ACS 12 Operating Instructions for Gear Washes: (August 10, 2011)

(Electric Spray Applicator – 460/480 V 3 phase – (13.8 Amp).

If you are using Dynasol EP read the following section regarding pre-heating the chemical. If using cold application Lubri-Sol skip to the next section "**One day before Gear Wash".**

Two days before Gear Wash

1. Place the Dynasol Drums on a wooden Pallet close to but not in front of the inspection opening of the Gear to be cleaned. The Spray Manifold from the ACS 12 Applicator will be in front of that inspection opening so the Drums should be off to the side but close enough so that the suction wand from the applicator will reach all Drums.

2. Our rental unit comes with 1200W Band (Drum) Heaters (110V). Place two on each Drum of Dynasol – one just below the bottom ring and the other just below the top ring.

3. Loosen the Bungs a little; plug in the Band Heaters, then, start heating the Dynasol to about 170 degrees F. This brings the temperature close to the melting point of the Grease and therefore speeds up the cleaning immensely. **Do not apply Dynasol EP cold.**

4. Make sure that someone checks the heating progress periodically to ensure that an electrical breaker has not been thrown on any of the band heaters.

One day before Gear Wash

1. If using Dynasol EP confirm that the drum heaters are installed and working.

2. Remove the ACS-12 applicator from its shipping/storage Container.

3. Position the control stand (Manifold) near the inspection panel of the grinding mill.

4. Position the pump cart near the Dynasol EP or Lubri-Sol Drums.

5. Install the Hoses on the control stand ready to attach to the spray wands.

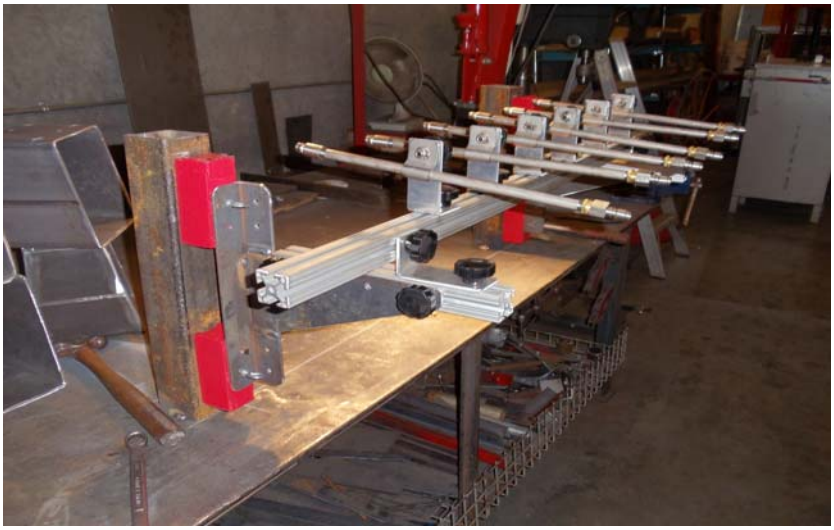
6. Measure the inspection panel opening first and then make up the spray harness for easy and rapid installation just before the gear wash is to begin. The harness is held in place with Red Magnets that you will affix to the Gear Guard, around the inspection opening. Please refer to the following pictures.

In the ACS 12 metal shipping container you will find all the pieces you need. Note how the red magnets are attached to the A-Frame support. Along the top of the support and at both ends there is a hole with turn screws to which you attach a short piece of channel bar. With those pieces assembled at both ends the harness is made complete by joining the ends with a long horizontal piece of channel bar, held in place with L Brackets as pictured.

Next, add six wand support Brackets along the top channel of the horizontal bar. The picture shows how the Wands are held secure but unlike the picture you should affix the Wand tips to the ends first and then secure the complete Wand unit into the bracket. The complete harness then will be ready to install the day of the Gear Wash.

Note that you do not have to adjust the Harness to the exact width of the inspection opening. The Wand positions are adjustable so it is easier to make the Harness a little wider than the opening. When everything is ready pick up the assembled unit, keeping your fingers away from the back of the magnets, tilt the bottom out so the bottom magnets attach first to the Gear Shroud and then tilt the unit up to allow the top magnets to connect.

CAUTION: The Magnets are powerful. Keep your hands away from the back of the magnets when placing them.



The following picture shows the simplest way to remove the magnets from a metal backing. Use a long Screwdriver to wedge the Magnet toward you and then lift it away. This simple procedure makes an otherwise difficult task easy.

7. Ensure that in addition to the tools in a normal kit you have an Infra-red heat sensor, Stroboscope and Flashlight available for the Gear Wash.

8. Ensure access from where the ACS 12 will be used to 460/480 VAC. Usually the welding circuit is used. (It will draw approx. 13.8 Amps on startup)

With the unit plugged into the circuit check that the Pump is turning the right way by placing the suction wand into a pail of water. Hold the end of the hose reel over the pail of water (that is the hose that will deliver the chemical to the manifold when you are ready to pump the EP Chemical.) If the wiring is correct you will be able to pump from the pail back to the pail. If that does not happen you need to reverse the plug wiring to get the pump turning the right way.

9.0. Some Mills like to use a Plastic Covering over the inspection opening during the Gear Wash so as to minimize splatter. If you elect to do that you will first need some heavy clear plastic sheeting. Then, using the measurements you have taken for the Wand Harness, cut holes in the plastic such that the Wands with Tips mounted can pass through and that the angle of spray will hit the Crown of the tooth squarely on.

Then make three cuts to create a "Door" in the plastic shield so that when spraying the EP Chemical the bottom of the Flap can be lifted up to allow use of the Stroboscope to monitor the Cleaning progress across the width of the entire Gear and to take temperature readings of the Gear. When those tools are not in use that "Door" or "Flap" can be left down to reduce splatter. You may also want to have some floor absorbent close by to soak up any spills.

Estimating discharge volume you will need to collect - Containment of the flow of Chemical and old Lubricant through the bottom of the Mill should be equal to the number of Drums of Chemical to be applied plus the amount or rinse chemical to be applied plus one Drum for old Lubricant.

A one Drum fudge factor over that total is a good idea.

As an example - If you are spraying 4 Drums of Chemical plan to have 6 empty Drums to hold the residue which you would pump (using most likely a diaphragm pump) from the containment area into the empty drums – 4 of which, in this example would be the empty Chemical Drums. Dispose of in line with local environmental regulations.
As to the containment itself Mills often use sand bags with a plastic liner or they might cut down a plastic fork-lift-able Tote to catch the run-off.

Lunch Box meeting – Estimating cleaning time - Time the shut down of the in-feed to do the Gear Wash in collaboration with the Mill personnel. The Gear wash is done while the Mill continues to operate through Grind-out so that on completion of the Gear Wash the Mill is empty or near empty of load.

In the event that the Mill is being cleaned simply to remove contaminated Lubricant then there is no need to shut down the in-feed at all as the Mill will not be stopped for maintenance or NDT following the Wash.

You will have determined the number of Drums required to clean your Gear in your first communications with Active Chemicals. (See the section below titled "4**. Cleaning the Gear** for an explanation of the Gear Wash steps including "stop and go")

4 of these stop and go cycles (the last being continuous spray) will empty a 205 L Drum in about 22 minutes.

So if the plan was to apply two of the Extreme Pressure added spray Chemical (EP Chemical) you would need 44 minutes plus two minutes of Rinse Spray at the end for a total of 46 minutes.

You need to keep these timings in mind throughout the Gear wash to end up with sufficient EP chemical to finish the wash as that chemical is the only source of Extreme Pressure Lubricant the Gear has at that point.

The Rinse should therefore be only the very last 2 minutes of your allotted time.

Day of the Gear Wash

1. If you are using Dynasol EP check the temperature of the Drums to ensure that they are approx. 170 degrees F and write down the temperature of the Gear.

2. Install the spray harness into the inspection panel opening with the spray wands and Tips attached.

Take extra care to ensure that the quick connects are in solidly so as not to blow out while spraying under pressure. Pass the Wands through a clear plastic shield if you made one.

3. Adjust the spray-wands to approximately 8 to 10 inches from the gear face. Adjust the spray-wands so that the spray patterns overlap and are in line with the slope of the gear.

4**. Cleaning the Gear:** When you are ready to start the Gear Wash start the ACS 12 to deliver the Chemical onto the Ring Gear. Immediately adjust the position of the Spray Nozzles in the Harness so that the V fan nozzle spray is across the face of the Gear and overlaps with the adjacent spray to cover the total width of the gear.

It should take only seconds to ensure that the full spray is being applied then IMMEDIATELY shut off the Lubricators. Monitor the temperature of the gear periodically. Also observe the progress of the cleaning with the Stroboscope.

A common practice is to clean the Gear in “Stop and Go” fashion, wherein you spray the cleaning chemical onto the Gear for two minutes and then shut the ACS 12 off for 4 minutes to allow the Chemical to work into the Grease.

The Goal with this approach is to reduce the old Lubricant on the Gear in Layers until only a relatively thin layer is left (you will be able to see a lot of the Gear metal but will also observe an amount of old Lubricant still to be removed – 3 stop and go cycles will usually be enough).

After the three stop and go cycles increase the ACS 12 spray pressure sufficiently to remove the Slurry that will then be on the Gear face. Finish the first Drum of EP chemical with this continuous, flushing process.

Use the Stroboscope continuously in this final flushing stage. You need to decide if a second Drum of chemical is needed to clean the Gear thoroughly or whether to terminate chemical spray with the first Drum and go directly to the final Rinse.

(IMPORTANT: Also take periodic temperature readings of the Gear to ensure that there is no significant heating occurring.)

If a second Drum is necessary repeat the stop and go cycle only twice and then monitor again with the Stroboscope. It will be obvious when you get to the stage where you can abandon stop and go in favor of continuous Spray to finish the second Drum. Apply this same approach to all subsequent Drums of EP Chemical used.

Where cleaning is progressing well in an area, reduce the volume of Chemical to that area by restricting the flow to the spray wand serving that section of the gear, so that a greater volume is directed to areas where the cleaning is progressing more slowly. The Center almost always cleans faster than the outsides of the Gear.

In these final minutes of the Gear Wash you will have to increase or decrease continuous spray pressures to balance two things: a) The need to have a clean Gear at the end of your allotted time and b) to ensure you finish in the time frame you agreed to initially.

5. If your daily Lubricant is an asphaltic open gear grease and you believe there is hard residue impacted deep into the root of the gear tooth then at some point in the wash attach one of the black Turbo Nozzles to one of the spray wands then spray at as high a pressure as you can without causing undue splatter. You would normally do this as a finishing process using the last half Drum of Chemical that you have for the cleaning. This is done by holding the wand by hand and directing spray from one shoulder of the Gear to the other at safe distance (about 8 to 10 inches). It may be necessary to remove one or more of the other spray wands before using the Turbo Nozzle: A picture of the nozzle follows:

6. The Rinse: For the final rinse turn up the pump pressure in increments staring at about 300 psi then increasing if necessary to purge the pump, hoses, valves and spray nozzles, and to remove any residual film of grease or Chemical on the face of the Gear. A drum of water, preferably warm to hot water, with 0.5% Action 502 [one liter in ~ 200 liters of water] MUST be applied.

Do not apply the Rinse for more than two minutes total and take heat readings on the Gear during that time.

7.Immediately following the Gear Wash

Disassemble the delivery hoses, and remove the spray harness from the inspection panel. Clean the spray tips, spray wands, spray harness brackets, delivery hoses, and the control panel.

Wipe dry, all hoses, wands, tips, and brackets - reassemble the spray harness and return to their proper places in the storage container.

Return the ACS-12 applicator to the shipping/storage container.

8. Empty residual Chemical from all the drums and replace the drum bungs, and wipe down the drums for disposal.

9. Wrap up and repackage the drum heaters.

10. Place all wiping rags, used packaging, and waste into a 20 liter pail for easy disposal.

11. Check that all the ACS 12 parts are replaced into the shipping container.

12. Close and secure the shipping/storage container.

13. Ship it back to Active Chemicals. **Please have it on it's way back within three days of completing the Wash.**

Return Address for the ACS 12 Rental Unit:

Active Chemicals Ltd. c/o Jim Sadlo Machining
Unit #207 - 30610 Progressive Way
Abbotsford, B.C.
V4K 4T2
Cellular: 778-551-1567

Please E-mail or Fax us to let us know who you will be shipping with along with a waybill and/or tracking number. Send that information to jboughner@activechemicalsltd.com or Fax to Active Chemicals at 604-946-3901

If you are shipping from outside of Canada your carrier will need to know our customs broker which is: Pacific Customs Brokers, # 101-17637 1st Avenue, Surrey, BC V3S 9S1. Phone: 604-538-3984 or 1-888-538-1566.

Shipping weights of the ACS-12 Container:

Ship weight (Unit Installed): 1150 lbs / 522 Kgs

Container Dimensions (LxWxH): 50.5 inch , 48 inch, 59 inch – (128cm x 122cm x 150cm)

Active Chemicals Ltd.

Engineered Spray System

Clean Grinding Mill, Washer Drum, and Kiln, Ring Gears

ACS12

- High pressure chemical spraying
- Operates at high pressure over 6 adjustable spraying nozzles
- Rotating turbo heads for extra impact
- Chemical resistant with 316 stainless steel fluid end
- Voltage: 480 VAC
- Portable cart with heavy duty non marking wheels
- Wheel choks lock unit in place during use and stow on frame
- 12 replacement QD style spray nozzles mounted on frame
- Easy to read pressure gauge, glycerine filled
- Adjustable pressure control
- Liquid tight magnetic starter controls
- Tool box
- Aluminum shipping / storage container
- Ball valve on / off spray control per nozzle

Use with ACL's Dynasol EP degreaser/cleaner to clean any Ring Gear in Minutes - without shutting the Mill down!

Pressure	2175 PSI (Max) / 1500 PSI operating over 6 spray tips
Flow	12.8 US GPM / 48 LPM (Max) / 7.1 GPM / 26.8 LPM normal operating
Electrical	460V - 3 Phase
Electrical Cord	50 ft / 15 m
Horse Power	10
Amp Draw	13.8 Amps @ 460V
Operating Cycle	Continuous Duty
Nozzles	6 x 25°, 6 x 40°, 2 x turbo nozzles
Fittings	Quick Disconnect
Suction Hose	Steel braided, non-collapsible – 10 ft / 3 m x 6
Dimensions L x W x H	50.5" x 48" x 59" / 128 x 122 x 150 cm
Weight (Gross)	1150 lbs / 522 kgs

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