

# **SECTION 1**

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**1.1**  
**SALES / SERVICE INFORMATION**

**J.H. FLETCHER & CO. SALES/SERVICE PERSONNEL**

Fred Merlino  
6790 Mud River Road  
Barboursville, WV. 25504  
(304) 736-5253

Herk Harbour  
159 Kaiser street  
Proctorville, OH. 45669  
(614) 886-7270

David Thomas  
215 West 31st St.  
Huntington, WV 25704  
(304) 429-4644

Butch Adkins  
Country Club Drive  
P.O. Box 1406  
Paintsville, Ky. 41240-5406  
(606) 789-1153

Larry Lester  
68 Frontier Lane  
Hurricane, WV 25526  
(304) 562-3950

**CENTRAL DISTRICT**

Steve McIntyre  
99 Kinsington Street  
Uniontown, PA 15410  
(412) 439-3830

Harry Cathell  
Rt. 4, Box 114  
Grafton, WV. 26354  
(304) 265-5851

**MIDWESTERN DISTRICT**

Mark Morgan  
411 E. Geiger St.  
Morganfield, Ky. 42437  
(502) 389-1626

Grover Fischbeck  
5944 Highway 130 N.  
Uniontown, Ky. 42461  
(502) 822-9372 & 822-4630

**SOUTHERN DISTRICT**

Don Sexton  
163 Blazerview Rd.  
Gray, Tn. 37615  
(615) 477-3622

Terry Phillips  
2923 Raccoon Valley Road  
Heiskel, Tn. 37754  
(615) 922-0909

**NORTHERN DISTRICT**

Bob Miller  
700 Goucher Street  
Johnstown, Pa. 15905  
(814) 255-1613

**WESTERN DISTRICT**

Bill Marston  
Rt. 1, Box 106M  
Helper, Ut. 84526  
(801) 472-3178

**1.1.1**  
**ORDERING INSTRUCTIONS**

**ORDER ALL PARTS FROM:  
J.H. FLETCHER AND COMPANY  
POST OFFICE BOX 2143  
HUNTINGTON, WEST VIRGINIA  
25722  
PHONE: 304-5257811  
SERVICE/PARTS MANAGER.....BILL GOAD**

**POLICY**

IT IS THE INTENTION OF J.H. FLETCHER AND COMPANY TO FURNISH OUR CUSTOMERS WITH THE CORRECT PARTS AT THE TIME THEY ARE NEEDED. OUR COMPANY WILL MAKE EVERY EFFORT TO SHIP AN ORDER THE SAME DAY IT IS REQUESTED. EMERGENCY ORDERS WILL BE GIVEN PRIORITY AND SPECIAL HANDLING BY THE SERVICE DEPARTMENT. THE ONLY METHODS OF SHIPPING INCLUDE: UPS, PARCEL POST, AND COMMERCIAL CARRIERS. IF A SPECIFIC PART IS NOT LISTED IN OUR PARTS CATALOG, A PHONE CALL TO OUR COMPANY WILL PROVIDE THE CORRECT ORDERING INFORMATION.

## PERMISSIBILITY CAUTION

<b>J.H. FLETCHER</b>
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**Caution Statement**  
(Required by 30CFR19 AppII)

To retain "permissibility" of this equipment the following conditions shall be satisfied:

1. General Safety. Frequent inspection shall be made. All electrical parts, including the portable cable and wiring, shall be kept in a safe condition. There shall be no openings into the casings of the electrical parts. A permissible distribution box shall be used for connection to the power circuit unless connection is made in fresh intake air. To maintain the overload protection of direct-current machines, the ungrounded conductor of the portable cable shall be connected to the proper terminal. The machine frame shall be effectively grounded. The power wires shall not be used for grounding except in conjunction with diode(s) or equivalent. The operating voltage should match the voltage rating of the motor(s).
2. Servicing. Explosion-proof enclosures shall be restored to the state of original safety with respect to all flame arresting paths, lead entrances, etc. following disassembly for repair or rebuilding, whether by the owner or an independent shop.
3. Fastenings. All bolts, nuts, screws and other means of fastening, and also threaded covers, shall be in place, properly tightened and secured.
4. Renewals and Repairs. Inspections, repairs, or renewals of electrical parts shall not be made unless the portable cable is disconnected from the circuit furnishing power, and the cable shall not be connected again until all parts are properly reassembled. Special care shall be taken in making renewals or repairs. Leave no parts off. Use replacement parts exactly like those furnished by the manufacturer. When any lead entrance is disturbed, the original leads or exact duplicates thereof shall be used and stuffing boxes shall be repacked in the approved manner.
5. Cable Requirements. A flame resistant portable cable bearing a MSHA assigned identification number, adequately protected by an automatic circuit-interrupting device shall be used. Special care shall be taken in handling the cable to guard against mechanical injury and wear. Splices in portable cables shall be made in a workmanlike manner, mechanically strong, and well insulated. Not more than one temporary splice is permitted in a portable cable regardless of length. Connections and wiring to the outby end of the cable shall be in accordance with recognized standards of safety.

**Warning to Coal Mine Operators and Maintenance Personnel**  
(See 30CFR Sections Indicated)

1. All installation and maintenance work on this equipment should be carried out by, or under the direct supervision of, a qualified person. (75.512-1, 75.153, 75.511, 75.511-1)
2. This equipment should be frequently examined, tested and properly maintained by a qualified person to assure safe operating conditions. (75.512)
3. Particular attention should be paid to ensuring that equipment of explosion proof design is maintained in permissible condition. All bolts, nuts, screws and washers used to secure explosion proof assemblies and covers, and all cable glands, connectors, etc. must be of the approved type, size and grade. Periodically inspect threaded holes for worn or damaged threads. Check flamepaths with thickness gauge for permissible fit. (75.503, 75.504)
4. Switch off all incoming electrical supplies before removing covers from electrical equipment compartments. (75.509, 75.511)
5. J.H. Fletcher & Co. does not recommend or condone the carrying out of maintenance work or "trouble-shooting" with covers removed and the equipment energised. Such practices are hazardous. (75.509)
6. The welding or cutting of explosion proof enclosures may weaken them to a dangerous extent. Welding assembled enclosures without removing the contents is likely to result in serious damage to the equipment.
7. Maintain the equipment in conformity with J.H. Fletcher & Co's. MSHA approved drawings. J.H. Fletcher & Co. cannot accept any responsibility for equipment which has been modified unless such modifications have been approved by J.H. Fletcher & Co., and MSHA, where applicable. To ensure safe operation, always use OEM replacement parts. There are no "equivalent" or "alternative" parts unless so shown on the component list.

THIS DRAWING IS NOT TO BE CHANGED  
WITHOUT THE APPROVAL OF MSHA

DWG. NO. AP-153-A  
DATE: 4/5/93 MSHA 3

## 1.2.1 WARNINGS

**WARNING:** Do not make any unauthorized machine modifications or utilize repaired or replacement parts which do not meet J.H. Fletcher and Co. specifications.

Unauthorized machine modifications or use of repaired or replacement parts which do not meet exact Fletcher & Co. specifications can create serious safety hazards and/or lead to loss of machine warranty, certifications or approvals.

**WARNING:** During manufacturing various **CAUTION, WARNING** and **DANGER** safety notices were attached to this machine.

These safety notices must be maintained in legible condition on the machine at all times.

Replacement notices are available from J.H. Fletcher & Co. for a nominal charge. Please order by part number.

**WARNING:** The safe operation of this machine requires special training, knowledge and experience. **DO NOT** attempt to operate unless properly trained and qualified.

Incorrect or careless operation can cause serious injury or death to yourself or others.

**WARNING:** Adjustments in machine operation must be made only by properly trained and authorized personnel.

Improper adjustment can lead to equipment damage and/or serious injury or death.

**1.2.2**  
**MATERIAL SAFETY DATA SHEET**

PRODUCT NAME: UNOCAL SPECIAL HYDRAULIC OIL 68      00786  
PRODUCT CODE NO: 04660      ISSUE DATE: 7/12/85      REF: PG. 1 OF 4

MANUFACTURER:

*UNOCAL REFINING & MARKETING DIVISION  
UNION OIL COMPANY OF CALIFORNIA  
1201 W. 5TH STREET  
LOS ANGELES, CALIFORNIA 90017*

*CONTACT FOR FURTHER INFORMATION:  
MSDS COORDINATOR (213) 977-7589*

TRANSPORTATION EMERGENCIES: CALL CHEMTREC

*(800) 424-9300 CONT. U.S. (202) 483-7616 (COLLECT) FROM ALASKA, HAWAII*

HEALTH EMERGENCIES: CALL LOS ANGELES POISON INFORMATION CENTER (24 HRS.) (213) 664-2121

PRODUCT IDENTIFICATION

PRODUCT NAME:      *UNOCAL SPECIAL HYDRAULIC OIL 68*

SYNONYMS:      *UNION SPECIAL HYDRAULIC OIL 68*

GENERIC NAME:      *INDUSTRIAL OILS*

CHEMICAL FAMILY:      *PETROLEUM HYDROCARBON*

DOT PROPER  
SHIPPING NAME:      *NOT APPLICABLE*

ID NUMBER:      *NONE*

**1.2.2.1**  
**MATERIAL SAFETY DATA SHEET**  
**CONTINUED**

<b>SECTION I - INGREDIENTS</b>	<b>TLV</b>	<b>UNITS</b>	<b>AGENCY</b>	<b>TYPE</b>
<i>OIL MIST, IF GENERATED</i>	<i>5.00</i>	<i>MG/M3</i>	<i>OSHA</i>	<i>FULL TERM TWA</i>

*THE IDENTITIES OF INGREDIENTS THAT ARE TRADE SECRETS ARE EXCLUDED FROM THIS LIST.*

**SECTION II - EMERGENCY & FIRST AID PROCEDURES \*\*\*EMERGENCY\*\*\***

*HAVE PHYSICIAN CALL LOS ANGELES POISON INFORMATION CENTER (24 HRS.) (213) 664-2121*

**EYE CONTACT:**

*FOR DIRECT CONTACT, FLUSH THE AFFECTED EYE(S) WITH CLEAN WATER. IF IRRITATION OR REDNESS DEVELOPS, SEEK MEDICAL ATTENTION.*

**SKIN CONTACT:**

*DO NOT USE GASOLINES, THINNERS OR SOLVENTS TO REMOVE PRODUCT FROM SKIN. WIPE MATERIAL FROM SKIN AND REMOVE CONTAMINATED CLOTHING. CLEANSE AFFECTED AREA(S) THOROUGHLY BY WASHING WITH SOAP AND WATER AND, IF NECESSARY, A WATERLESS SKIN CLEANSER. IF IRRITATION OR REDNESS DEVELOPS AND PERSISTS, SEEK MEDICAL ATTENTION.*

**INHALATION (BREATHING):**

*IF IRRITATION OF NOSE OR THROAT DEVELOPS, MOVE AWAY FROM SOURCE OF EXPOSURE AND INTO FRESH AIR. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION. IF VICTIM IS NOT BREATHING OR IF BREATHING DIFFICULTIES DEVELOP, ARTIFICIAL RESPIRATION OR OXYGEN SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL. SEEK IMMEDIATE MEDICAL ATTENTION.*

**1.2.2.2**  
**MATERIAL SAFETY DATA SHEET**  
**CONTINUED**

**SECTION II CONTINUED**

INGESTION (SWALLOWING):

*IF VICTIM IS CONSCIOUS AND ALERT, GIVE 2 TO 3 CUPS OF MILK OR WATER TO DRINK. SEEK MEDICAL ATTENTION. TO PHYSICIAN: EMESIS OR LAVAGE IS NOT RECOMMENDED FOR INGESTIONS OF MINUTE QUANTITIES OR TASTES OF MOST HYDROCARBONS. MEDICAL OPINION IS DIVIDED FOR LARGER INGESTIONS. EMESIS OR LAVAGE HAS BEEN RECOMMENDED FOR THOSE PETROLEUM PRODUCTS WHICH HAVE A HIGH ORAL TOXICITY. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IS RECOMMENDED BY SOME PHYSICIANS TO PREVENT ASPIRATION.*

**SECTION III - POTENTIAL ADVERSE HEALTH EFFECTS**

EYE CONTACT:

*THIS MATERIAL MAY CAUSE EYE IRRITATION. DIRECT CONTACT MAY CAUSE BURNING, TEARING AND REDNESS.*

SKIN CONTACT:

*THIS MATERIAL MAY CAUSE SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY CAUSE REDNESS, BURNING AND DERMATITIS.*

INHALATION (BREATHING):

*EXPOSURE TO MISTS, OR PROLONGED OR REPEATED EXPOSURE TO FUMES OR VAPORS THAT MAY BE GENERATED WHEN THIS MATERIAL IS HEATED, MAY CAUSE IRRITATION OF NOSE AND THROAT.*

INGESTION (SWALLOWING):

*ACCIDENTAL INGESTION OF THIS MATERIAL MAY CAUSE IRRITATION OF THE DIGESTIVE TRACT.*



**1.2.2.3**  
**MATERIAL SAFETY DATA SHEET**  
**CONTINUED**

**SECTION IV - SPECIAL PROTECTION INFORMATION**

VENTILATION

*IF CORRECT VENTILATION PRACTICES ARE NOT ADEQUATE IN MAINTAINING AIRBORNE CONCENTRATIONS BELOW THE ESTABLISHED EXPOSURE LIMITS (SEE SECTION I), ADDITIONAL VENTILATION OR EXHAUST SYSTEMS MAY BE REQUIRED.*

RESPIRATORY PROTECTION:

*IF AIRBORNE CONCENTRATIONS EXCEED RECOMMENDED EXPOSURE LIMITS, A SUITABLE FILTER - TYPE RESPIRATOR SHOULD BE WORN. (SEE SECTION I.)*

PROTECTIVE GLOVES:

*THE USE OF GLOVES IMPERMEABLE TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT AND POSSIBLE IRRITATION.*

EYE PROTECTION:

*APPROVED EYE PROTECTION TO SAFEGUARD AGAINST POTENTIAL EYE CONTACT, IRRITATION OR INJURY IS RECOMMENDED.*

OTHER PROTECTIVE EQUIPMENT:

*IT IS SUGGESTED THAT A SOURCE OF CLEAN WATER BE AVAILABLE IN WORK AREA FOR FLUSHING EYES AND SKIN. BARRIER CREAMS THAT ARE SPECIFIC FOR OIL-BASED MATERIALS ARE RECOMMENDED WHEN GLOVES ARE IMPRACTICAL.*

**1.2.2.4**  
**MATERIAL SAFETY DATA SHEET**  
**CONTINUED**

**SECTION V - REACTIVITY DATA**

STABILITY:

*STABLE*

CONDITIONS TO AVOID (STABILITY)

*AVOID CONTACT WITH ANY SOURCE OF IGNITION.*

INCOMPATIBILITY (MATERIALS TO AVOID):

*AVOID CONTACT WITH STRONG OXIDIZING AGENTS. EXTENDED EXPOSURE TO HIGH TEMPERATURES MAY CAUSE DECOMPOSITION.*

**1.2.2.5**  
**MATERIAL SAFETY DATA SHEET**  
**CONTINUED**

Product Name: UNOCAL SPECIAL HYDRAULIC OIL 68      00786  
PRODUCT CODE NO. 04660      ISSUE DATE: 7/12/85      REF: PG. 3 OF 4

**SECTION V - REACTIVITY DATA**

HAZARDOUS DECOMPOSITION PRODUCTS:

*THERMAL DECOMPOSITION IN THE PRESENCE OF AIR MAY YIELD MAJOR AMOUNTS OF OXIDES OF CARBON AND MINOR AMOUNTS OF OXIDES OF NITROGEN, PHOSPHORUS, SULFUR AND ZINC.*

HAZARDOUS POLYMERIZATION:

*WILL NOT OCCUR*

**SECTION VI - SPILL OR LEAK PROCEDURES**

*\*\*\*HIGHWAY OR RAILWAY SPILLS\*\*\*  
CALL CHEMTREC (800) 424-9300 CONT. U. S.  
(COLLECT) (202) 483-7616 FROM ALASKA & HAWAII*

PRECAUTIONS IN CASE OF RELEASE OR SPILL:

*COLLECT LEAKING LIQUID IN SEALABLE CONTAINERS. ABSORB SPILLED LIQUID IN SAND OR INERT ABSORBENT. CONTACT FIRE AUTHORITIES AND APPROPRIATE STATE/LOCAL AGENCIES. IF SPILL OF ANY AMOUNT IS MADE INTO OR UPON U. S. NAVIGABLE WATERS, THE CONTIGUOUS ZONE, OR ADJOINING SHORELINES, NOTIFY COAST GUARD NATIONAL RESPONSE CENTER (PHONE NUMBER 800-424-8802).*

WASTE DISPOSAL METHOD:

*DISPOSE OF PRODUCT IN ACCORDANCE WITH LOCAL, COUNTY, STATE, AND FEDERAL REGULATIONS.*

**1.2.2.6**  
**MATERIAL SAFETY DATA SHEET**  
**CONTINUED**

**SECTION VII - STORAGE PRECAUTIONS**

HANDLING AND STORAGE PRECAUTIONS:

*STORE IN A COOL, DRY LOCATION, KEEP AWAY FROM INCOMPATIBLE MATERIALS (SEE SECTION V). AVOID PROLONGED OR REPEATED SKIN CONTACT. WASH THOROUGHLY AFTER HANDLING. DO NOT WEAR OIL-SOAKED CLOTHING OR SHOES.*

**SECTION VIII - FIRE AND EXPLOSION HAZARD DATA**

HAZARD RANKING 0 = LEAST, 1 = SLIGHT, 2 = MODERATE, 3 = HIGH, & 4 = EXTREME

NFPA	HEALTH HAZARD: 0	DOT FLAMMABILITY	<u>FLASH POINT</u>
HAZARD	FLAMMABILITY: 1	<u>CLASSIFICATION</u>	
CLASS	REACTIVITY: 0		410, COC F
	OTHER:	NOT REQUIRED	210 C

EXTINGUISH MEDIA:

*EXTINGUISH WITH DRY CHEMICAL, CO<sub>2</sub>, WATER SPRAY, FOAM, SAND OR EARTH. WATER AND FOAM MAY CAUSE FROTHING.*

FIRE & EXPLOSION HAZARDS:

*THIS MATERIAL WILL BURN, BUT WILL NOT IGNITE READILY.*

FIRE FIGHTING PROCEDURES:

*WATER SPRAY MAY BE USEFUL IN MINIMIZING VAPORS AND COOLING CONTAINERS EXPOSED TO HEAT AND FLAME. AVOID SPREADING BURNING LIQUID WITH WATER USED FOR COOLING PURPOSES. MOVE UNDAMAGED CONTAINERS FROM FIRE AREA IF YOU CAN DO SO WITHOUT RISK.*

1.2.2.7  
MATERIAL SAFETY DATA SHEET  
CONTINUED

**SECTION IX - PHYSICAL DATA**

<u>APPROX. BOILING RANGE</u>	<u>VAPOR DENSITY</u>
<i>ABOVE 600 F (316) C</i>	<i>HEAVIER THAN AIR</i>
<u>EVAPORATION RATE</u>	<u>% VOLATILE</u>
<i>SLOWER THAN ETHER</i>	<i>NEGLIGIBLE</i>
<u>% SOLUBILITY IN WATER</u>	<u>SPECIFIC GRAVITY</u>
<i>NEGLIGIBLE</i>	<i>0.89</i>
<u>APPEARANCE</u>	<u>ODOR</u>
<i>CLEAR, BROWN</i>	<i>CHARACTERISTIC</i>

**SECTION XI - DOCUMENTARY INFORMATION**

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

*THE INFORMATION IN THIS DOCUMENT IS BELIEVED TO BE CORRECT AS OF THE DATE ISSUED. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. THIS INFORMATION AND PRODUCT ARE FURNISHED ON THE CONDITION THAT THE PERSON RECEIVING THEM SHALL MAKE HIS OWN DETERMINATION AS TO THE SUITABILITY OF THE PRODUCT FOR HIS PARTICULAR PURPOSE AND ON THE CONDITION THAT HE ASSUME THE RISK OF HIS USE THEREOF.*

### 1.3

## LUBRICATION AND PREVENTIVE MAINTENANCE

Preventive maintenance is any care which reduces or eliminates the necessity of more complex and expensive corrective maintenance. This care is considered part of the normal operation of the machine and involves minimal disassembly, replacement, and reassembly.

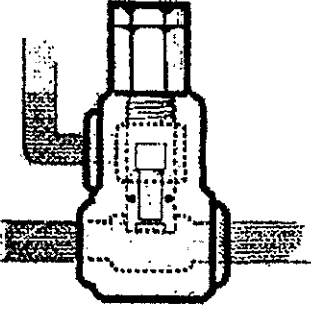
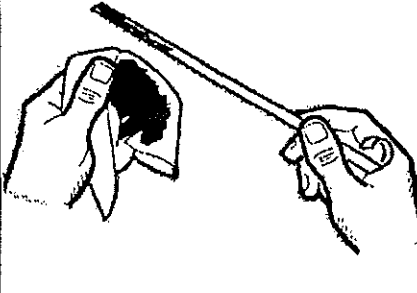
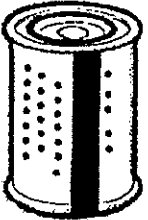
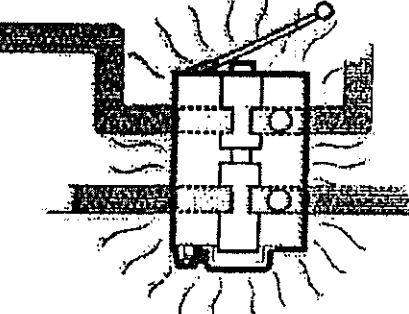

Lubrication is the most common form of preventive maintenance. Any lubricant, whether it is an oil or grease, has several jobs to do. Ordinarily, its first requirement is to reduce friction, and to do this it forms a film that separates two metal surfaces to keep them from rubbing against each other. It takes a lot more power to rub one base metal part against another when dry than it does if the parts are separated by an oil film. Thus lubrication reduces power requirements. Even with the best lubrication, power consumption is an important factor in the cost of operation. Without lubrication, if that were possible, the cost of power to overcome the extra friction would be tremendous. To a relative degree, the same holds for any machine - from the smallest anti-friction bearing to the largest. The film also reduces wear, making the machine last longer.

Good oils and greases have another equally important effect, they protect against rust and corrosion. There is always some moisture in the air, and even a small amount can cause destructive rusting or oxidation of highly polished metal surfaces. Lubrication also helps cool a bearing. On some simple bearings this effect is nothing more than keeping temperatures down by reducing friction. In others, cooling is a more positive function. In cases where oil is used as a coolant, oil in large volumes is passed through the bearing. The oil is cool when it enters. It picks up heat from the bearing and carries it away. In this way, it keeps the bearing running relatively cool.

Other preventive maintenance procedures are as important as lubrication. The use of proper hydraulic fluid and prompt replacement of filter elements to name a few. If the lubrication and service schedule is followed with reasonable care, maintenance costs will be lower and longer periods of continuous production will be assured.

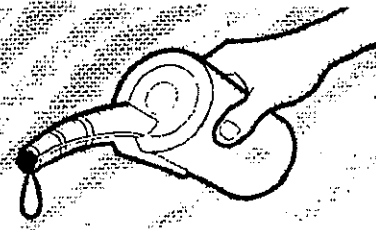
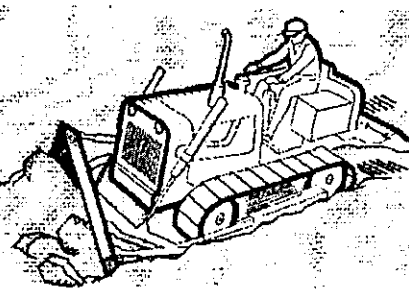
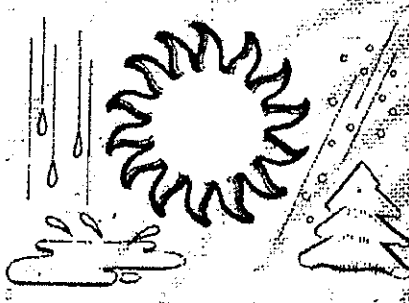
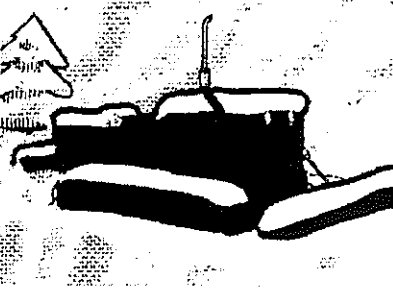
### 1.3.1

## FLUID POWER PREVENTIVE MAINTENANCE TIPS

<p><b>Dirty Oil Is Expensive</b></p> <p>Dirty oil can play hob with your hydraulic system, ultimately destroying it. One drastic and immediately obvious effect of dirty oil is a jammed relief valve.</p>	<p>But dirty oil is detectable. Look at your oil. A sample on the dipstick will show its condition.</p>	<p>are not compatible with most hydraulic fluids, and even traces of kerosene left behind can cause real problems later when they mix with the clean oil. Also, avoid solvents and chemical cleaners. They will very likely damage the seals and hoses. Next, change your filter.</p>
		
<p>But some effects are not so obvious. Dirty oil scores valve spools, gouges metals from thrust plates and pump housings. Sooner or later something malfunctions, and productive equipment stops. To get it going again requires replacement parts and repair time, both unnecessary expenses. If performance seems to be lagging, very likely you're running with dirty oil. A sure sign the system becomes hotter.</p>	<p>A drop on a blotter, cloth or paper may reveal residue. Any residue means dirty oil. Look also for signs of oil leaks at rotating or sliding seal areas. Dirty oil causes seals and shafts to wear faster in these critical areas. Take heart. Dirty oil is easy to correct. First, drain the oil and flush the system.</p>	<p>Sometimes filters are not provided on equipment. Sometimes they are not needed. If your oil becomes dirty more quickly than you think it should, and there is not filter, discuss the problem with your equipment dealer. Replace the breather cap promptly if it's missing. Clean it if it's dirty. If your inspection uncovers other problems, contact your dealer or the manufacturer's representative. Now, refill with clean oil. Clean oil will minimize pump wear and extend the life of all system components. Only clean oil possesses all the qualities of lubricity, film strength, and resistance to oxidation which assure a smooth-running, efficient hydraulic system. Best of all, clean oil helps eliminate expensive downtime. As we said, dirty oil expensive. In fact, its the most expensive kink you can use. This is number 9 in a series of ads intended to help you keep hydraulic equipment running smoother, longer, with less work on your part. If there's a special problem you think others would find helpful. Please contact Mr. Paul M. Farwell @ Commercial Shearing &amp; Stamping Co., Youngstown, Ohio 45501, Dept. CM-297</p>
		
	<p>Draining the oil is a simple operation just open the petcock and let the existing oil flow into a container. Once emptied of the dirty oil, the system can be flushed. Best suggestion here is to follow the equipment manufacturer's recommendations for flushing. Your oil supplier will also have helpful suggestions. It is not advisable to flush with straight kerosene unless that method has been specifically approved by the equipment manufacturer. Kerosene has properties that</p>	

### 1.3.1.1

## FLUID POWER PREVENTIVE MAINTENANCE TIPS

<p><b>Use the right oil</b></p> <p>Commercial has long preached that dirty hydraulic oil is expensive. The wrong oil can be expensive, too. Four things affect the choice of oil:</p> <ol style="list-style-type: none"> <li>1. The equipment in use</li> <li>2. How it is used.</li> <li>3. Climate</li> <li>4. The type of hydraulic components on your equipment.</li> </ol> <p>The best advice on the right oil to use can be given by:</p> <ol style="list-style-type: none"> <li>1. Your equipment dealer who represents the manufacturer.</li> <li>2. Your oil supplier.</li> </ol> <p>In the long run, your own experience may prove the most practical guide.</p>		<p>20° below anticipated outdoor temperatures. aside from winter-service hydraulic oils, there are other types of oils that may be considered, from SAE 10W weight motor oils through multiple viscosity oils (10W-20) to ATF (Automatic Transmission Fluid) Oils</p>
	<p>Too heavy an oil may not feed the pump adequately...cause cavitation and overheating...sluggish operation. <i>Viscosity Index</i>. High Viscosity Index Oils (90 or above) are recommended for hydraulic systems. The V.I. of an oil is an indication of its change in viscosity with change in temperature. Low V.I. oils thin out too quickly with rising temperatures. <i>Additives</i>. Oils rated for hydraulic service generally contain additives which improve V.I., inhibit rust and oxidation and often include a foam depressant. <i>Anilin Point</i>. Should never be below 175, with 200 or higher preferred. If anilin point is below 175, seals may fail and leak prematurely. This reading gives some evidence of how oils affect seals and packing in pumps, valves, motors and cylinders. Packings may swell and bind.</p>	
<p><b>Generally desirable properties</b></p> <p><i>Correct Viscosity</i>. At your operating temperature, the oil should have a viscosity of between 100 SSU and 60 SSU (Saybolt Seconds Universal). You should not run your system with oil thinner than 60 SSU. Oils thinner than 60 ssu will slip more readily through clearances built into hydraulic components, resulting in efficiency loss. Thin oils lose their film strength and cause localized overheating. As a consequence of frictional contact, steel parts may show bluing.</p>		<p><i>All-Season Oils</i>. Some oil companies now offer "all season" hydraulic oils. They contain V.I. improvers and pour point depressants. Some ATF oils also can be advantageously use year-round. Furthermore, some hydraulic components are less finicky about oils than others.</p> <p><i>Multi-Purpose Oils</i>. Several oils on the market are rated as multi-purpose. Although slightly more costly, they can cut costs by simplifying inventories, by reducing service downtime, and by permitting the scheduling of maintenance checks and oil changes at longer intervals. Like dirty oil, the wrong oil is expensive, too.</p> <p>This is Number 10 in a series of ads intended to help you keep your hydraulic equipment running smoother, longer, with less work on your part. Of there's a special problem you think others would find interesting and helpful, please drop a line to Mr. Paul M. Farwell at Commercial Shearing &amp; Stamping company, Youngstown, Ohio 44501, dept. CM-38</p>
	<p><i>Oils for Winter Use</i>. To avoid preheating equipment during cold morning startup, you need an oil that will flow at the lowest temperature you expect. Oil viscosity of 7500 SSU at startup should never be exceeded. Pour point should be no less than</p>	



SHEET NO.

L-426

TITLE

LUBRICATION DIAGRAM FOR MODEL RRII

DATE

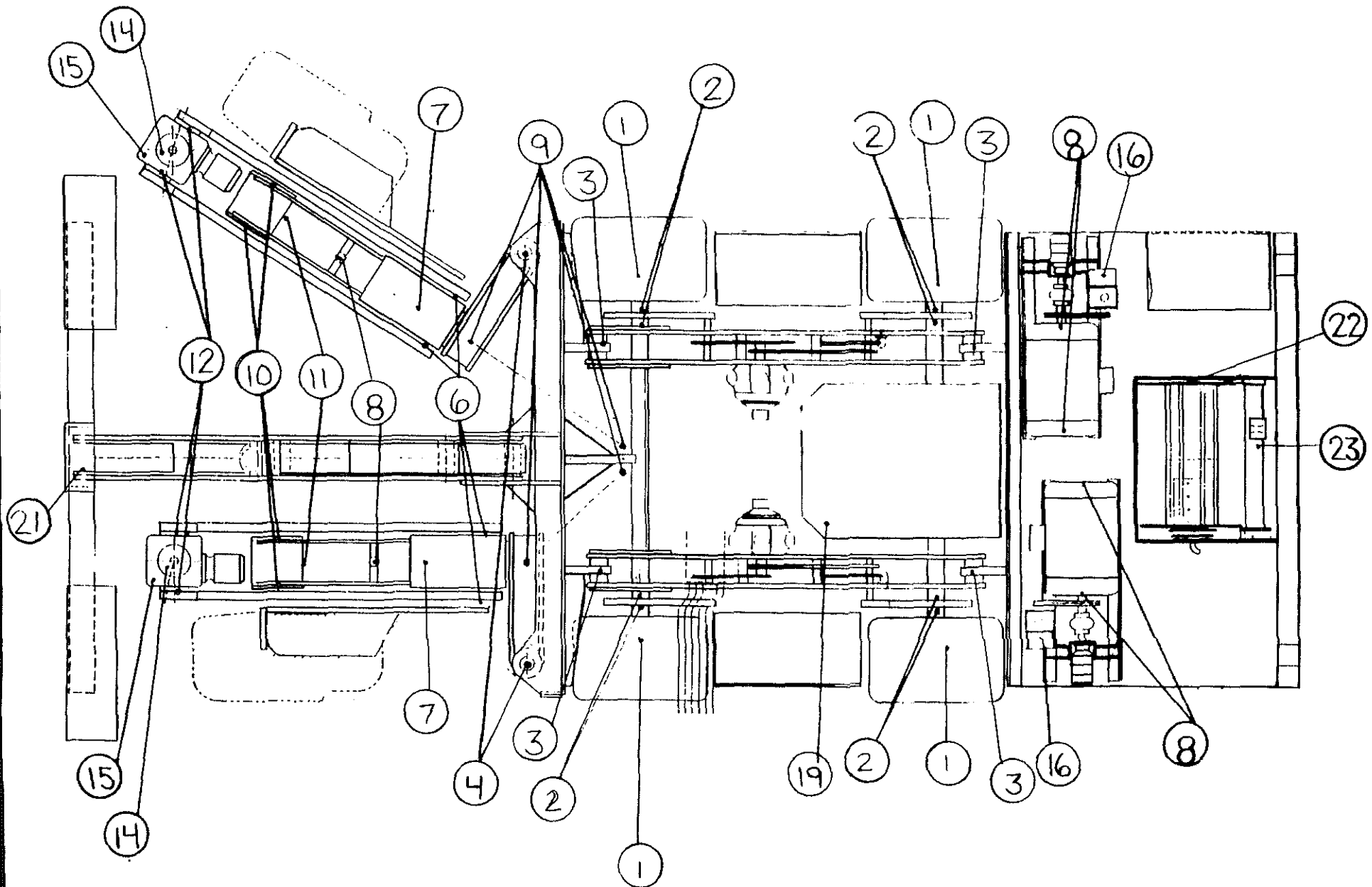
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**J. H. FLETCHER & CO.**

707 WEST 7TH STREET

HUNTINGTON W VA

ITEM	DESCRIPTION	RECOMMENDED LUBRICATION	INTERVALS
1.	WHEEL HUB	MULTI-PURPOSE GREASE #2 LITHIUM	WEEKLY (100 HRS)
2.	TRAM DRIVE COUNTERSHAFT BEARING	" " " " "	DAILY (8 HRS)
3.	FRONT LIFT & REAR LIFT PIVOT PINS	" " " " "	WEEKLY (100 HRS)
4.	BOOM PIVOT PINS	" " " " "	" " "
6.	BOOM ARM PIVOT & FOOT PIVOT	MULTI-PURPOSE GREASE #2 LITHIUM	WEEKLY (100 HRS)
7.	BOOM ROLLER ASSEMBLY	" " " " "	" " "
8.	BOOM FOOT PIVOT PINS	" " " " "	" " "
9.	BOOM SWING CYLINDER PINS	" " " " "	" " "
10.	BOOM ARM PIVOT PIN	" " " " "	" " "
11.	DRILLFEED CYLINDER PIN	" " " " "	" " "
12.	DRILLHEAD PIVOT PINS	" " " " "	" " "
14.	DRILLHEAD FLINGER ASSEMBLY	" " " " "	DAILY (8 HRS)
15.	DRILLHEAD ASSEMBLY (OIL LEVEL)	SAE 90 80W/90 MULTI-PURPOSE GEAR LUB.	" "
16.	BLOWER ASSEMBLY	SEE BLOWER INSTRUCTION MANUAL	AS RECOMMENDED
17.	HYDRAULIC FILTERS	CHECK FILTER ELEMENT	CHANGE AS NEEDED
18.	ELECTRIC MOTORS	SEE ELECTRIC MOTOR INSTRUCTION MANUAL	AS RECOMMENDED
19.	HYDRAULIC OIL TANK	ASTM 315 OR ISO-VG68 ANTI-WEAR HYDRAULIC OIL	AS NEEDED
21.	TRS HOUSING PIVOT	MULTI-PURPOSE GREASE #2 LITHIUM	WEEKLY (100 HRS)
22.	CABLE REEL ASSEMBLY	" " " " "	" " "
23.	SPOOLER ASSEMBLY	" " " " "	DAILY (8 HRS)



SHEET NO.

L-426

TITLE

LUBRICATION DIAGRAM FOR MODEL RR11

DATE

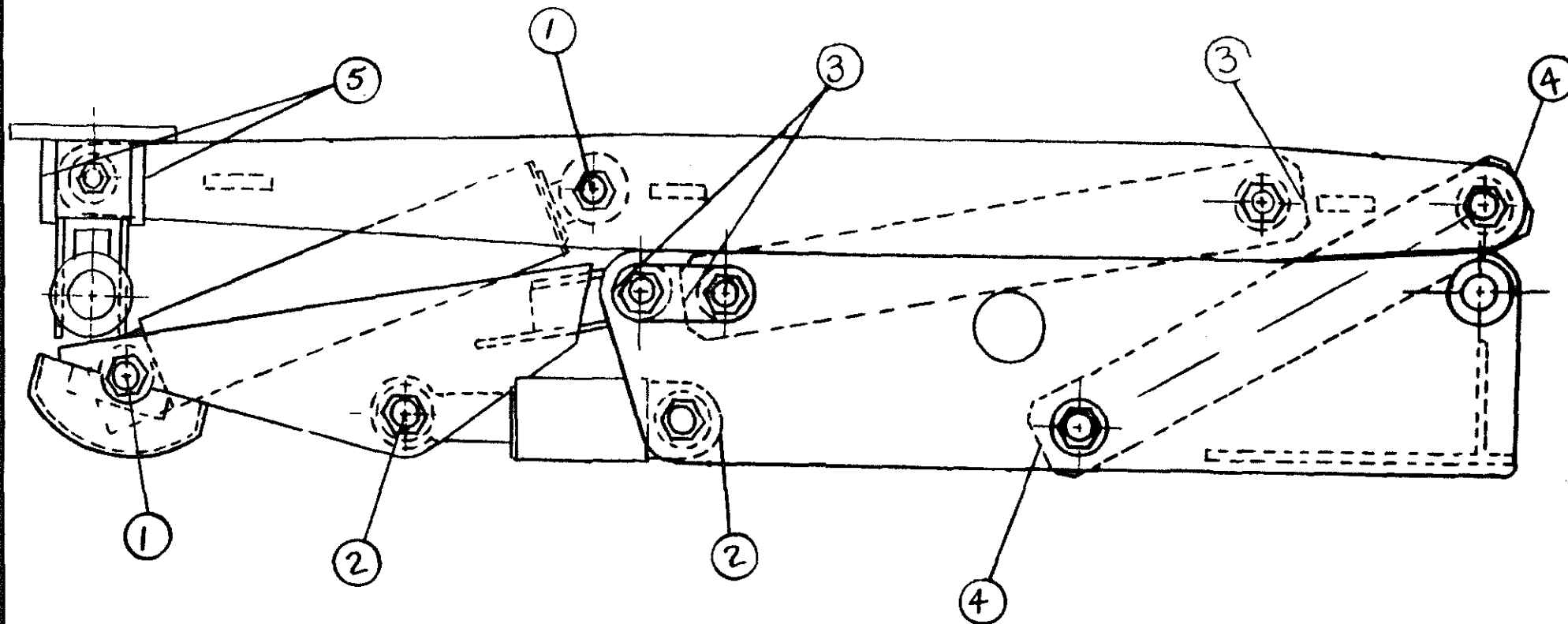
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**J. N. FLETCHER & CO.**

402 HIGH STREET

HUNTINGTON, W. VA.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>LUBRICATION</u>	<u>INTERVAL</u>	<u>HOURS</u>
1	RAISE CYLINDER EYES	MULTI-PURPOSE #2 LITHIUM GREASE	WEEKLY	100 hrs
2	FOOT CYLINDER EYES	" " " "	WEEKLY	"
3	UPPER LEMNISCATE LINK	" " " "	WEEKLY	"
4	LOWER LEMNISCATE LINK	" " " "	WEEKLY	"
5	TRS BEAM LINK PIVOT	" " " "	WEEKLY	"



SHEET NO.

L-329

TITLE

L-STYLE TRS LUB DIAGRAM

DATE

10-15-86

**J.H. FLETCHER & CO.**

402 HIGH STREET

HUNTINGTON, W.VA.

### 1.3.3 CHECK AND ADDING HYDRAULIC FLUID

Check the hydraulic fluid level every shift of operation. Make sure the machine is parked on level ground before checking fluid level.

#### **Procedure for checking hydraulic fluid level:**

- (1) Put machine in tram position (**Make sure all cylinders are fully collapsed**)
- (2) Shut down machine
- (3) Wait a few minutes for oil to settle
- (4) Remove breather cap and dipstick assembly

**CAUTION** *Tank may be under slight pressure*

- (5) If hydraulic fluid shows on dipstick, the oil level is satisfactory, replace breather cap
- (6) If hydraulic fluid can not be seen on dipstick, follow procedure for adding fluid

**NOTE:** Some machines may be equipped with sight gauge's, proper oil level is between two sights. **DO NOT USE DIPSTICK.**

#### **Procedure for adding hydraulic fluid:**

- (1) Make sure hydraulic fluid to be added meets recommendations.
- (2) Remove fill hose from holder and clean thoroughly.
- (3) Remove cap from end of hose and submerge hose end in hydraulic fluid to be added.
- (4) Using hand pump, add fluid until proper oil level is obtained.
- (5) Remove fill hose, replace cap, and return to holder.
- (6) Secure pump handle and breather cap.

**NOTE:** Always use fill pump when adding hydraulic fluid, Pouring oil through breather assembly may result in spillage and contamination.

#### **HYDRAULIC OIL SPECIFICATIONS ARE AS FOLLOWS:**

**VISCOSITY INDEX:** 50-56 SSU @ 210 DEGREE F & 295-300 SSU @ 110 DEGREE F

**SPECIFIC GRAVITY:** 25.5 TO 20.5

**FLASH POINT:** 410-430 DEGREE F

**FLAME POINT:** 470-490 DEGREE F

**POUR POINT:** 0 DEGREE F

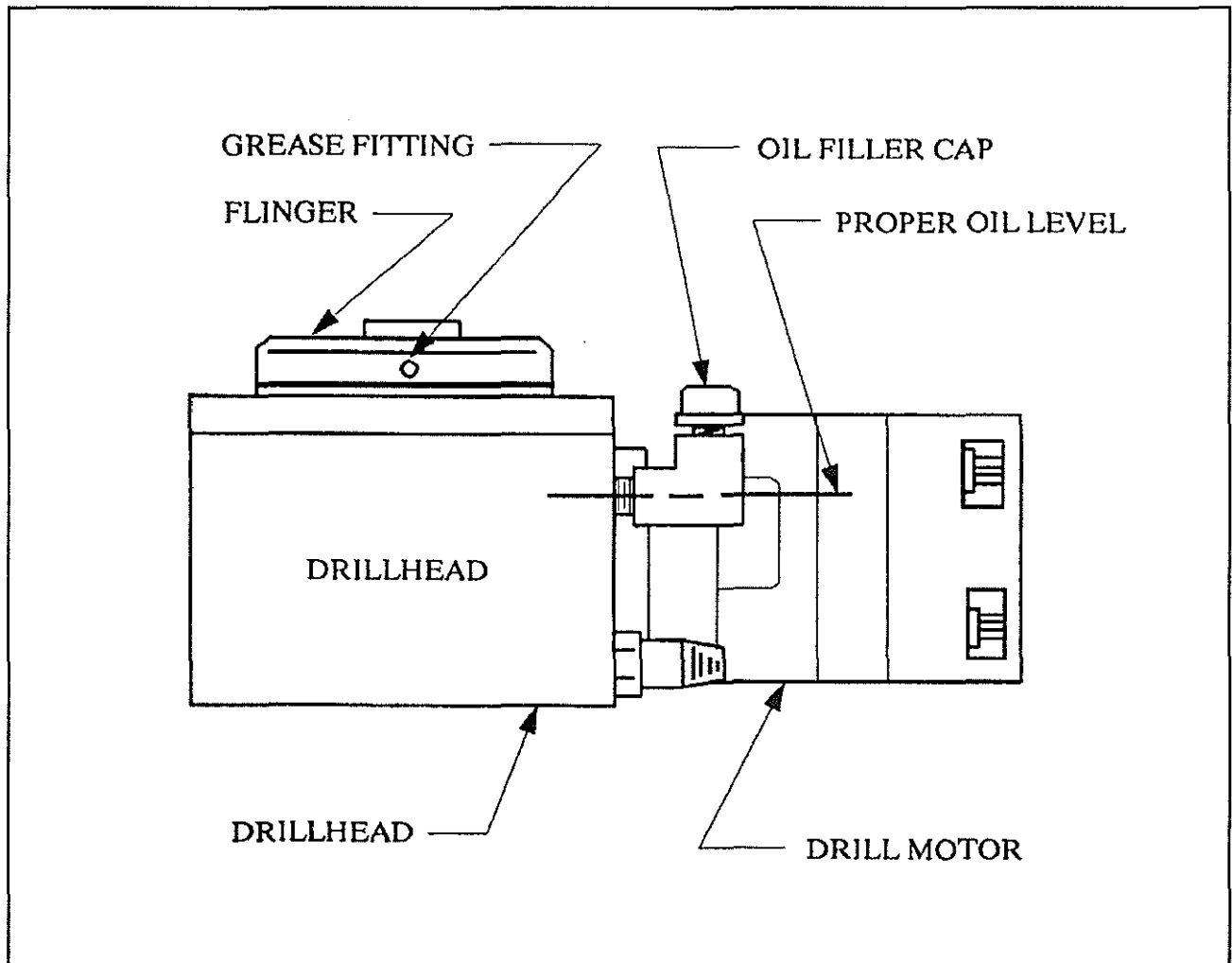
**FOR A LIST OF RECOMMENDED LUBRICANT TRADE NAMES, SEE APPENDIX A**

### 1.3.4 DRILLHEAD LUBRICATION

Check the drillhead oil level and grease the drillhead flinger each shift. The drillhead oil level is checked by removing the fill cap and looking into the fill pipe. If no oil can be seen at the elbow, add SAE 90 or 80 W/90 multi-purpose gear lube until oil remains in the elbow. The flinger should be lubricated with NLG1 - Grade #2, multi-purpose grease. Grease until fresh grease emerges from between the drillhead and flinger.

Every 100 hours of drillhead operation the gear oil should be drained. Flush the gear case by filling with hydraulic oil, running drillhead full speed under no load for 3-5 minutes, and draining the hydraulic oil. Refill the gear case with SAE 90 or 80 W/90 multi purpose gear lube to the proper level.

**NOTE:** FILL ELBOW ON DRILLHEAD, MAY BE REPLACED BY A BUTTON HEAD FITTING ON NEWER MODLES.



### 1.3.5

## ELECTRIC MOTOR LUBRICATION

The electric motor bearings run at a high temperature, requiring a planned maintenance schedule using high temperature grease. The manufacturer recommends one of the following three or an equivalent grease:

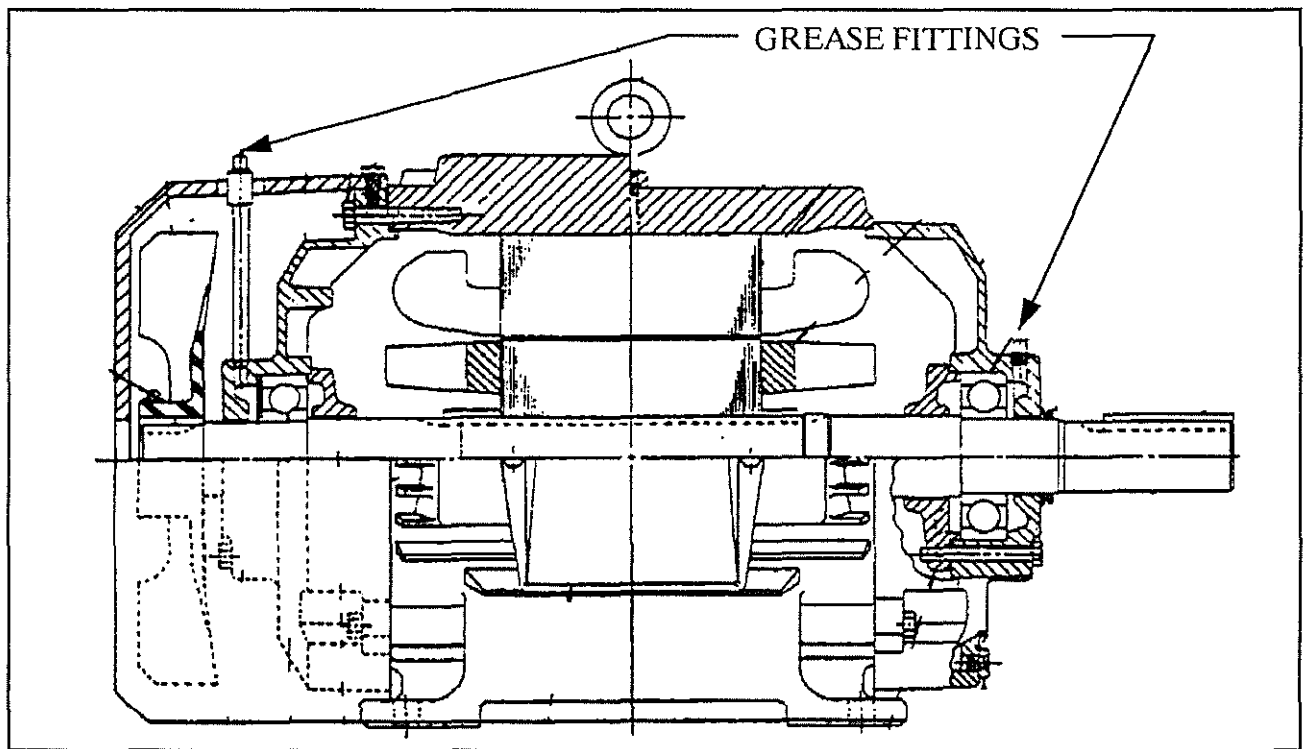
Chevron Oil - SRI No. 2  
Shell Oil Co. - Dolium R  
Texaco Inc. - Premium RB

### **WARNING:**

*Mixing lubricants may destroy lubricating properties of both. If a change in lubricants is desired, follow lubricating instructions and repeat after 100 hours of service. Look for signs of lubricant incompatibility such as extreme soapiness visible from grease relief around shaft.*

**Follow the lubrication procedure every 3 month of operation.**

- (1) Locate the grease inlet, clean the area and replace the pipe plug with a grease fitting.
- (2) Add 1.5 Cu. In. per bearing of the recommended lubricant using a hand operated grease gun.
- (3) Run the motor for two hours.
- (4) Replace the pipe plug in grease inlet.



### 1.3.6 BLOWER LUBRICATION

Shaft bearings at the gear end of the blower are splash lubricated from the oil sump. Check oil level every three shifts by opening petcock. If no oil runs out remove plug on top of housing and add SAE 40 oil until it begins to run out stopcock. Close the petcock and replace fill plug.

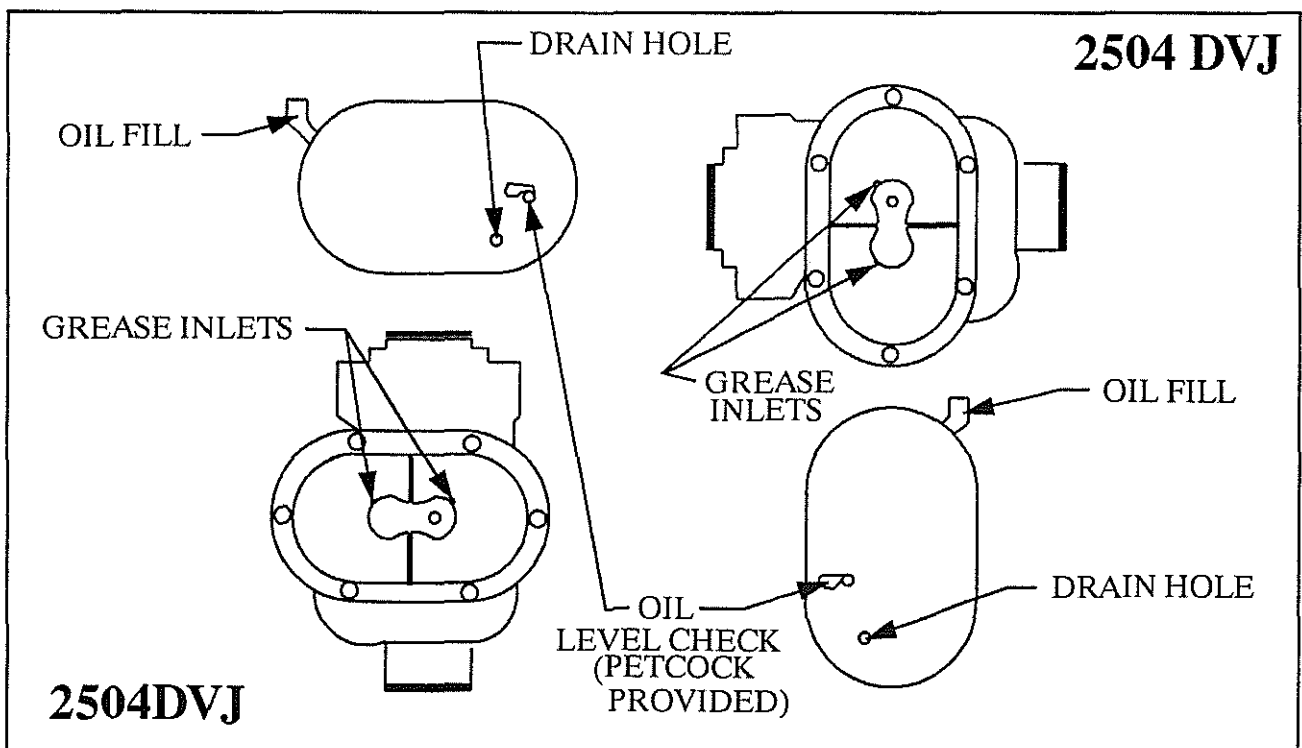
Change oil weekly using SAE 40 oil. After draining old oil and replacing drain plug, add new oil using the same procedure as adding oil.

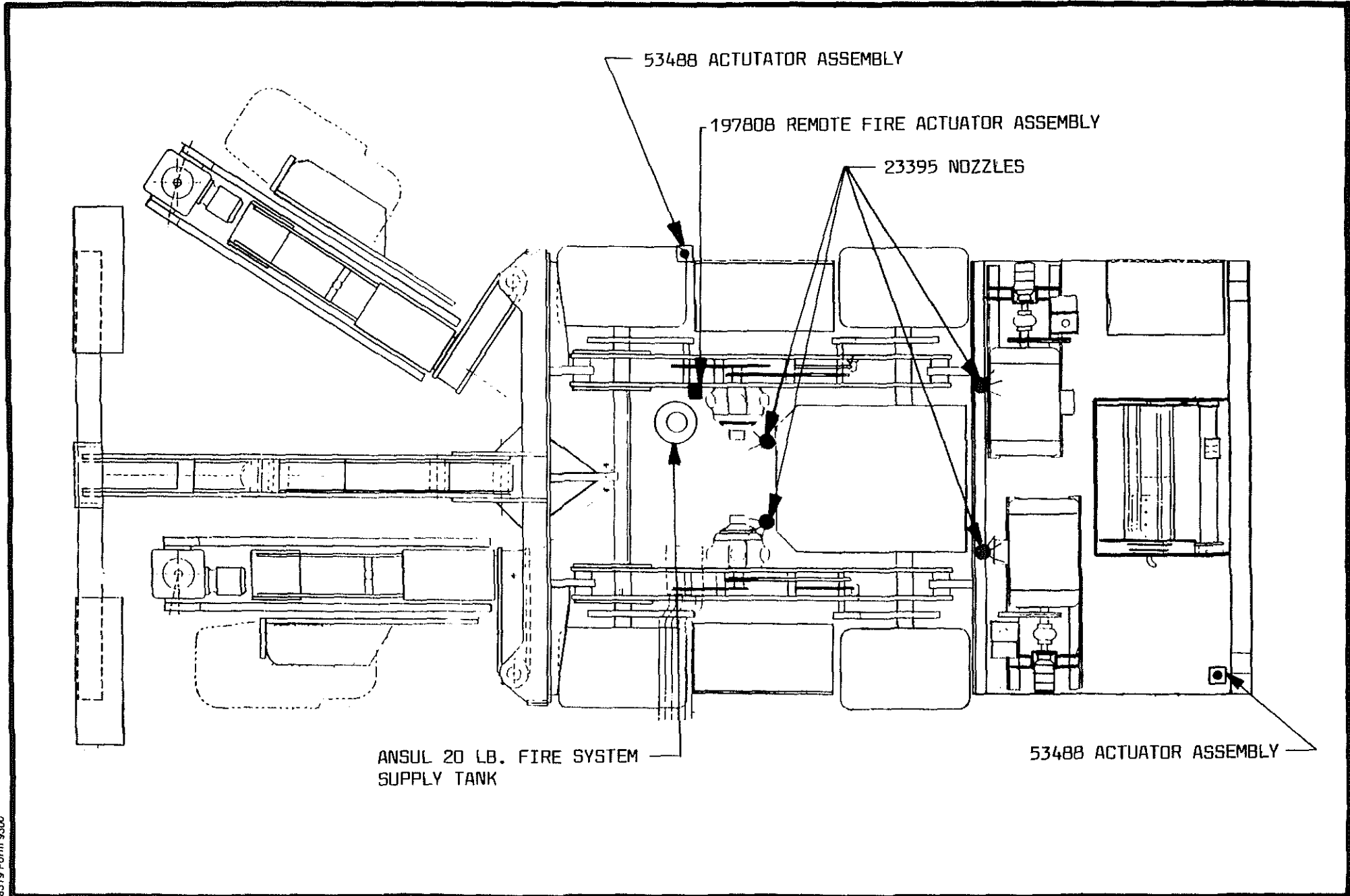
**WARNING: DO NOT OVER FILL OIL SUMP**

Shaft bearings at the drive end of the blower are grease lubricated. Grease bearings every 150 working hours with a recommended grease only. The manufacturer recommends one of the following or an equivalent NGL1 No. 2 high temperature grease with synthetic base:

Shell Oil Co.	Areo Shell 16
Mobil Oil Co.	Mobil 26.
Texaco Inc.	TG 4971
Std. Oil Calif.	TED 3720
Amoco	ASU 06752
Royal Royco	60R and 25
Exxon Ployrex	

**WARNING: MIXING LUBRICANTS MAY DESTROY LUBRICATING PROPERTIES OF BOTH.**





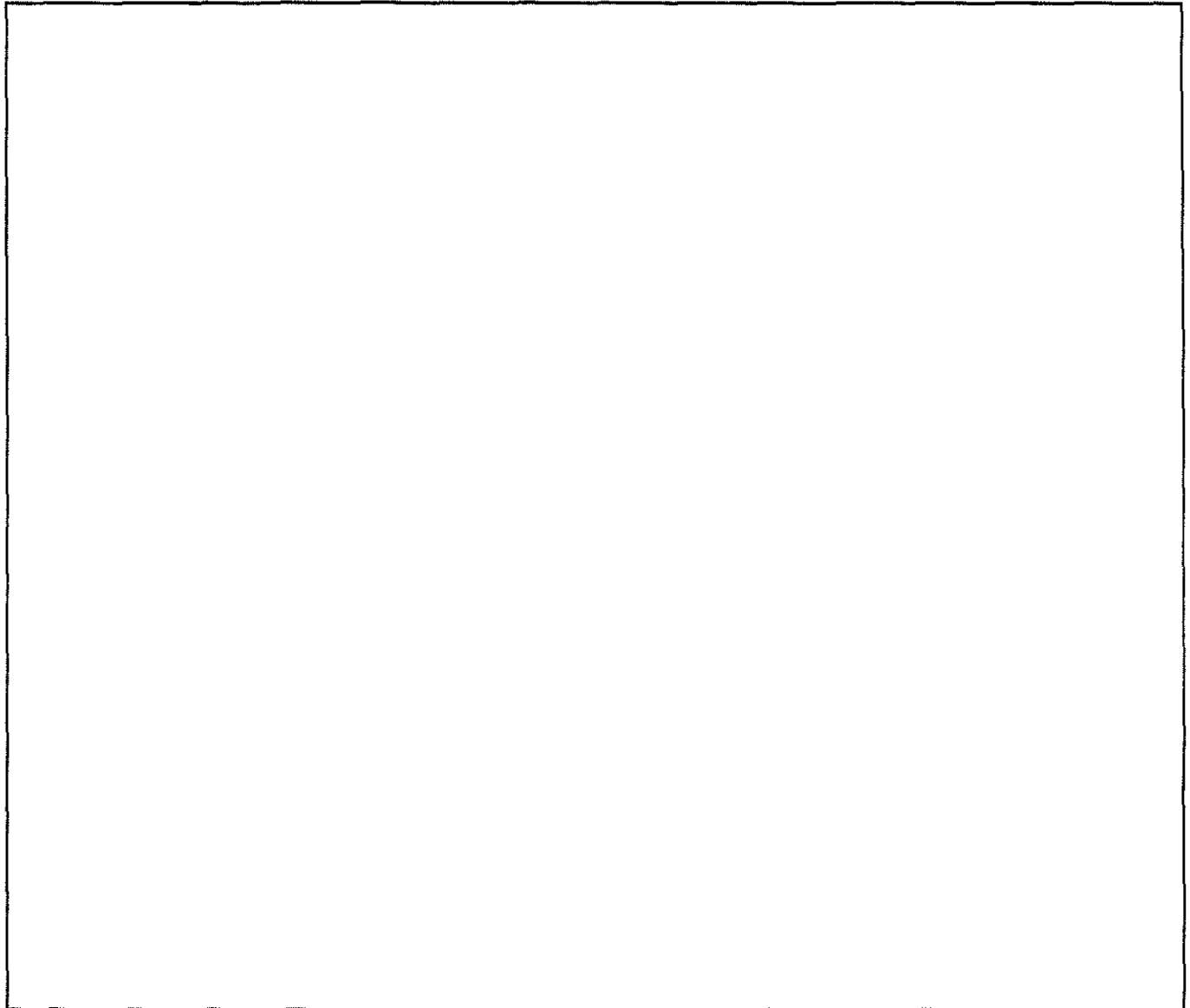
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SHEET NO.	TITLE	DATE	R	<b>J. H. FLETCHER &amp; CO.</b> 402 HIGH STREET HUNTINGTON, W. VA
	LOCATIONS FOR FIRE SYSTEM			



# 1.4 FIRE SUPPRESSION SYSTEM

## LOCATIONS:



## PERTINENT DATA

Capacity: 20 pounds dry chemical

Dry Chemical Agent: Anusl foray, weight 20 pounds

Pressurizing Agent: C02

Discharge Method: Four fixed - position discharge nozzles

Storage Containers: 20 pound dry chemical cylinder, w/ pneumatic actuator

Remote Actuator: A manually activated C02 cartridge which pneumatically actuates the dy chemical cylinder.

Safety Relief: C02 cartridge - 300 to 3600 psi at 160 degree F

Discharge Hose: High pressure (hydraulic), 1/2", 7/8"

Pressure Hose: High pressure (hydraulic), 1/4"

Periodic Maintenance: Semi - annual

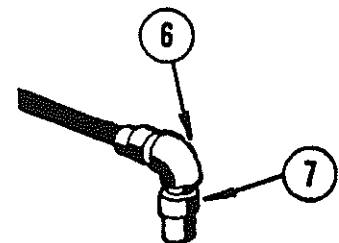
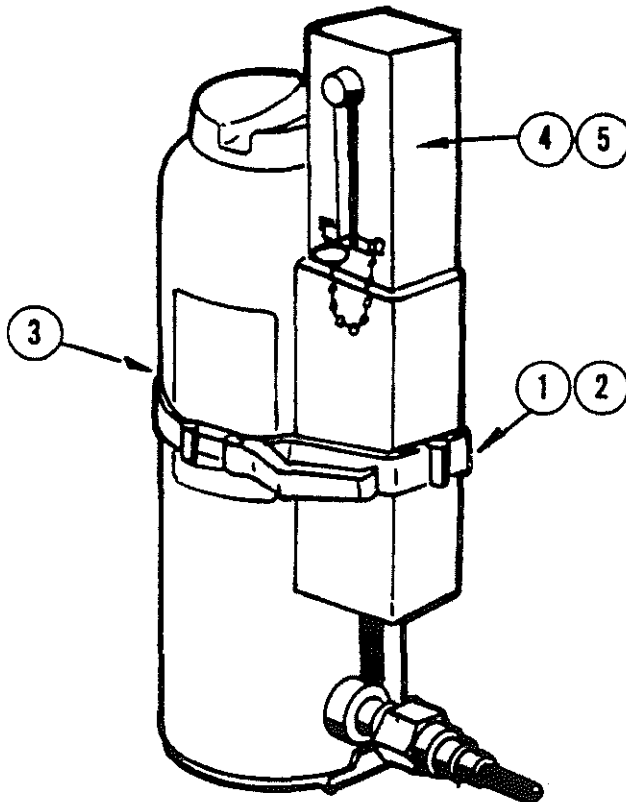
# 1.4.1 FIRE SUPPRESSION SYSTEM INSPECTION



## INSPECTION – AUTOMATIC/MECHANICAL ACTUATION

To provide reasonable assurance that your Ansul A-101 system is fully charged and operable:

1. Make certain extinguisher is in designated place.
2. Note general appearance for mechanical damage.
3. Check nameplate for readability.
4. Check visual seal on ring pin in cocking handle.
5. Check visual release indicator position – should be in “cocked” position.
6. Check piping, fittings, blow-off caps and nozzles for mechanical damage.
7. Check nozzle openings – slot should be closed (capped) with silicone grease or covered with black plastic blow-off cap (Part No. 4120).
8. Record date of inspection.



## 1.4.1.1

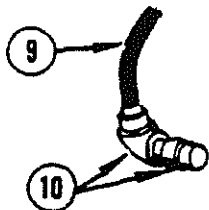
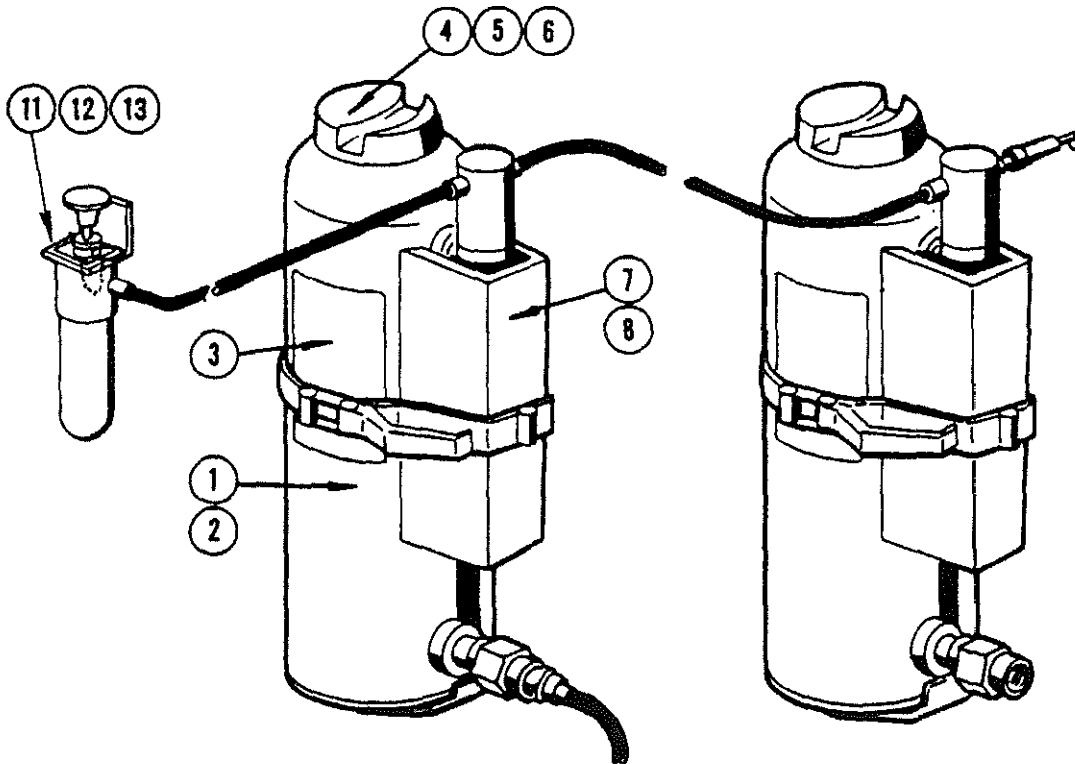
# FIRE SUPPRESSION SYSTEM INSPECTION CONTINUED



### INSPECTION – PNEUMATIC ACTUATION

To provide reasonable assurance that your Ansel A-101 System is charged and operable:

1. Make certain extinguisher is in its designated place.
2. Note general appearance for mechanical damage or corrosion.
3. Check nameplate(s) for readability.
4. Remove fill cap assembly.
5. Make certain extinguisher is filled with free-flowing Ansel dry chemical to a level of not more than 3 inches from the bottom of the fill opening.
6. Secure fill cap, hand tighten.
7. Remove cartridge from extinguisher and examine disc – seal should be unruptured.
8. Return cartridge to cartridge receiver/actuator assembly, hand tighten.
9. Check piping (hose), fittings and nozzles for mechanical damage and cuts.
10. Check nozzle openings – slot should be closed (capped) with silicone grease or covered with black plastic blow-off cap (Part No. 4120).
11. Remove cartridge from remote actuator, and examine disc – seal should be unruptured.
12. Return cartridge to remote actuator assembly, hand tighten.
13. Replace any broken or missing lead and wire seals and record date of inspection.



Numbers are keyed to instructions.

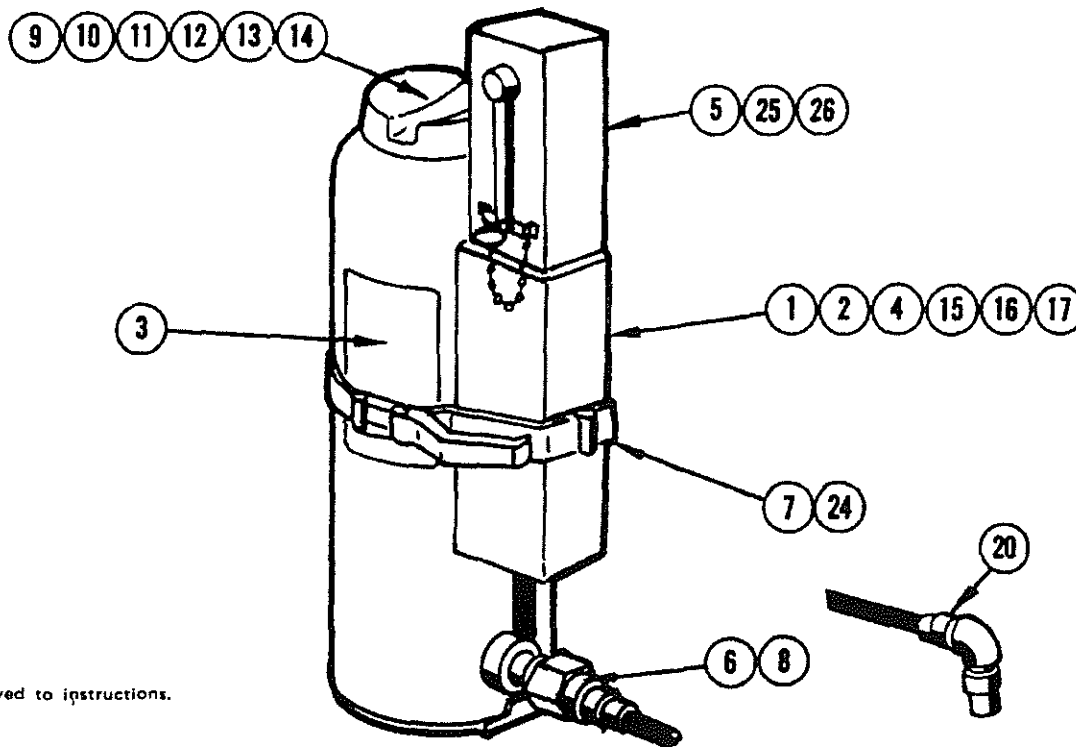
## 1.4.1.2 FIRE SYSTEM MAINTENANCE



### MAINTENANCE -- AUTOMATIC/MECHANICAL ACTUATION

To provide reasonable assurance that your Ansul A-101 System will operate effectively and safely:

1. Make certain extinguisher is in designated place.
  2. Note general appearance for mechanical damage.
  3. Check nameplate for readability.
  4. Install ring pin in actuator/cartridge receiver.
  5. Remove cover plate from extinguisher side of release.
  6. Disconnect bursting disc union.
  7. Release holding strap and remove extinguisher.
  8. Check the bursting disc to insure that it has not been ruptured and is properly installed – full disc side must face extinguisher.
  9. Remove fill cap.
  10. Check threads on fill cap and in fill opening for nicks, burrs, cross threading, rough or feathered edges.
  11. Check pressure relief vent hole in fill opening for obstructions.
  12. Check fill cap gasket for elasticity – clean and coat lightly with good grade of high heat resistant grease.
  13. Make certain tank is filled with free-flowing Ansul dry chemical to a level not more than 3 inches from bottom of fill opening.
  14. Secure fill cap, hand tighten.
  15. Remove cartridge guard assembly.
  16. Remove cartridge and weigh. Weight must be within ¼ ounce of weight stamped on cartridge.
  17. Screw in cartridge, hand tighten.
  18. Replace cartridge guard.
- (DO NOT REINSTALL EXTINGUISHER AT THIS TIME.)
19. Check hose, fittings, and nozzles for mechanical damage.
  20. Check nozzle openings – slot should be closed (capped) with silicone grease or covered with black plastic blow-off cap (Part No. 4120).
  21. Install fusible link in detector(s).
  22. Cut or melt fusible link to test fire detection system.
- NOTE: If system does not fire, check wire rope tension – adjust tension on wire rope and cock the release. Repeat Steps 21 and 22.
23. After successful test firing, cock release and secure with ring pin and seal with visual seal (Part No. 15999).
  24. Reinstall fully charged extinguisher. Reassemble bursting disc union, wrench tighten. Secure extinguisher with holding strap.
  25. Replace cover on mechanical release.
  26. Remove ring pin from actuator/cartridge receiver.
  27. Record date of maintenance.



Numbers are keyed to instructions.

### 1.4.1.3

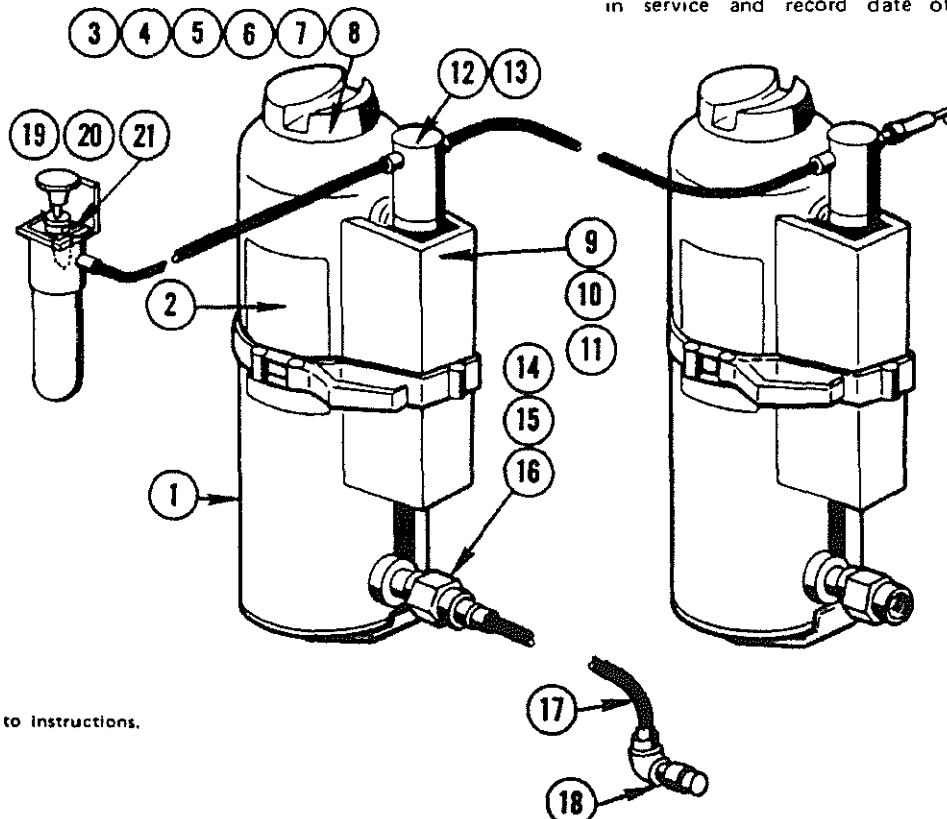
## FIRE SYSTEM MAINTENANCE CONTINUED



### MAINTENANCE – PNEUMATIC ACTUATION

To provide maximum assurance that your Ansul A-101 System will operate effectively and safely:

1. Note general appearance for mechanical damage or corrosion.
2. Check nameplate for readability, corrosion or looseness.
3. Remove fill cap assembly.
4. Examine fill cap gaskets for elasticity – clean and coat lightly with a good grade of high heat resistant grease.
5. Inspect threads on fill cap and in fill opening for nicks, burrs, cross threading, rough or feathered edges.
6. Check pressure relief vent in fill opening threads for obstruction.
7. Make certain extinguisher is filled with free-flowing Ansul FORAY dry chemical to a level of not more than 3 inches from bottom of fill opening.
8. Secure fill cap, hand tighten.
9. Remove extinguisher cartridge guard assembly.
10. Unscrew cartridge and weigh (replace if weight is 1/4 oz. less than stamped on cartridge).
11. Inspect threads on cartridge and in receiver/actuator for nicks, burrs, cross threading, rough or feathered edges.
12. Check pressure vents in receiver/actuator for obstruction.
13. Examine cartridge receiver gasket for elasticity – clean and coat lightly with a good grade of high heat resistant grease. Return cartridge to receiver/actuator, hand tighten.
14. Disengage bursting disc union and open bracket clamp.
15. Lift extinguisher partially out of bracket and examine bursting disc – should be installed with full disc side facing extinguisher, properly seated and undamaged (scored, or ruptured).
16. Reposition extinguisher, engage bursting disc union (wrench tighten) and close bracket clamp.
17. Check hose, fittings and nozzles for mechanical damage.
18. Check nozzle openings – slot should be closed (capped) with silicone grease or covered with black plastic blow-off cap (Part No. 4120).
19. Check remote actuator – **DASHBOARD TYPE.**  
Remove cartridge and weigh (replace if weight is 1/4 oz. less than stamped on cartridge).  
Inspect threads on cartridge and in actuator for nicks, burrs, cross threading, rough or feathered edges.  
Check pressure safety vent in actuator body for obstruction.  
Examine actuator cartridge gasket for elasticity – clean and coat lightly with a good grade of high heat resistant grease.  
Pull ring pin and operate actuator button several times to check for free movement.
20. Seal ring pin to puncture lever with lead and wire seal, Ansul Part No. 197. Return cartridge to remote actuator, hand tighten.
21. Notify operating personnel extinguishing system is back in service and record date of maintenance check.



Numbers are keyed to instructions.

## 1.4.2 ANSUL MANUAL ACTUATOR PUNCTURE PIN REPLACEMENT INSTRUCTIONS

### FORWARD

These instructions are intended for the installation of an improved puncture pin assembly (Part No. 55940) in conjunction with a maintenance examination of remote manual and dashboard type actuators (Part No.'s 70581, 71699, 70584, 57484, 68645, 57452, and 71804). Refer to corresponding Ansul system manual for maintenance procedures covering the balance of the fire suppression system.

### CARTRIDGE REMOVAL AND INSPECTION

1. Unscrew cartridge from actuator receiver body. (depending on the actuator model, the threads may be either right or left-handed.) Also remove cartridges from any other actuators that are connected to the same actuation network as the actuator being serviced.

#### **! WARNING**

GAS CARTRIDGES ARE UNDER HIGH PRESSURE WHICH COULD BE ACCIDENTALLY RELEASED IF CARTRIDGE IS NOT PROPERLY HANDLED OR NOT INSTALLED IN PROPER SEQUENCE. DO NOT REINSTALL ANY CARTRIDGES UNTIL INSTRUCTED TO DO SO IN THE "CARTRIDGE REINSTALLATION" SECTION. MAKE CERTAIN SAFETY SHIPPING CAPS ARE SECURELY INSTALLED WHENEVER CARTRIDGES ARE NOT SECURED IN ACTUATOR BODY.

2. Check cartridge threads for nicks, burrs, cross-threading, and rough or feathered edges. Check cartridge seal for proper Ansul identification marking and that it has not been punctured, corroded, or scored in any way. (See Figure 1.) Replace cartridge if damage is found on threads or seal.

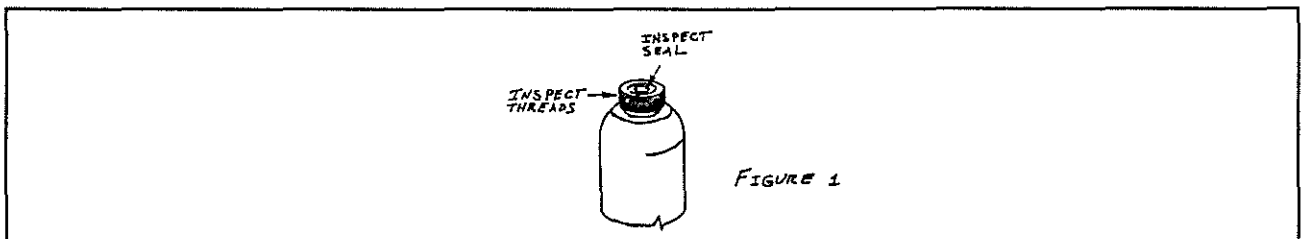


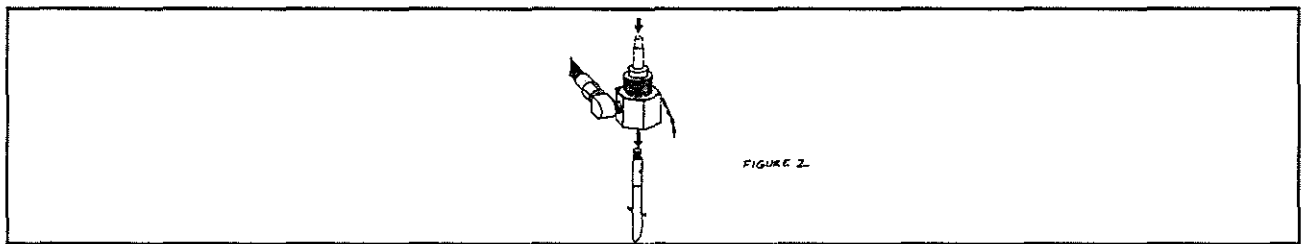
FIGURE 1

3. Weigh the cartridge. Replace cartridge if weight is 1/4 ounce (7.1g) or more below weight stamped on cartridge. (See corresponding Ansul system manual for cartridge shipping part number.)
4. Install a safety shipping cap and set cartridge aside in a safe location.

# 1.4.2.1 ANSUL MANUAL ACTUATOR PUNCTURE PIN REPLACEMENT INSTRUCTIONS

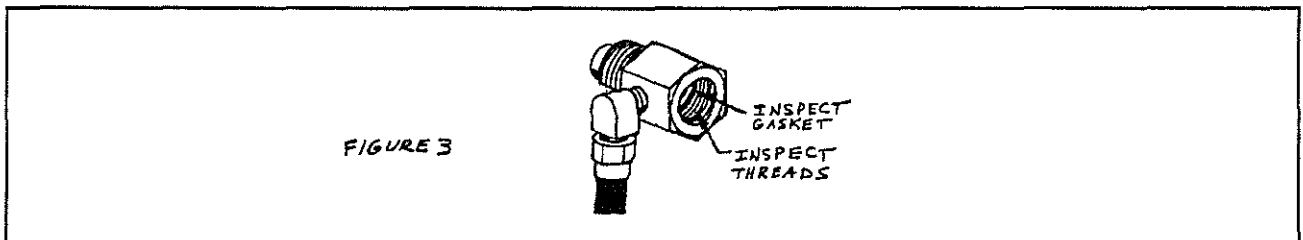
## ACTUATOR DISASSEMBLY

1. While ring pin is still in place, unscrew palm button (red knob) from top of actuator. Then, pull ring pin from puncture pin shaft and slide rubber boot off shaft.
2. If PIPE is connected to the actuator outlet as in SOA-50 systems, disconnect the pipe. If HOSE is connected to outlet as in a-101 systems, removal is not necessary.
3. Unscrew the jam nut from the top threads of the actuator body and slide actuator out of mounting bracket.
4. Remove puncture pin assembly by pushing down on the top of the puncture pin shaft. (See Figure 2.) The pin assembly should slide out the bottom of the actuator body. (Save puncture pin as it will be returned to Ansul.)



## ACTUATOR INSPECTION AND CLEANING

1. Use a stiff bristle brush to clean threads on inside of actuator body. Check threads for nicks, burrs, cross-threading, and rough or feathered edges. (See Figure 3.) Replace actuator body if threads are damaged.

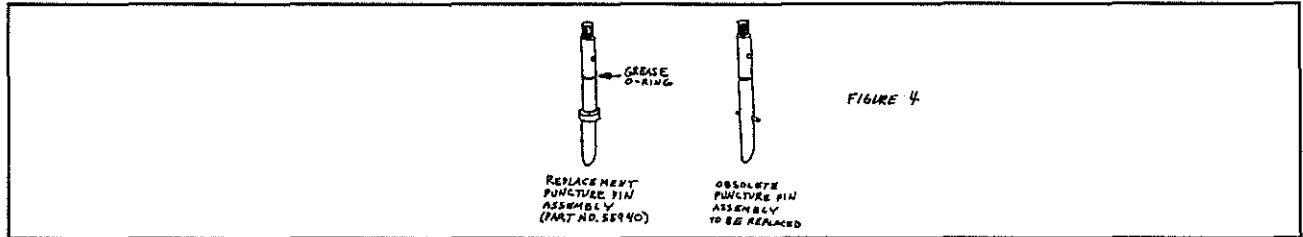


2. Inspect inside of actuator body for corrosion or other damage. Clean or replace body if required.
3. Remove the cartridge receiver gasket from inside of actuator body. (See Figure 3.) Check gasket for elasticity, cut, abrasions, or checking. Replace gasket if damage. Clean gasket and coat it lightly with a good grade of high/low temperature silicone grease (Dow Corning No. 33 or equivalent). Then reinstall gasket.

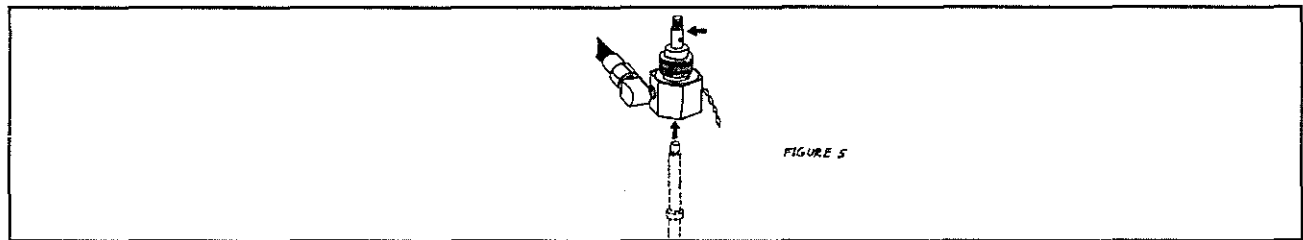
## 1.4.2.2 ANSUL MANUAL ACTUATOR PUNCTURE PIN REPLACEMENT INSTRUCTIONS (CONTINUED)

### ACTUATOR ASSEMBLY

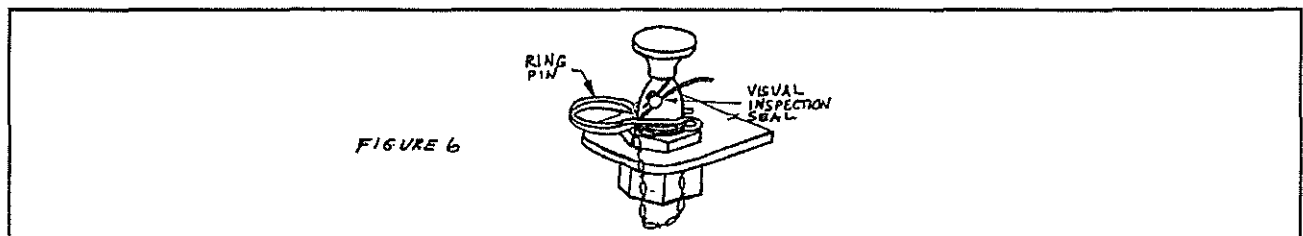
1. Obtain REPLACEMENT PUNCTURE PIN ASSEMBLY (PART NO. 55940) as shown in Figure 4.



2. Coat O-ring on replacement puncture pin shaft with a good grade of high/low temperature silicone grease (Dow Corning No. 33 or equivalent). See Figure 4
3. Slide replacement puncture pin assembly up through the actuator body so that the threaded end of the shaft extends through the top of the actuator as shown in Figure 5. (To avoid dulling the puncture pin point, use a small wooden stick or pencil to push shaft through actuator body.)



4. Reinstall actuator into mounting bracket and secure with jam nut. If system uses actuation piping, reconnect pipe to actuator outlet.
5. Slide rubber boot over puncture pin shaft so that holes in boot line up with hole in shaft. Insert ring pin through holes in boot and puncture pin shaft. Then, hand tighten palm button (red knob) onto top of shaft.
6. Remove ring pin and move the palm button up and down to ensure that puncture pin moves freely.
7. Reinsert ring pin through holes in boot and puncture pin shaft. Install visual inspection seal. (See Figure 6.)





**1.4.2.3**  
**ANSUL MANUAL ACTUATOR**  
**PUNCTURE PIN REPLACEMENT INSTRUCTION**  
**CONTINUED**

**CARTRIDGE REINSTALLATION**

**! WARNING**

GAS CARTRIDGES ARE UNDER HIGH PRESSURE WHICH COULD BE ACCIDENTALLY RELEASED IF CARTRIDGE IS NOT PROPERLY HANDLED OR NOT INSTALLED IN PROPER SEQUENCE. NEVER LEAVE CARTRIDGE INSTALLED IN MANUAL ACTUATORS ON THE SAME ACTUATION NETWORK WHEN ONE OR MORE OF THE ACTUATORS ARE BEING SERVICED.

WHEN CERTAIN ACTUATOR PUNCTURE PIN IS IN THE FULLY RETRACTED (UP) POSITION AND THAT RING PIN IS INSERTED THROUGH THE PUNCTURE PIN SHAFT BEFORE INSTALLING CARTRIDGE. IF PUNCTURE PIN IS NOT FULLY RETRACTED, THE CARTRIDGE SEAL COULD BE PUNCTURED DURING CARTRIDGE INSTALLATION AND INJURY COULD RESULT DUE TO ESCAPE OF UNRESTRICTED HIGH PRESSURE GAS.

1. Before reinstalling cartridge, make certain any other manual actuators in the actuation network have been serviced and are ready for cartridge installation.
2. Make certain puncture pin is in the fully retracted (up) position with ring pin inserted through shaft and visual inspection seal installed.
3. Unscrew safety shipping cap from cartridge.
4. Screw cartridge into actuator body and hand tighten firmly. (Depending on the actuator model, the threads may be either right or left handed.)
5. Repeat steps 1 through 4 for each actuator being serviced.