Shell	Albida LC

STANDARD BEARING GREASE – NLGI 2EP Lithium

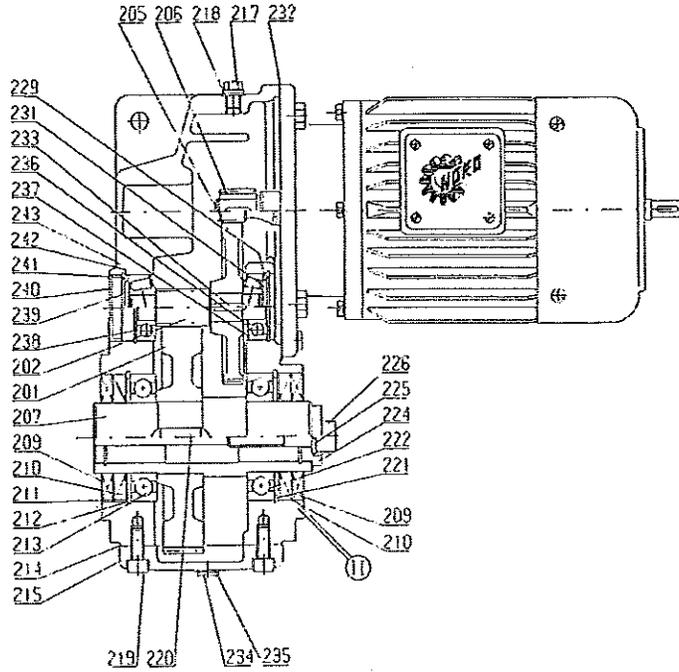
Ambient Temperature	Formulation
-20 to 140°F (-30 to 60°C)	Mineral

OPTIONAL BEARING GREASES

Ambient Temperature	Formulation	Manufacturer	Grease Brand Name
-40 to 230°F (-40 to 110°C)	Synthetic	Shell	Aeroshell 6
-40 to 230°F (-40 to 110°C)	Food Grade - Synthetic	Lubriplate	SFL1

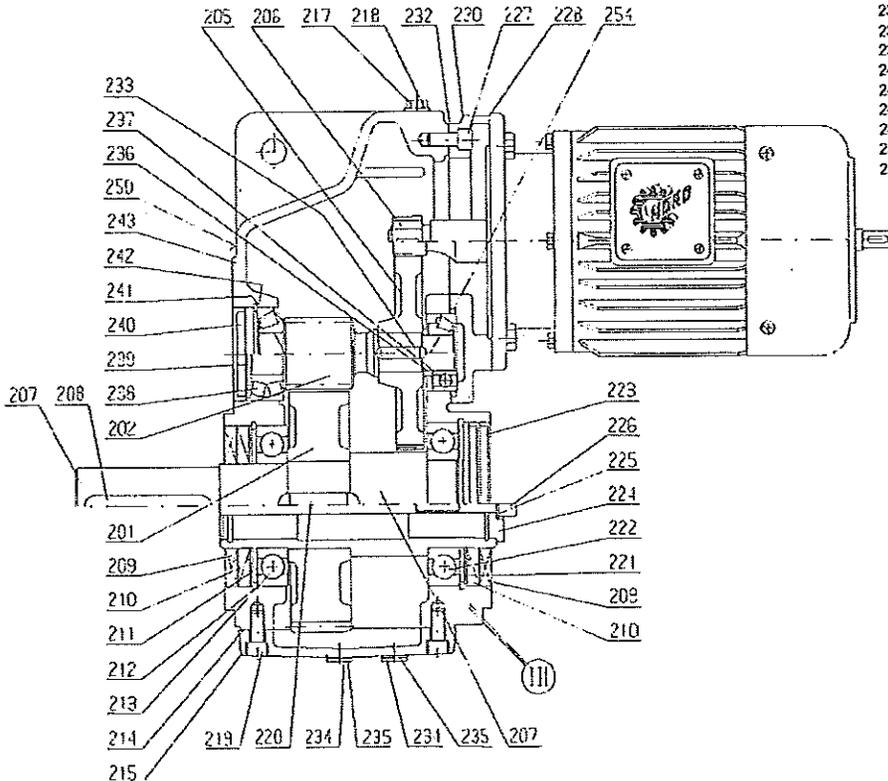
PARTS LIST

SK1282 - SK 5282



- 201 Driven gear
- 202 Pinion shaft
- 205 Driving gear
- 208 Driving pinion
- 207 Output shaft (Hollow shaft)
- 208 Key
- 209 Shaft seal
- 210 Shaft seal
- 211 Orclip
- 212 Shim
- 213 Ball bearing
- 214 Seal
- 215 Gear case cover
- 217 Vent plug
- 218 Seal
- 219 Socket head screw
- 220 Key
- 221 Orclip
- 222 Ball bearing
- 223 Locking cap
- 224 Washer
- 225 Washer
- 226 Socket head screw
- 227 Socket head screw
- 228 Seal
- 229 Supporting disc
- 230 Gearbox cover
- 231 Orclip
- 232 Seal
- 233 Key
- 234 Drain plug
- 235 Seal
- 236 Supporting disc
- 237 Pinion shaft bearing
- 238 Pinion shaft bearing
- 239 Orclip
- 240 Locking cap
- 241 Shim
- 242 Supporting disc
- 243 Gear case
- 250 Locking cap
- 254 Spacer

SK6282 - SK11282



RECOMMENDED SPARE PARTS

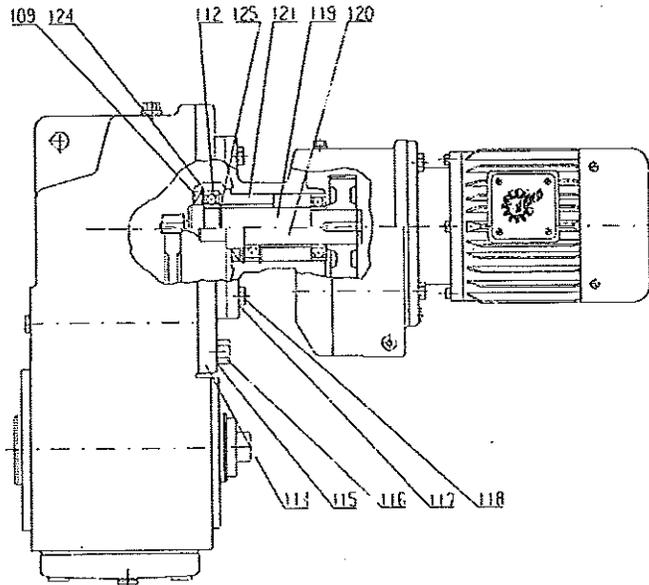
Bearings - all Gaskets - all Shims - all
Seals - all Seal Plugs - all

IMPORTANT!

When ordering parts, it is necessary to have the **NORD SERIAL NUMBER** from the unit the parts are for. The serial number will dictate the correct parts for that particular unit. The gearbox nameplate will have the serial number on it.

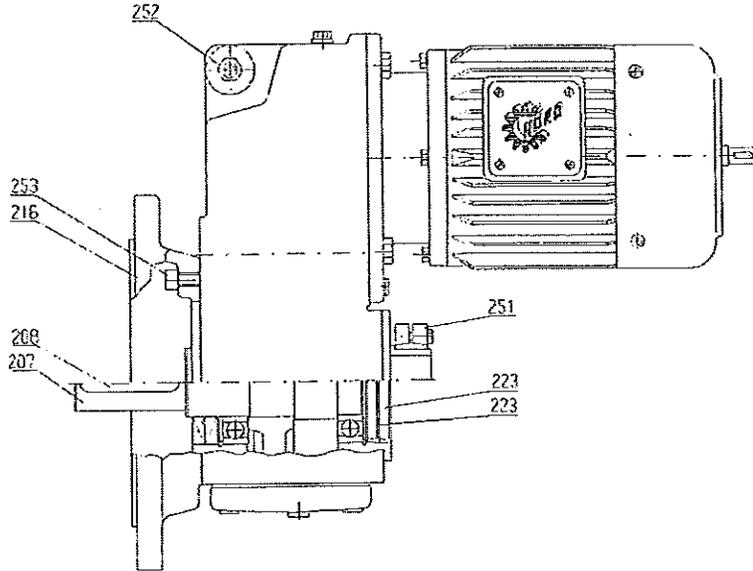
PARTS LIST

SK1282/02 - SK11382/52



- 109 Shaft seal
- 112 Ball bearing
- 114 Intermediate flange
- 115 Washer
- 116 Hexagon screw
- 117 Washer
- 118 Hexagon screw
- 119 Intermediate shaft, plain
- 120 Intermediate shaft, gearcut
- 121 Bearing sleeve
- 124 O-ring
- 125 O-ring
- 207 Output shaft
- 208 Key
- 216 Flange
- 223 Locking cap
- 251 Shrink disc connector
- 252 Torque arm
- 253 Socket head screw

SK1282 - SK11282
SK1382 - SK11382



TROUBLE SHOOTING

PROBLEM WITH THE REDUCER		POSSIBLE CAUSES	SUGGESTED REMEDY
Runs Hot	Overloading	Load exceeds the capacity of the reducer	Check rated capacity of reducer, replace with unit of sufficient capacity or reduce load
	Improper lubrication	Insufficient lubrication	Check lubricant level and adjust up to recommended levels
		Excessive lubrication	Check lubricant level and adjust down to recommended levels
		Wrong lubrication	Flush out and refill with correct lubricant as recommended
Runs Noisy	Loose foundation bolts	Weak mounting structure	Inspect mounting of reducer. Tighten loose bolts and/ or reinforce mounting and structure
		Loose hold down bolts	Tighten bolts
	Worn RV Disc	Overloading unit may result in damage to disc	Disassemble and replace disc. Recheck rated capacity of reducer.
	Failure of Bearings	May be due to lack of lubricant	Replace bearing. Clean and flush reducer and fill with recommended lubricant.
		Overload	Check rated capacity of reducer.
Insufficient Lubricant	Level of lubricant in the reducer not properly maintained.	Check lubricant level and adjust to factory recommended level.	
Output Shaft Does Not Turn	Internal parts are broken	Overloading of reducer can cause damage.	Replace broken parts. Check rated capacity of reducer.
		Key missing or sheared off on input shaft.	Replace key.
		Coupling loose or disconnected.	Properly align reducer and coupling. Tighten coupling.
Oil Leakage	Worn Seats	Caused by dirt or grit entering seal.	Replace seats. Autovent may be clogged. Replace or clean.
		Overfilled reducer.	Check lubricant level and adjust to recommended level.
		Autovent clogged.	Clean or replace, being sure to prevent any dirt from falling into the reducer.
		Improper mounting position, such as wall or ceiling mount of horizontal reducer.	Check mounting position. Name tag & verify with mounting chart in manual.

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Phone 905-796-3606
Fax 905-796-8130

ATTACHMENT J-1502000-11

**PERFORMANCE
ASSESSMENT
PLAN**

SOLICITATION# N40085-16-R-6328

BULLET TRAP OPERATIONS, MAINTENANCE, AND REPAIRS

**MARINE CORPS BASE CAMP LEJEUNE (MCBCL), NC
MARINE CORPS AIR STATION-NEW RIVER (MCAS-NR),
JACKSONVILLE, NC
MARINE CORPS AIR STATION, CHERRY POINT (MCAS-CP),
NORTH CAROLINA**

PREPARED BY:

**OICC, MCI EAST, NAVFAC MIDLANT
AND
FACILITIES SUPPORT CONTRACTS (FSC)**

[FEB 2016]

Performance Assessment Plan Contents

1. Performance Assessment Plan	1
1.1 Introduction.....	1
1.2 Roles and Responsibilities	1
1.3 Training.....	2
1.4 Safety	2
1.5 Security	2
1.6 Submittals	3
1.6.1 Quality Management Plan Submittal.....	3
1.6.2 Accident Prevention Plan Submittal	3
1.7 Meetings.....	3
1.8 Methods of Assessment (MOA)	3
1.9 Quality Management System (QMS).....	4
1.10 Assessment Procedures.....	4
1.10.1 Post-Award Planning	4
1.10.2 Scheduling Assessments	4
1.10.3 Performance Assessment Process	5
1.10.4 Safety Assessment	10
1.11 Assessment Summary and Evaluation Procedures	11
1.11.1 Monthly Performance Assessment Summary (MPAS)	11
1.11.2 Invoice Validation and Withholdings	11
1.11.3 Performance Assessment Board (PAB).....	12
1.12 Summary	12
Attachment A: Functional Assessment Plan (FAP)	13
Attachment B: Performance Assessment Worksheet (PAW)	16
Attachment C: QMS Pre-performance Checklist.....	17
Attachment D: FSC Safety Assessment Checklist	20
Attachment E: Customer Complaint Record.....	21
Attachment F: QMS In-process Review Checklist.....	22
Attachment G: Contract Discrepancy Report (CDR).....	25
Attachment H: MPAS Coversheet.....	26
Attachment I: PAB Rating Summary.....	27

1. Performance Assessment Plan

1.1 Introduction

The Performance Assessment Plan (PAP) establishes Performance Assessment (PA) provisions for Contract Bullet Trap Operation, Maintenance, and Repairs at MCBCL, MCAS-NR, and, MCAS-CP, North Carolina.

The PAP describes the methodology for assessing the Contractor's performance that will be used to provide Contractor feedback, update Contractor Performance Assessment Rating System (CPARS), and, determine eligibility in earning incentives. The PAP includes the Functional Assessment Plan (FAP), Attachment A, and standard Performance Assessment Worksheets (PAW), Attachment B, to document and report Government observations and rate Contractor performance. The Government's role is to assess Contractor's work against measurable performance standards, and per the principles of Performance Based Services Acquisition (PBSA), the Contractor's role is to ensure its quality through successful implementation of its Quality Management System (QMS). Per FAR Subpart 46.4, Government PA "shall be performed at such times and places as may be necessary to determine that the supplies or services conform to contract requirements" in order to ensure payments are made only for services that meet performance standards specified in the contract.

A positive relationship between the Government and the Contractor is essential in fulfilling a performance-based requirement. The Government's relationship with the Contractor should be one that promotes a strong and positive business alliance to achieve mutually beneficial goals, such as timely delivery and acceptance of high-quality services through the use of efficient business practices. It is essential that the Government and the Contractor work together as a team to communicate expectations, agree on common goals, develop a common understanding of measurable standards, and identify and address problems early in the contract to achieve desirable outcomes.

1.2 Roles and Responsibilities

The Government's key roles and responsibilities for performance assessment are as follows:

Performance Assessment Representative (PAR). The PAR is the on-site representative who assesses Contractor performance. The PAR periodically observes Contractor performance, reviews delivered services, reviews quality management corrective actions, keeps current records of performance issues and results, periodically assesses and documents Contractor performance on Performance Assessment Worksheets (PAWs) and the Monthly Performance Assessment Summary (MPAS), and communicates findings as necessary with the Contractor, Senior PAR (SPAR), Contracting Officer (KO), and Contracting Officer Representative (COR), as applicable.

Senior PAR (SPAR). The SPAR reviews PA schedules and PA documentation for sufficiency and consistency of oversight. The SPAR reviews PAWs and MPASs (and creates a consolidated MPAS if required) for completeness and accuracy before their presentation to the Performance Assessment Board (PAB). The SPAR is normally designated as the PAB chairperson.

Contract Specialist (CS). The ACO and/or PCO assigned to the contract.

Contracting Officer (KO). The KO has final responsibility for Contractor PA per FAR Part 42—Contract Administration and Audit Services, non-conformance modifications, and unilateral determination of incentives.

Contracting Officer’s Representative (COR). The COR is responsible for a variety of contract administration duties that may include oversight of PA, reviewing invoices, and acceptance of work. The COR should be assigned as a PAB member due to their broad technical background and knowledge of overall Contractor performance.

Performance Assessment Board (PAB). The PAB is comprised of key technical and administrative personnel appointed in writing by the KO. The PAB will convene on a regular basis to review Contractor performance documentation for the prior evaluation period, and prepare and forward a summary report of findings and recommendations to the KO. The PAB makes recommendations for CPARS and provides input for the determination of contract incentives, if applicable.

1.3 Training

To effectively implement the PA Program, individuals who monitor the Contractor’s performance should be experienced in the annex/sub-annex areas for which they are assigned and adequately trained. Mandatory training standards for all personnel performing PA of NAVFAC contracts are specified in BMS B-14.3, Performance Assessment. Additionally, safety training requirements are detailed in BMS B-14.18, FSC Safety and training for those assigned as CORs is promulgated by NFAS 1.602 and BMS B-18.3.6.

PARs and CORs assigned to provide oversight of this contract must meet the applicable training requirements and must be appointed in writing by the KO per BMS S.18.3.6.

1.4 Safety

Proper oversight of Contractor safety is an integral part of effective performance assessment. The PAR must ensure that the Contractor is in compliance with safety requirements specified in Spec Item 2.9 of the contract. The PAR should be present during any local Safety briefings. If the PAR observes a violation of any safety requirements by the Contractor, the PAR should:

- Report the safety hazard resulting from unsafe acts or conditions, defective tools, materials, or equipment used by the Contractor to the KO.
- When imminent danger is apparent (where, if the hazard is not immediately corrected, there is a high probability that a serious accident will occur, life will be in danger or there will be extensive property damage), immediately inform the Contractor and request immediate action be taken to correct the hazard. If the Contractor does not voluntarily

Further detail of safety assessment procedures is provided in paragraph 1.10.4 below.

1.5 Security

The PAR should become familiar with all security requirements specified in Spec Item 2.8 of the contract and report any observed violations to the KO.

1.6 Submittals

The PAR should review reports and other submittals identified in Section F to ensure they comply with applicable requirements and specifications.

1.6.1 Quality Management Plan Submittal

The Quality Management System Pre-Performance Review Checklist, Attachment C, should be used for the review of the Contractor's QM Plan submittal and as a guideline for discussion of the Contractor's QMS during the post-award kickoff/pre-performance conference. The PAR, SPAR, Contractor Quality Manager and Project Manager, and any applicable subcontractor quality representatives should sign off on the QMS review checklist.

1.6.2 Accident Prevention Plan Submittal

Per BMS B-14.18, FSC Safety, the FMFS Pre-Performance Safety Checklist should be used for the review of the Contractor's Accident Prevention Plan submittal (including Activity Hazard Analyses (AHAs) and Occupational Risk and Compliance Plans and Programs) and as a guideline for discussion of the Contractor's Safety Program during the post-award kickoff/pre-performance conference. The PAR should coordinate with the local command Safety Representative for assistance in review of Contractor's APP. The PAR, SPAR, Contractor Site Safety and Health Officer (SSHO) and Project Manager, and any applicable subcontractor safety representatives should sign off on the Safety review checklist. The Contractor must submit and have an approved APP before any work may begin on site. Additionally, new or revised AHAs must be submitted and reviewed at the beginning of each work phase, when new hazards are identified, or when a new work crew is brought on site.

1.7 Meetings

The PAR should attend and be prepared for required meetings, including partnering sessions. The PAR should be familiar with the Spec Items in Annex 2 titled "Required Conferences and Meetings" and "Partnering." The FSC Partnering process is addressed in BMS B-14.16.

1.8 Methods of Assessment (MOA)

The PAR will periodically assess services for conformance to contract performance objectives and standards using the following MOAs:

- Periodic Sampling (PS) – requires a pre-determined plan for assessing a portion of the work, using sample size and frequency at the applicable assessment level.
- Validated Customer Complaints (VCC) – consists of customers observing defects in the services they have received and using a pre-determined procedure to report these defects to the PAR for validation.
- Unscheduled Visits (UV) – impromptu assessments of performance standards and objectives whenever practical.

- Customer's Evaluation (CE) – consists of collected survey data of Contractor performance from the customer's perspective through the use of a feedback form.

The MOAs used for assessment of each performance objective and standard are identified within the FAP included in Attachment A.

1.9 Quality Management System (QMS)

When the Government's assessment of the Contractor's performance reveals that the quality management efforts are not effective in ensuring performance objectives and standards are achieved, further action is required. The PAR will conduct a review of the Contractor's QMS processes and quality inspection and surveillance records for the work item(s) where deficiencies are noted to validate the accuracy and effectiveness of the Contractor's QMS.

For QMS to be considered acceptable, the Contractor must demonstrate to the Government through quality management and QC corrective and preventive actions that the risk of failure to meet performance standards has been satisfactorily mitigated.

Further detail of the QMS review process is provided in paragraph 1.10.3 below.

1.10 Assessment Procedures

1.10.1 Post-Award Planning

The PAR and SPAR should review and understand the final contract requirements, including any amendments made during the solicitation period, paying particular attention to performance objectives and standards and any changes in the scope of work. The PAR and SPAR should also review the Contractor's technical proposal received in response to the solicitation and initial submittals, such as the QMS program (including Quality Management Plan), Accident Prevention Plan (including Activity Hazard Analyses (AHAs) and Occupational Risk and Compliance Plans and Programs), list of key personnel and employee listing.

The PAR and SPAR should also meet with customer representatives to review details of the contract and discuss the process for reporting and handling of customer complaints and review the contract requirements for partnering and the process described in BMS B-14.16, FSC Partnering, to be prepared for these meetings.

1.10.2 Scheduling Assessments

The PAR and SPAR should develop a planned assessment schedule based upon factors such as selected MOAs, Contractor's recurring performance schedule, population of work, and local priorities and conditions. Certain work requirements may necessitate normal assessment at AL2 or AL3 based on performance risk considerations, e.g., services that are mission critical or have life safety impacts. Risk is measured based on two things: the likelihood (or probability) and event will occur and the consequence (or impact) if the event does occur.

The FAP, Attachment A, along with the starting point for assessments based on risk determination should be compared against the Contractor's work schedules as applicable to develop the initial assessment schedule. This schedule may be adjusted when required based on Contractor performance as detailed in paragraph 1.10.3 below.

1.10.3 Performance Assessment Process

The flowcharts and corresponding descriptions shown below detail the performance assessment process used by the PAR to observe, assess, document, and rate Contractor's performance.

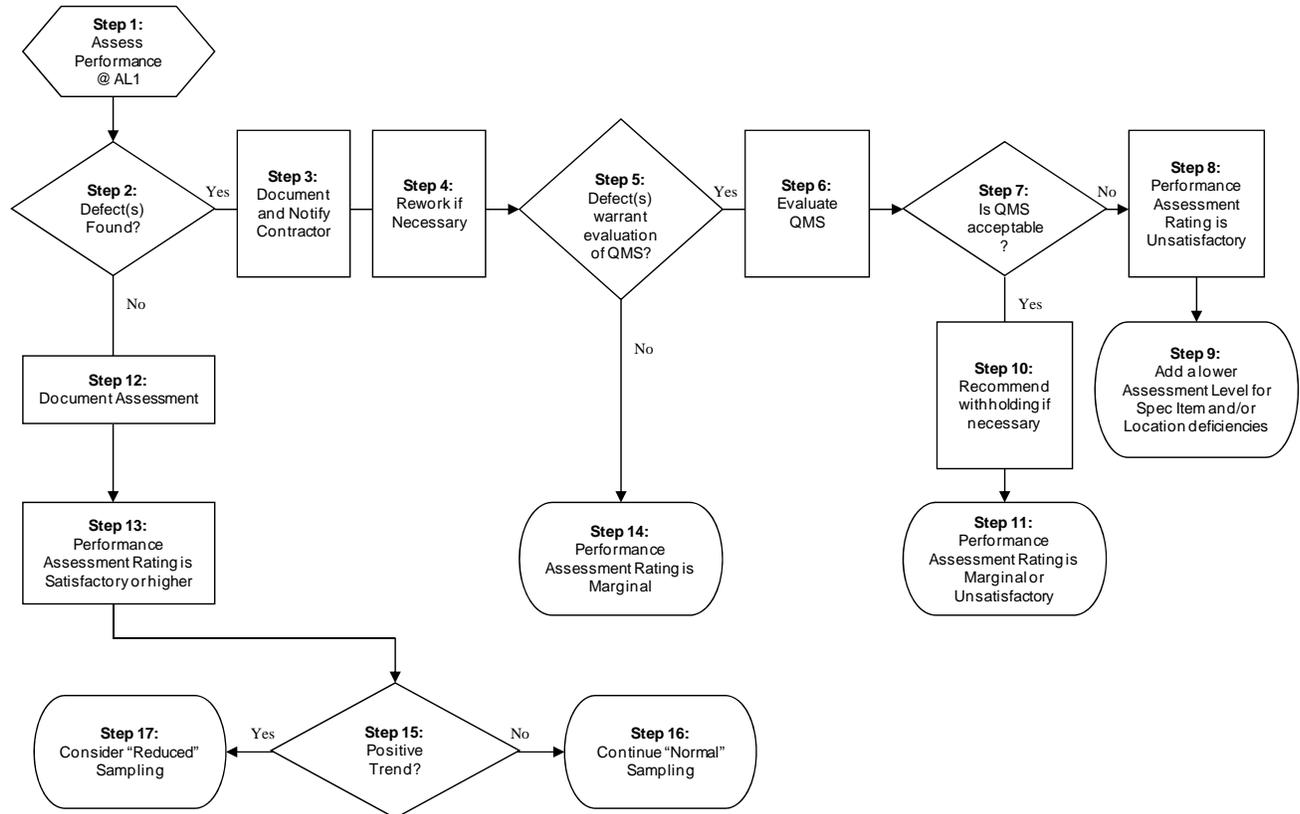


Figure 1. Performance Assessment Process for Assessment Level 1 (AL1)

The following descriptions are provided for the flowchart shown in Figure 1:

Step 1: Assess Performance at AL1 – This is the typical starting point of assessment. Assess the Contractor's performance using the MOA, frequencies, and sample sizes indicated at AL1 of the FAP. The starting point may include additional PA at lower assessment levels for mission critical, safety, or environmental related services as determined based on the risk assessment performed during post-award planning. A Performance Assessment Worksheet (PAW) must be used for each assessment indicating this is an AL1 assessment. A PAW is the form used to document and report Government observations and rate Contractor performance.

Step 2: Defect(s) Found – The PAR should evaluate the Contractor's performance of work looking for both failures to comply with performance objectives and standards as well as instances of value-added services or work that exceeds performance standards. Any observation of work that fails to meet any of the specified performance standards will be documented as a defect. Validated customer complaints (VCC) or instances of non-conforming work discovered during unscheduled visits (UV) should also be documented as defects. Where customer complaints are received, all

alleged defects must be evaluated within a reasonable time to validate that the performance standards were not met. Documentation will be completed using the Customer Complaint Record, Attachment D. Documentation of UVs will be completed on a PAW. DECISION: If a defect is found, continue. If not, jump to Step 12.

Step 3: Document and Notify Contractor – Document any observed negative performance that fails to meet contract performance standards with supporting narrative on the Performance Assessment Worksheet (PAW). If defects are found, the PAR will forward a copy of the PAW to the Contractor. The Contractor shall sign and return the PAW within the specified timeframe to acknowledge receipt of the document. The Contractor’s signature does not constitute agreement with the Government’s assessment, it merely acknowledges that the Contractor has been notified of a Government observed defect. Should the Contractor disagree with the Government’s observations, discussions should be conducted to reach a common understanding of performance objectives and standards.

Step 4: Rework if Necessary – In the case of unsatisfactory or non-performed work, the Government may, at its option, allow the Contractor an opportunity to correct by re-performance at no additional cost to the Government. Rework shall be completed within the timeframe specified in Section E, Consequences of Contractor’s Failure to Perform Required Services clause of the contract.

Step 5: Defect(s) Warrant Evaluation of QMS? – Defects warrant evaluation of QMS if: 1) they are “Significant”, 2) a “Trend” has been established, or 3) the work is not considered “Substantially Complete”. Significant defects include the Contractor’s failure to meet performance objectives and standards that result in damage to the Government, or incomplete major or critical work items. Significant defects are subjective and should be discussed in initial partnering sessions with the Contractor. Trends are defects that may be considered minor but are recurring and have not been corrected through the Contractor’s QMS. Trends are typically defects found in the same or similar work requirements repeated consistently over several periods of the assessment frequency. Substantially complete means that the performance standard is fully met except for minor or trivial non-conformances per FAR 46.407. A service will be judged to be fully conforming to the contract performance standards if the nonconformance is minor or trivial and there is no omission of essential work, and approximately 95% of the total work (population) assessed meets the performance standard. Substantial completion can be measured based on the total work requirement being assessed or based on any one element of work performance. DECISION: If QMS evaluation is warranted, continue. If not, jump to Step 14.

Step 6: Evaluate QMS – The PAR should evaluate the Contractor’s QMS to verify proper controls are in place to ensure the delivery of quality services. The PAR should follow the QMS In-Process Review Checklist, Attachment E, and document findings on this form. This review should begin with a focus on the Spec Items and/or location where defects have been found as opposed to a complete audit of the Contractor’s QMS (use Parts A & B of the checklist). The evaluation should identify corrective actions the Contractor is taking for specific discrepancies and identify any QMS changes the Contractor is implementing to preclude systemic problems, avoid repeat discrepancies, and regain Quality Control (QC). If the initial evaluation identifies deficiencies in the Contractor’s QMS with insufficient planned corrective actions or QMS changes, or, if corrective actions and QMS changes planned during previous QMS reviews have been ineffective, then broaden the evaluation to a more comprehensive review of the Contractor’s QMS program (use Parts C through F of the checklist).

Step 7: Is QMS Acceptable? – The Contractor must demonstrate to the Government that they have taken corrective actions and identified QMS changes to preclude systemic problems, avoid repeat discrepancies, and regain QC. QMS is considered “Acceptable” if the Contractor’s actions will satisfactorily reduce the risk of continued failure to meet performance standards. DECISION: If QMS is unacceptable, continue. If QMS is acceptable, jump to Step 10.

Step 8: Performance Assessment Rating is Unsatisfactory – If the Contractor’s QMS is unacceptable, then the PAR should document all findings, including a summary of the findings associated with the Contractor’s QMS, on the PAW. The PAR should rate the Contractor Unsatisfactory in accordance with the adjectival ratings included in the PARC. The PAR should also document recommendations for withholding of payment on the PAW for non-conforming services when defects cannot be corrected by re-performance.

Step 9: Add a lower Assessment Level for Spec Item and/or Location deficiencies – When the Contractor’s performance is Unsatisfactory at AL1 and QMS is Unacceptable, additional PA at Assessment Level 2 or 3 (AL2 or AL3) should be conducted for the Spec Item and/or location deficiencies as shown in Figure 3. [End of this assessment]

Step 10: Recommend withholding if necessary – Even if the QMS is acceptable and the Contractor has implemented or planned appropriate corrective actions, withholdings may still be warranted. The PAR should document recommendations for withholding of payment on the PAW for non-conforming services when defects cannot be corrected by re-performance.

Step 11: Performance Assessment Rating is Marginal or Unsatisfactory – The PAR shall document all findings, including a summary of the findings associated with the Contractor’s QMS evaluation, on the PAW. The PAR should rate the Contractor Marginal or Unsatisfactory in accordance with the PARC adjectival descriptions. The PAR should continue sampling the size identified as “Normal” in the FAP at AL1. [End of this assessment]

Step 12: Document Assessment – Document results of assessment particularly noting how it was validated that performance complied with contract requirements and detailing any instances of value-added services or work that exceeds contract performance standards, with supporting narrative on the PAW.

Step 13: Performance Assessment Rating is Satisfactory or Higher – If the Contractor has performed all work in accordance with the performance objectives and standards, then a performance rating of Satisfactory or higher should be assigned. The PAR should rate the Contractor Satisfactory, Very Good, or Exceptional in accordance with the PARC adjectival descriptions. Jump to Step 15.

Step 14: Performance Assessment Rating is Marginal – The PAR shall document all findings, including details of the failures to comply with performance objectives and standards on the PAW. The PAR should rate the Contractor Marginal in accordance with the PARC adjectival descriptions. The PAR should continue sampling the size identified as “Normal” in the FAP at AL1. [End of this assessment]

Step 15: Positive Trend Established? – If the Contractor has established a trend of Satisfactory, Very Good or Exceptional performance, repeated consistently over several periods of the assessment frequency, the PAR should consider sampling at the reduced level (Jump to Step 17). If a trend has not yet been established the PAR should continue normal sampling.

Step 16: Continue “Normal” Sampling – The PAR should continue sampling the size identified as “Normal” in the FAP at AL1. [End of this assessment]

Step 17: Consider “Reduced” Sampling – The PAR should adjust sampling to the size identified as “Reduced” in the FAP at AL1. [End of this assessment]

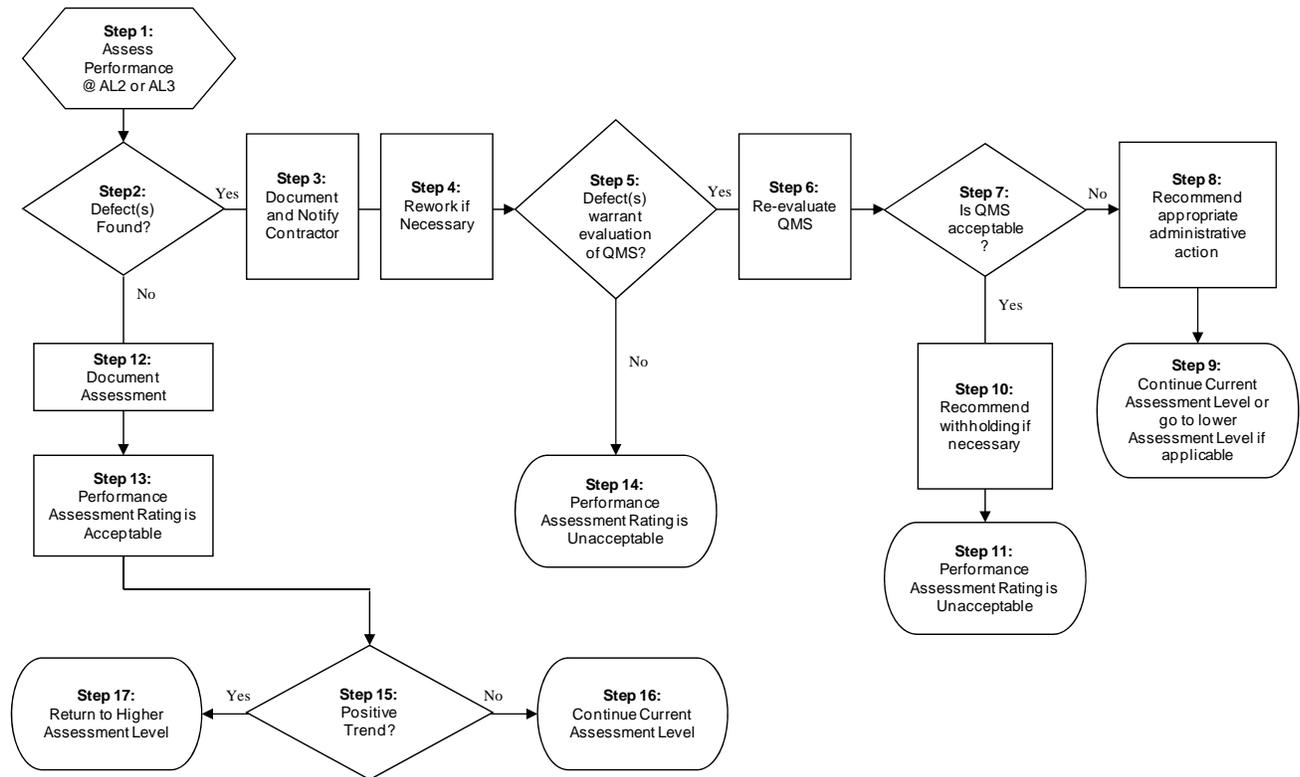


Figure 2. Performance Assessment Process for Assessment Level 2 or 3 (AL2 or AL3)

The following descriptions are provided for the flowchart shown in Figure 2:

Step 1: Assess Performance at AL2 or AL3 – Start additional assessment(s) at a lower level if the rating on PAW 1 was Unsatisfactory and QMS was unacceptable. Certain work requirements may necessitate normal assessment at AL2 or AL3 based on performance risk considerations, e.g., services that are mission critical or have life safety impacts. Assess the Contractor’s performance using the MOA, frequencies, and sample sizes indicated at the appropriate assessment level, e.g., AL2 or AL3 of the FAP.

Step 2: Defect(s) Found – If the Contractor has performed all work in accordance with the performance objectives and standards, then a performance rating of Acceptable should be assigned. The PAR will document any instances of value-added services or work that exceeds performance standards with supporting narrative on the Performance Assessment Worksheet (PAW). When the assessed work fails to comply with performance objectives and standards, the PAR will document the defect on the PAW and notify the Contractor. Validated customer complaints (VCC) or instances of non-conforming work discovered during unscheduled visits (UV) should also be documented as defects. Where customer complaints are received, all alleged defects must be

evaluated within a reasonable time to validate that the performance standards were not met. Documentation will be completed using the Customer Complaint Record, Attachment D. Documentation of UV will be completed on a PAW. DECISION: If defect is found, continue. If not, jump to Step 12.

Step 3: Document and Notify Contractor – Document instances of value-added performance that exceeds contract performance standards, and negative performance that fails to meet contract performance standards, with supporting narrative on the Performance Assessment Worksheet (PAW). If defects are found the PAR will forward a copy of the PAW to the Contractor. The Contractor shall sign and return the PAW within the specified timeframe to acknowledge receipt of the document. The Contractor's signature does not constitute agreement with the Government's assessment, it merely acknowledges that the Contractor has been notified of a Government observed defect. Should the Contractor disagree with the Government's observations, discussions should be conducted to reach a common understanding of performance objectives and standards.

Step 4: Rework if Necessary – In the case of unsatisfactory or non-performed work, the Government may, at its option, allow the Contractor an opportunity to correct by re-performance at no additional cost to the Government. Rework shall be completed within the timeframe specified in Section E, Consequences of Contractor's Failure to Perform Required Services clause of the contract.

Step 5: Defect(s) Warrant Evaluation of QMS? – Defects warrant evaluation of QMS if 1) they are "Significant", 2) a "Trend" has been established, or 3) the work is not considered "Substantially Complete". Significant defects include the Contractor's failure to meet performance objectives and standards that result in damage to the Government, or incomplete major or critical work items. Significant defects are subjective and should be discussed in initial partnering sessions with the Contractor. Trends are defects that may be considered minor but are recurring and have not been corrected through the Contractors QMS. Substantially complete means that the performance standard is fully met except for minor or trivial non-conformances per FAR 46.407. A service will be judged to be fully conforming to the contract performance standards if the nonconformance is minor or trivial and there is no omission of essential work, and approximately 95% of the total work (population) assessed meets the performance standard. DECISION: If QMS evaluation is warranted, continue. If not, jump to Step 14.

Step 6: Re-evaluate QMS – The PAR should reevaluate the Contractors QMS to verify proper controls are in place to ensure the delivery of quality services. This review should be limited to the Spec Items and/or location where defects have been found as opposed to a complete audit of the Contractor's QMS. The evaluation should identify corrective actions the Contractor is taking for specific discrepancies, and identify any QMS changes the Contractor is implementing to preclude systemic problems, avoid repeat discrepancies, and regain Quality Control (QC).

Step 7: Is QMS Acceptable? – The Contractor must demonstrate to the Government that they have taken corrective actions and identified QMS changes to preclude systemic problems, avoid repeat discrepancies, and regain QC. QMS is considered "Acceptable" if the Contractor's actions will satisfactorily reduce the risk of continued failure to meet performance standards. DECISION: If QMS is unacceptable, continue. If QMS is acceptable, jump to Step 10.

Step 8: Recommend appropriate administrative action – The PAR should make recommendations to the Contracting Officer via the SPAR/COR/FSCM for appropriate administrative actions. Administrative actions may include additional performance review meetings,

issuance of a Contract Discrepancy Report (CDR), Attachment F, withholding of payment including liquidated damages, or interim CPARS rating. The PAR should also document recommendations for withholding of payment on the PAW for non-conforming services when defects cannot be corrected by re-performance.

Step 9: Continue Current Assessment Level or go to lower Assessment Level if applicable – The PAR shall continue sampling at the size and frequency identified in the FAP at the appropriate assessment level or can move to a lower level of assessment if applicable. Additionally, if there is a negative trend in Contractor performance, the PAR should consider modification of the MOAs, sample sizes, and frequencies included in the FAP.

Step 10: Recommend withholding if necessary – If the Contractor’s QMS is acceptable, then the PAR may still consider recommending withholding of payment for non-conforming services when defects cannot be corrected by re-performance by documenting on the PAW.

Step 11: Document Performance Assessment Rating as Unacceptable – The PAR shall document all findings, including findings associated with the Contractor’s QMS, which justify rating the Contractor’s performance as Unacceptable. The PAR shall continue sampling the size identified in the FAP at the current assessment level. [End of this assessment]

Step 12: Document Assessment – Document results of assessment with supporting narrative on the PAW, particularly noting how it was validated that performance complied with contract requirements.

Step 13: Document Performance Assessment Rating as Acceptable at appropriate assessment level – The PAR shall document all findings which justify rating the Contractor’s performance as Acceptable. Jump to Step 15.

Step 14: Document Performance Assessment Rating as Unacceptable – The PAR shall document all findings which justify rating the Contractor’s performance as Unacceptable. The PAR shall continue sampling the size identified in the FAP at the current assessment level. [End of this assessment]

Step 15: Positive Trend Established? – If the Contractor has established a trend of acceptable performance over a period of time, e.g., three months, the PAR should return to a higher assessment level (Jump to Step 17). If a positive trend has not yet been established the PAR should continue at the current assessment level.

Step 16: Continue Current Assessment Level – The PAR should continue sampling at the size and frequency identified in the FAP at the appropriate assessment level. [End of this assessment]

Step 17: Return to Higher Assessment Level – The PAR should discontinue the additional lower level assessment and move to a higher assessment level or reduce to normal AL1 assessment. [End of this assessment]

1.10.4 Safety Assessment

As detailed in BMS B-14.18, FSC Safety, proper oversight of Contractor safety is an integral part of effective performance assessment. There are two preferred methods for assessing a Contractor’s safety performance: 1) Assessing safety while conducting regular periodic sampling; and 2) Documenting “unscheduled visits” to specifically assess safety anytime the performance of work can be observed.

Note: Anytime a safety issue is observed, the PAR should take appropriate immediate action to stop work as necessary until the unsafe practices are properly corrected.

The PAR shall record all safety assessments on the PAW including a supporting narrative regarding the safety issues observed in the comments block. The FSC Safety Assessment Checklist, Attachment G, should be used to identify the specific areas where safety issues were noted and attached to the PAW. Similar to the assessment process detailed above, the PAR should consider the significance of safety issues and any trends observed in evaluating the need for further review of the Contractor's safety program and the addition of more scheduled assessments.

If a detailed review of the Contractor's safety program is deemed necessary, the PAR should evaluate the Contractor's Accident Prevention Plan (APP)/Activity Hazard Analysis (AHA) to verify proper safety controls are in place to ensure their employees are performing work in accordance with EM 385-1-1. This review shall ensure the APP/AHA is site specific and relevant to the service process. The safety program review should identify discrepancies between the Contractor's APP/AHA with the EM 385-1-1 and identify any corrective actions the Contractor is implementing to preclude systemic problems and avoid repeat safety issues. The PAR should coordinate with the local command Safety Representative for assistance in review of Contractor's APP.

The PAR must also be familiar with other safety responsibilities detailed in BMS B-14.18, including assisting with Occupational Safety and Health Administration (OSHA) inspections and ensuring Contractors follow the proper procedure for mishap notification.

1.11 Assessment Summary and Evaluation Procedures

1.11.1 Monthly Performance Assessment Summary (MPAS)

The PAR and SPAR will collect, review, and evaluate the results of all performance assessments including PAW documentation, safety assessments, validated customer complaints, customer evaluations, trend data, and Contractor QMS corrective and preventive actions. The PAR summarizes PA information and completes the comments block on the MPAS for each annex/sub-annex. The MPAS for each annex/sub-annex is included with the applicable FAP, Attachment A. The SPAR reviews completed annex/sub-annex MPAS, provides recommended actions as applicable, assigns an overall technical rating for the function, and validates the MPAS by signing it. Supporting information (e.g. copies of completed PAWs, VCCs, Customer Evaluation forms, and other assessment documentation) should be made available with the MPAS.

1.11.2 Invoice Validation and Withholdings

Results of performance assessments and other PA information should also be used as part of the validation of the Contractor's monthly invoice amount. The PAR and SPAR will determine the value of the estimated damages to the Government for non-conforming or non-performed work and recommend to the KO the appropriate withholding including liquidated damages (LDs). Documentation must be provided to support the reduced value of services and/or the estimated cost and related profit to correct deficiencies and complete unfinished work.

1.11.3 Performance Assessment Board (PAB)

The Performance Assessment Board membership consists of the following:

PAB Chairperson – SPAR

PAB Member –COR

PAB Member – KO

The PAB will convene to review and evaluate Contractor performance. The date, time, and location of PAB meetings will be established by the PAB Chairperson and communicated to all PAB members.

Additional participants may include as specifically requested or approved by the PAB Chairperson. The personnel may participate in the discussion of Contractor performance, but will have no vote on consensus ratings.

The PAR/SPAR should be prepared to brief the PAB on the monthly summary information and trend data and offer a recommended consensus rating to the PAB based on assessment results. Each PAB member should consider the information presented and individually document ratings with supporting comments for each area defined in CPARS on the PAB Rating Summary form, Attachment I. The PAB Chairperson should develop a consensus rating for each factor and document comments relevant to each rating factor from the PAB review. At, or near, the end of each performance period, the PAB should review previous PAB Rating Summaries in addition to performance during the most recent evaluation period to develop overall input for official CPARS ratings and relevant comments. This final PAB report should be used by the Assessing Official Representative (AOR) for entry into CPARS for the performance period.

Specific details of the PAB process are provided in BMS B-14.26, Performance Assessment Board.

1.12 Summary

The PAP is based on the premise that the Contractor is responsible for managing and ensuring that quality controls meet the terms of the contract. The PAP facilitates consistent and effective tiered PA to verify the accuracy and completeness of the Contractor's QMS and to assess overall compliance with performance objectives and standards. The Government will evaluate Contractor performance through appropriate assessment methods to ensure payments are made only for services that comply with contract requirements. This PAP is a "living" document that will be revised or modified as circumstances warrant.

Attachment A: Functional Assessment Plan (FAP)

FOR GOVERNMENT USE ONLY

MONTHLY PERFORMANCE ASSESSMENT SUMMARY

Annex/sub-annex: 1502000 Facility Investment

Month/Year: _____

Spec Item	Title	AL1 Rating					AL2/AL3 Rating			VCC	
		E	VG	S	M	U	# Samples	A	U		# Samples
3.	Recurring										
3.1	Operation and Maintenance										
3.1.1	Service Trouble Calls										
3.1.2	Rubber Berm Traps										
3.1.3	Screw Conveyor System										
3.1.4	Dust Collection Units										
3.1.5	TCT-2 Systems										
3.2	Minor Modifications/Repairs										
3.3	Air Filtration Filters exchange										
3.4	Storage, Transporting, Disposal and Shipping Documents										

MONTHLY PERFORMANCE ASSESSMENT SUMMARY

Annex/sub-annex: 1502000 Facility Investment (cont) **Month/Year:** _____

Comments:

Recommended Actions:

SPAR Signature: _____ **Date:** _____

Attachment B: Performance Assessment Worksheet (PAW)

PERFORMANCE ASSESSMENT WORKSHEET

ANNEX/SUB-ANNEX: _____

PAW (Indicate Level)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> Non-recurring
CONTRACT NO:		PAR NAME:		
SAMPLE ID:		DATE:		
SAMPLE LOCATION:				
SPEC ITEM / TO #:		TITLE:		
SAFETY ASSESSMENT: Issues found? <input type="checkbox"/> No <input type="checkbox"/> Yes (document details below)				
COMMENTS: (Document findings/observations of how performance complies with contract requirements and detail any value-added or negative performance, and trends)				
RATING: (For AL-2/3)		<input type="checkbox"/> Acceptable	<input type="checkbox"/> Unacceptable	
PAR (signature): _____ DATE: _____				
CONTRACTOR (signature): _____ DATE: _____				
REWORK:	<input type="checkbox"/> Acceptable	<input type="checkbox"/> Unacceptable	<input type="checkbox"/> N/A	
QMS EVALUATION: (Document effectiveness of contractor's QMS to detect/correct negative performance and reverse trends. Attach QMS review checklist.)				
QMS RATING:	<input type="checkbox"/> Acceptable	<input type="checkbox"/> Unacceptable	<input type="checkbox"/> N/A	
PERFORMANCE ASSESSMENT RATING: (FOR AL-1 or Non-recurring)				
<input type="checkbox"/> Exceptional	<input type="checkbox"/> Very Good	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Marginal	<input type="checkbox"/> Unsatisfactory

QUALITY MANAGEMENT SYSTEM PRE-PERFORMANCE REVIEW CHECKLIST

GENERAL INFORMATION			
	NAME	PHONE	EMAIL
CONTRACTOR Project Manager			
CONTRACTOR Quality Manager			
SUB-CONTRACTOR QC			
SUB-CONTRACTOR QC			
SUB-CONTRACTOR QC			
PERFORMANCE ASSESSMENT REPRESENTATIVE (PAR)			
SUPERVISORY PAR			
CONTRACT INFORMATION			
TITLE:			
Contract #:	TO#	LOCATION:	
START:	END:	CONTRACT PRICE:	

ACCEPTANCE OF CONTRACTOR'S QUALITY APPROACH DOES NOT LIMIT CONTRACTING OFFICER FROM REQUIRING ADDITIONAL MEASURES IF PERFORMANCE IS UNACCEPTABLE.

QUALITY MANAGEMENT BRIEFING CHECKLIST	
CHECKPOINT (Y/N)	COMMENTS
QUALITY ORGANIZATION:	
Is the QM plan submitted in accordance with Annex 0200000 and Section F requirements?	
Is the Quality organization clearly identified (e.g., org chart) and a list of all Quality personnel provided?	
Are the responsibilities of Quality personnel detailed and lines of authority explained (e.g., Quality staff and Quality Manager reports directly to Prime Contractor management)?	
Are the training and qualification requirements for Quality staff specified and does the Contractor's staff meet these requirements?	
Does the Quality organization show relationship between the Prime Contractor's Quality staff and Subcontractor's management or Quality?	
QUALITY APPROACH:	
Is the QM plan current and specifically tailored for this contract?	

	Does the Contractor's Quality Management System and management approach indicate a clear understanding of the contract requirements?	
METHODS AND PROCEDURES FOR PERFORMANCE OF WORK:		
	Does the Contractor provide detail of their work planning and control to ensure first time quality? This could include:	
	a. Proper selection and training of personnel	
	b. Tracking and verification of training and certification requirements	
	c. Work center supervisor/lead personnel oversight of work performance	
	d. Detailed SOPs and procedures for work requirements	
	e. Routine training and meetings	
	f. Selection procedures for subcontractors	
	g. Management control of subcontracted work	
SURVEILLANCE AND INSPECTION PROCEDURES:		
	Does the Contractor provide detailed procedure for the selection of samples (e.g., percentage of work inspected, process for selection of samples, in-process vs. completed work.)?	
	Does the QM plan detail procedures for the collection, recording, and analysis of inspection and surveillance results?	
	Does the QM plan include processes for utilization analysis of inspection and surveillance results to determine cause and implement corrective actions?	
	Does the QM plan provide a process for preventing recurrence of quality issues and continuous improvement of work performance?	
	Does the QM plan detail specific procedures for the oversight of subcontracted work or the review and analysis of subcontractor quality?	
DOCUMENTATION AND RECORDS MANAGEMENT:		
	Does the Contractor have a process for the control and retention of Quality documentation and records?	
	Does the Contractor provide the controls in place to ensure all Quality records are documented, maintained reviewed and properly filed?	

	Does the QM plan have a process for the review of documentation for completeness, accuracy, and consistency? (This may include management reviews or internal audit plan.)	
	Does the QM Plan provide a process for tracking and ensuring all submittal requirements are met?	
COMMUNICATION WITH GOVERNMENT:		
	Does the QM plan address the level, format, and frequency of communications with the government? This could include:	
	a. Routine, yet informal communications between contractor, quality staff, and Government PARs	
	b. Established meeting requirements between Contractor Quality and/or management staff with Government PA and/or contracting personnel.	
	c. Progressive reporting and communication based on the frequency or severity of the issue being addressed (e.g., Quality staff to PAR, Quality Manager to SPAR/FSCM, Project Manager to PWO	
	d. Details of protocol for attendance at meetings required by contract, including partnering sessions.	
REVIEW SIGNATURES		
PAR:		DATE:
SPAR:		DATE:
CONTRACTOR QUALITY MANAGER:		DATE:
CONTRACTOR PROJECT MANAGER:		DATE:
SUBCONTRACTOR:		DATE:
SUBCONTRACTOR:		DATE:
SUBCONTRACTOR:		DATE:

Attachment D: FSC Safety Assessment Checklist

CONTRACT NO:				PAR NAME:			
SAMPLE ID:				DATE:			
SAMPLE LOCATION:							
SPEC ITEM / TO #:			TITLE:				
SAFETY ASSESSMENT: Issues found? <input type="checkbox"/> No <input type="checkbox"/> Yes (indicate area of safety deficiency below)							
Administrative					Issue	No Issue	N/A
Is the Contractor staff knowledgeable of Activity Hazard Analyses (AHAs) and Occupational Risk and Compliance Plans and Programs related to the work performed?							
Is the Contractor Site Safety Plan (AHA) on site?							
Have all potential hazards been identified and appropriate controls implemented?							
Are there Emergency Planning/Communication procedures in place?							
Are there First Aid and CPR Trained personnel on site as required?							
Safety Hazards	Issue	No Issue	N/A	Safety Hazards	Issue	No Issue	N/A
Chemical hazards/MSDS				Accident Prevention (signs, tags, barricades, covers, etc)			
Site Cleanliness (floor care, signage removal, etc)				Hot Work (Welding/Grinding)			
Environmental Conditions (Heat/Cold stress, weather)				Fall Protection/Working at Heights (Ladder Safety, Scaffolding/Staging, Aerial Lifts, etc)			
Lead Paint/Asbestos				Slips, Trips, and Falls			
Biological Hazards (Animals, insects, etc)				Personal Protective Equipment (PPE)			
Soil Disturbance				Respirator Protection			
Underground Utilities/Utility Clearance				Confined and Enclosed Space			
Vehicle Operation and Condition				Trenching/Excavations			
Weight Handling Equipment Safety				Electrical Safety			
Crane Safety				Lockout/Tagout (Control of Hazardous Energy)			
Traffic Control				Ergonomics and Musculoskeletal Hazards			
Equipment Use and Condition				Fire Safety			
Material Handling				Compressed Gas			
<i>Note: Include detailed comments related to Safety assessment on the PAW</i>							

Attachment E: Customer Complaint Record

CUSTOMER COMPLAINT RECORD

ANNEX/SUB-ANNEX: _____

CONTRACT NO:		DATE/TIME RECEIVED:	
		RECEIVED BY:	
SOURCE OF COMPLAINT			
ORGANIZATION:		INDIVIDUAL:	PHONE:
LOCATION:			
SPEC ITEM:		TITLE:	
<u>DETAILS OF COMPLAINT:</u>			
<u>COMMENTS:</u>			
Complaint Validation:	<input type="checkbox"/> Valid	<input type="checkbox"/> Non-valid	
PAR (signature): _____		DATE: _____	
CONTRACTOR (signature): _____		DATE: _____	
REWORK:	<input type="checkbox"/> Acceptable	<input type="checkbox"/> Unacceptable	<input type="checkbox"/> N/A
PAR (signature): _____		DATE: _____	

QMS IN-PROCESS REVIEW CHECKLIST

CONTRACT #:	TITLE:
PAR NAME:	DATE:
ANNEX/SUB-ANNEX:	
SPEC ITEM:	TITLE:

QMS REVIEW CHECKLIST	
If observed defects warrant evaluation of QMS, the initial review should be limited to the Spec Items and/or location where defects have been found. This process begins with Part A & B below.	
CHECKPOINT (Y/N)	COMMENTS
A. QUALITY SURVEILLANCE AND INSPECTION SCHEDULES	
1. Is there a quality surveillance and inspection schedule? Does it include:	
a. Surveillance and inspections to be performed?	
b. Frequency of surveillance and inspections?	
2. Is there a current schedule?	
3. Does the schedule reflect all contractual requirements?	
4. Are the number and frequency of surveillance and inspections sufficient?	
5. Do the schedules match the QM plan?	
6. Is the schedule being followed?	
B. DOCUMENTATION AND ANALYSIS OF QUALITY DATA	
1. Are the results of all surveillance and inspections properly documented?	
2. Are quality deficiencies properly resolved and tracked?	
3. Is quality documentation of deficiencies analyzed for trends and root cause?	
4. Is appropriate action taken or planned to prevent recurrence of quality issues?	
5. Is there verification process to ensure corrective and preventative actions are effective?	
6. Are appropriate continuous improvement plans in place and communicated to workforce?	

<p>Comments: (Document corrective actions taken or QMS changes being implemented. If QMS is unsatisfactory, document findings and rationale for additional review conducted below.)</p>		
<p>If review conducted above identifies deficiencies in the Contractor's QMS with insufficient planned corrective actions or QMS changes, or, if corrective actions and QMS changes planned during previous QMS reviews have been ineffective, then continue review with Parts C through F below.</p>		
CHECKPOINT (Y/N)		COMMENTS
C. QUALITY MANAGEMENT PLAN		
	1. Is the written QM plan available on site?	
	2. Is the QM Plan current?	
	3. Does the QM staff meet the requirements designated in QM plan (in terms of staff provided and qualifications and training)?	
D. WORK PROCESSES AND PROCEDURES		
	1. Are work instructions, processes and procedures documented?	
	2. Are work instructions, processes and procedures available and used by affected personnel?	
	3. Is there a process to communicate work instructions, processes and procedures throughout the project and organization?	
	4. Are training records properly maintained for employees who are performing the work?	
E. SURVEILLANCE AND INSPECTION PROCESS		
	1. Does the documented surveillance and inspection system match the requirements of the QM plan?	
	2. Are surveillance and inspection forms used systematically that document both conformances and non-conformances?	
	3. Are the surveillance and inspection criteria linked to the performance objectives and standards of the contract?	
	4. Does the communication and follow-up on deficiencies follow the process detailed in the QM plan?	
	5. Is analysis performed on surveillance and inspection data to identify trends and opportunities for improvement?	
	6. Are there examples of process improvements based on surveillance and inspection data?	

CHECKPOINT (Y/N)	COMMENTS		
F. CUSTOMER COMMUNICATION			
	1. Are required meetings being held and attended as scheduled?		
	2. Is there documentation of the meetings and associated follow-up activities, i.e. action registers, meeting minutes, agendas?		
	3. Is there proper response and tracking of issues identified by Government personnel?		
	4. Is there a written documentation of issues, e.g., complaint/compliments logs, registers, records?		
	5. Is there a system for correction of defects/problems to satisfy customers?		
	6. Is there an escalation procedure if defects/problems are not addressed satisfactorily?		
<p><u>Comments:</u> (Document corrective actions taken or QMS changes being implemented. If QMS is unsatisfactory, document recommendation to move to a lower assessment level or take appropriate administrative action.)</p>			
QMS RATING:	<input type="checkbox"/> Acceptable	<input type="checkbox"/> Unacceptable	<input type="checkbox"/> N/A
REVIEW SIGNATURES			
PAR:		DATE:	
CONTRACTOR QUALITY REPRESENTATIVE:		DATE:	

Attachment G: Contract Discrepancy Report (CDR)

CONTRACT DISCREPANCY REPORT		1. CONTRACT NUMBER
GOVERNMENT ACTION		
2. TO (Contractor and Manager Name)	3. FROM (Name of Government Representative)	
4. DISCREPANCY OR PROBLEM		
5. CONTRACTOR NOTIFIED (Date, Time, Contact Name)		
6. SIGNATURE OF CONTRACTING OFFICER	7. DATE	
CONTRACTOR ACTION		
8. TO (Contracting Officer)	9. FROM (Contractor)	
10. CONTRACTOR RESPONSE (Cause, corrective actions to prevent recurrence. Attach continuation sheet if necessary.)		
11. SIGNATURE OF CONTRACTOR REPRESENTATIVE	12. DATE	
GOVERNMENT CLOSE OUT		
13. GOVERNMENT EVALUATION (Acceptance, partial acceptance. Attach continuation sheet if necessary.)		
14. GOVERNMENT ACTIONS (Payment deduction, cure notice, show cause, other.)		
15. SIGNATURE OF CONTRACTING OFFICER	16. DATE	
17. SIGNATURE OF REVIEWING OFFICIAL	18. DATE	

MONTHLY PERFORMANCE ASSESSMENT SUMMARY COVERSHEET

Contract #: _____ **Month/Year:** _____

Annex/ Sub- annex	Title	Functional Annex/ Sub-annex Rating (mark using "X")					
		E	VG	S	M	U	N/A
1502000	Bullet Traps (Recurring Work)						
	Bullet Traps (Non-recurring Work)						
	Comments:						
OVERALL RATING FOR Recurring AND Non-recurring WORK							
SPAR: _____							
Signature: _____				Date: _____			

Performance Assessment Board Rating Summary

<p>Block 18a - Quality of Product or Service. Assess the contractor’s conformance to contract requirements, specifications and standards of good workmanship (e.g., commonly accepted technical, professional, environmental, or safety and health standards). List and assess any sub-elements to indicate different efforts where appropriate. Include, as applicable, information on the following:</p> <ul style="list-style-type: none"> • Are reports/data accurate? • Does the product or service provided meet the specifications of the contract? • Does the contractor’s work measure up to commonly accepted technical or professional standards? • What degree of Government technical direction was required to solve problems that arise during performance? 					
	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Rating (place an X in the appropriate box)					
Comments:					
<p>Block 18b - Schedule. Assess the timeliness of the contractor against the completion of the contract, task orders, milestones, delivery schedules, and administrative requirements (e.g., efforts that contribute to or affect the schedule variance). This assessment of the contractor’s adherence to the required delivery schedule should include the contractor’s efforts during the assessment period that contributes to or affect the schedule variance. This element applies to contract closeout activities as well as contract performance. Instances of adverse actions such as the assessment of liquidated damages or issuance of Cure Notices, Show Cause Notices, and Delinquency Notices are indicators of problems which may have resulted in variance to the contract schedule and should, therefore, be noted in the evaluation.</p>					
	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Rating (place an X in the appropriate box)					
Comments:					

Block 18c - Cost Control. (N/A).					
Block 18d - Business Relations.					
<p>Assess the integration and coordination of all activity needed to execute the contract, specifically the timeliness, completeness and quality of problem identification, corrective action plans, proposal submittals, the contractor's history of reasonable and cooperative behavior (to include timely identification of issues in controversy), customer satisfaction, timely award and management of subcontracts. Include, as applicable, information on the following:</p> <ul style="list-style-type: none"> • Is the contractor oriented toward the customer? • Is interaction between the contractor and the government satisfactory or does it need improvement? • Include the adequacy of the contractor's accounting, billing, and estimating systems and the contractor's management of Government Property (GFP) if a substantial amount of GFP has been provided to the contractor under the contract. • Address the timeliness of awards to subcontractors and management of subcontractors, including subcontract costs. <p>Consider efforts taken to ensure early identification of subcontract problems and the timely application of corporate resources to preclude subcontract problems from impacting overall prime contractor performance.</p> <ul style="list-style-type: none"> • Assess the prime contractor's effort devoted to managing subcontracts and whether subcontractors were an integral part of the contractor's team. 					
	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Rating (place an X in the appropriate box)					
Comments:					
Block 18e - Management of Key Personnel (For Services and Information Technology Business Sectors only - Not Applicable to Operations Support).					
<p>Assess the contractor's performance in selecting, retaining, supporting, and replacing, when necessary, key personnel. For example:</p> <ul style="list-style-type: none"> • How well did the contractor match the qualifications of the key position, as described in the contract, with the person who filled the key position? • Did the contractor support key personnel so they were able to work effectively? • If a key person did not perform well, what action was taken by the contractor to correct this? • If a replacement of a key person was necessary, did the replacement meet or exceed the qualifications of the position as described in the contract schedule? 					
	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Rating (place an X in the appropriate box)					
Comments:					

Block 18f - Other Areas. (Safety)

Assess the contractor’s conformance to safety requirements, specifications, and adherence to their safety program (including APP, AHAs, and Occupational Risk and Compliance Plans). List and assess any sub-elements to indicate different efforts where appropriate. Include, as applicable, information on the following:

- Has the Contractor consistently demonstrated a commitment to safety and properly managed and implemented safety procedures for itself and its subcontractors?
- Do the documented safety issues, near misses, and recordable safety incidents indicate the Contractor has followed safe work practices taking into account any upward or downward trends and extenuating circumstances?
- Has the Contractor reported safety incidents in a proper and timely manner and taken appropriate corrective actions?
- What degree of Government direction was required to solve problems that arise during performance?

	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Rating (place an X in the appropriate box)					

Comments:

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Evaluation Ratings Definitions (Excluding Utilization of Small Business)		
Rating	Definition	Note
Exceptional	Performance meets contractual requirements and exceeds many to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractor was highly effective.	To justify an Exceptional rating, identify multiple significant events and state how they were of benefit to the Government. A singular benefit, however, could be of such magnitude that it alone constitutes an Exceptional rating. Also, there should have been NO significant weaknesses identified.
Very Good	Performance meets contractual requirements and exceeds some to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the contractor was effective.	To justify a Very Good rating, identify a significant event and state how it was a benefit to the Government. There should have been no significant weaknesses identified.
Satisfactory	Performance meets contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the contractor appear or were satisfactory.	To justify a Satisfactory rating, there should have been only minor problems, or major problems the contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified. A fundamental principle of assigning ratings is that contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements of the contract.
Marginal	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the contractor has not yet identified corrective actions. The contractor's proposed actions appear only marginally effective or were not fully implemented.	To justify Marginal performance, identify a significant event in each category that the contractor had trouble overcoming and state how it impacted the Government. A Marginal rating should be supported by referencing the management tool that notified the contractor of the contractual deficiency (e.g., management, quality, safety, or environmental deficiency report or letter).
Unsatisfactory	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains a serious problem(s) for which the contractor's corrective actions appear or were ineffective.	To justify an Unsatisfactory rating, identify multiple significant events in each category that the contractor had trouble overcoming and state how it impacted the Government. A singular problem, however, could be of such serious magnitude that it alone constitutes an unsatisfactory rating. An Unsatisfactory rating should be supported by referencing the management tools used to notify the contractor of the contractual deficiencies (e.g., management, quality, safety, or environmental deficiency reports, or letters).