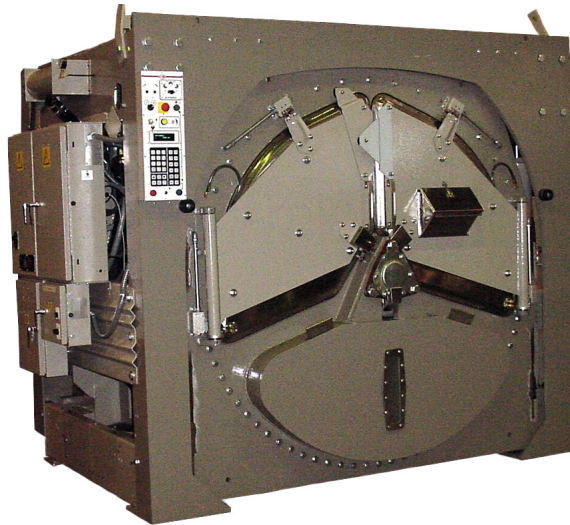


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# 72044SP2, SR2/SR3 72044WP2, WR2/WR3





# MQHD7M01U1/16104A

- 1**
- 3**
- 1. English**
- Maintenance Guide—72-series, Divided Cylinder  
Washer-extractor

MQHD7M01EN/20160301



English

1





**Read the  
separate  
safety  
manual  
before  
installing,  
operating,  
or servicing**

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# **Maintenance Guide—**

## **72-series, Divided Cylinder Washer-extractor**

**PELLERIN MILNOR CORPORATION** POST OFFICE BOX 400, KENNER, LOUISIANA 70063 - 0400, U.S.A.

**Applicable Milnor® products by model number:**

72044SP2 72044SP3 72044WP2 72044WP3



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# Chapter 1

# Machine Description, Identification, and Certification

BIUUUF01 (Published) Book specs- Dates: 20160301 / 20160301 / 20160301 Lang: ENG01 Applic: HD7

## 1.1. About This Milnor® Machine—72-series, Divided Cylinder Washer-extractor

This manual applies to the Milnor products whose model numbers are listed inside the front cover and which are in the families of machines defined below.

### 1.1.1. Functional Description

**Washer-extractors** wash linen using water and nonvolatile chemicals and remove excess water by centrifugal force.

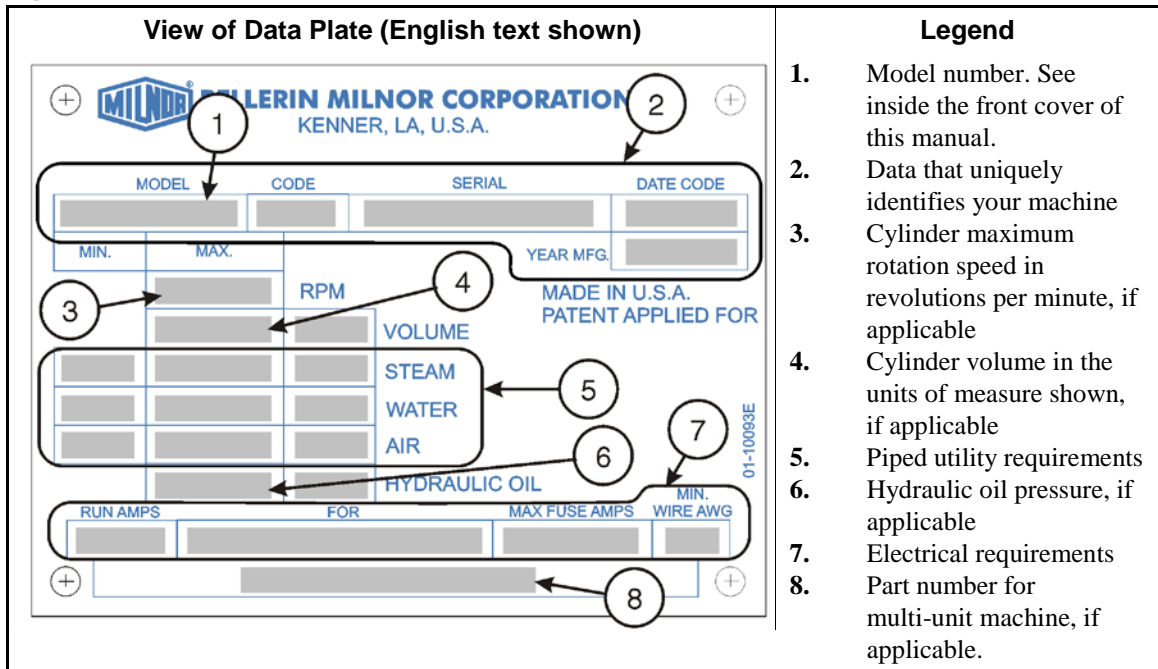
**72-series, Divided Cylinder Washer-extractor** models are suspended washer-extractors with a 72 inch (1829 mm) diameter, walled cylinder for processing separate loads simultaneously.

72-series Staph Guard® models are front-loaded and rear-unloaded for use in soil-side/clean-side barrier applications.

### 1.1.2. Machine Identification

Find the model number and other data for your machine on the machine data plate affixed to the machine. See the figure that follows.

Figure 1: Machine Data Plate



— End of BIUUUF01 —

BIWUUL01 (Published) Book specs- Dates: 20160301 / 20160301 / 20160301 Lang: ENG01 Applic: HD7

## 1.2. General Content of the EC-Declaration of Conformity

Manufacturer: Pellerin Milnor Corporation

Hereby we declare under our sole responsibility that the machinery

Type (see the declaration for your machine)

Serial no (see the declaration for your machine)

Manufacturing date (see the declaration for your machine)

is in conformity with the provisions of

2006/42/EC (17 May 2006) - Machinery

2004/108/EC (15 December 2004) - Electromechanical compatibility

2006/95/EC (12 December 2006) - Low voltage

Pellerin Milnor Corporation certifies that the machine(s) listed above, manufactured in Kenner, Louisiana, 70063, USA conform(s) as stipulated by schedule of verification of

ISO 10472-1:1997 - Safety requirements for industrial laundry machinery - Part 1: Common requirements

ISO 10472-2:1997 - Safety requirements for industrial laundry machinery - Part 2: Washing machines and washer-extractors

ISO 13857:2008 - Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs

EN 61000-6-3:2007/A1:2011 - Emission standard for residential, commercial and light-industrial environments

EN 61000-6-4:2007/A1:2011 - Emission standard for industrial environments

EN 60204-1:2006/A1:2009 - Safety of machinery - Electrical equipment of machines, Part One, General requirements.

Safety compliance to the standard is described in detail in MILNOR manual (see the declaration for your machine).

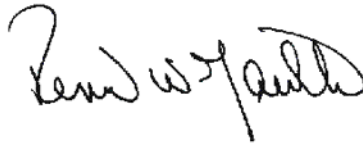
This letter confirms that the machine(s) only meets the required aforementioned standards. It is the responsibility of the installer/owner of the machine(s) to ensure compliance with all requirements for on-site preparation, installation, and operation.

Our conformance to the above listed standards is certified with exceptions listed in MILNOR Conformance Report (see the declaration for your machine).

Place Kenner, Louisiana, 70063, USA

Date of first issue of above mentioned machine type

Signature Kenneth W. Gaulter Engineering Manager



Signature Russell H. Poy Vice President, Engineering



— End of BIWUUL01 —

# Chapter 2

## Safety

BIUUUS27 (Published) Book specs- Dates: 20160301 / 20160301 / 20160301 Lang: ENG01 Applic: HD7

### 2.1. Safety—Divided Cylinder and Staph-Guard® Washer-Extractors

#### 2.1.1. General Safety Requirements—Vital Information for Management Personnel [Document BIUUUS04]

Incorrect installation, neglected preventive maintenance, abuse, and/or improper repairs, or changes to the machine can cause unsafe operation and personal injuries, such as multiple fractures, amputations, or death. The owner or his selected representative (owner/user) is responsible for understanding and ensuring the proper operation and maintenance of the machine. The owner/user must familiarize himself with the contents of all machine instruction manuals. The owner/user should direct any questions about these instructions to a Milnor® dealer or the Milnor® Service department.

Most regulatory authorities (including OSHA in the USA and CE in Europe) hold the owner/user ultimately responsible for maintaining a safe working environment. Therefore, the owner/user must do or ensure the following:

- recognize all foreseeable safety hazards within his facility and take actions to protect his personnel, equipment, and facility;
- work equipment is suitable, properly adapted, can be used without risks to health or safety, and is adequately maintained;
- where specific hazards are likely to be involved, access to the equipment is restricted to those employees given the task of using it;
- only specifically designated workers carry out repairs, modifications, maintenance, or servicing;
- information, instruction, and training is provided;
- workers and/or their representatives are consulted.

Work equipment must comply with the requirements listed below. The owner/user must verify that installation and maintenance of equipment is performed in such a way as to support these requirements:

- control devices must be visible, identifiable, and marked; be located outside dangerous zones; and not give rise to a hazard due to unintentional operation;
- control systems must be safe and breakdown/damage must not result in danger;
- work equipment is to be stabilized;
- protection against rupture or disintegration of work equipment;



- guarding, to prevent access to danger zones or to stop movements of dangerous parts before the danger zones are reached. Guards to be robust; not give rise to any additional hazards; not be easily removed or rendered inoperative; situated at a sufficient distance from the danger zone; not restrict view of operating cycle; allow fitting, replacing, or maintenance by restricting access to relevant area and without removal of guard/protection device;
- suitable lighting for working and maintenance areas;
- maintenance to be possible when work equipment is shut down. If not possible, then protection measures to be carried out outside danger zones;
- work equipment must be appropriate for preventing the risk of fire or overheating; discharges of gas, dust, liquid, vapor, other substances; explosion of the equipment or substances in it.

**2.1.1.1. Laundry Facility**—Provide a supporting floor that is strong and rigid enough to support—with a reasonable safety factor and without undue or objectionable deflection—the weight of the fully loaded machine and the forces transmitted by it during operation. Provide sufficient clearance for machine movement. Provide any safety guards, fences, restraints, devices, and verbal and/or posted restrictions necessary to prevent personnel, machines, or other moving machinery from accessing the machine or its path. Provide adequate ventilation to carry away heat and vapors. Ensure service connections to installed machines meet local and national safety standards, especially regarding the electrical disconnect (see the National Electric Code). Prominently post safety information, including signs showing the source of electrical disconnect.

**2.1.1.2. Personnel**—Inform personnel about hazard avoidance and the importance of care and common sense. Provide personnel with the safety and operating instructions that apply to them. Verify that personnel use proper safety and operating procedures. Verify that personnel understand and abide by the warnings on the machine and precautions in the instruction manuals.

**2.1.1.3. Safety Devices**—Ensure that no one eliminates or disables any safety device on the machine or in the facility. Do not allow machine to be used with any missing guard, cover, panel or door. Service any failing or malfunctioning device before operating the machine.

**2.1.1.4. Hazard Information**—Important information on hazards is provided on the machine safety placards, in the Safety Guide, and throughout the other machine manuals. **Placards must be kept clean so that the information is not obscured. They must be replaced immediately if lost or damaged. The Safety Guide and other machine manuals must be available at all times to the appropriate personnel.** See the machine service manual for safety placard part numbers. Contact the Milnor Parts department for replacement placards or manuals.

**2.1.1.5. Maintenance**—Ensure the machine is inspected and serviced in accordance with the norms of good practice and with the preventive maintenance schedule. Replace belts, pulleys, brake shoes/disks, clutch plates/tires, rollers, seals, alignment guides, etc. before they are severely worn. Immediately investigate any evidence of impending failure and make needed repairs (e.g., cylinder, shell, or frame cracks; drive components such as motors, gear boxes, bearings, etc., whining, grinding, smoking, or becoming abnormally hot; bending or cracking of cylinder, shell, frame, etc.; leaking seals, hoses, valves, etc.) Do not permit service or maintenance by unqualified personnel.

### 2.1.2. Safety Alert Messages—Internal Electrical and Mechanical Hazards [Document BIUUUS11]

The following are instructions about hazards inside the machine and in electrical enclosures.



**WARNING 1: Electrocutation and Electrical Burn Hazards**—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not unlock or open electric box doors.
- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Keep yourself and others off of machine.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.



**WARNING 2: Entangle and Crush Hazards**—Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Keep yourself and others off of machine.
- Know the location of all emergency stop switches, pull cords, and/or kick plates and use them in an emergency to stop machine motion.

### 2.1.3. Safety Alert Messages—External Mechanical Hazards [Document BIUUUS12]

The following are instructions about hazards around the front, sides, rear or top of the machine.



**WARNING 3: Crush Hazards**—Suspended machines only—Spaces between the shell and housing can close and crush or pinch your limbs. The shell moves within the housing during operation.

- Do not reach into the machine housing or frame.
- Keep yourself and others clear of movement areas and paths.

### 2.1.4. Safety Alert Messages—Cylinder and Processing Hazards

[Document BIUUUS13]

The following are instructions about hazards related to the cylinder and laundering process.



**WARNING 4: Crush Hazards**—Contact with the turning cylinder can crush your limbs. The cylinder will repel any object you try to stop it with, possibly causing the object to strike or stab you. The turning cylinder is normally isolated by the locked cylinder door.

- Do not attempt to open the door or reach into the cylinder until the cylinder is stopped.
- Do not place any object in the turning cylinder.
- Do not operate the machine with a malfunctioning door interlock.
- Divided cylinder machines only—Keep yourself and others clear of cylinder and goods during inching or Autospot operation.
- Do not operate the machine with malfunctioning two-hand manual controls.



**WARNING 5: Confined Space Hazards**—Confinement in the cylinder can kill or injure you. Hazards include but are not limited to panic, burns, poisoning, suffocation, heat prostration, biological contamination, electrocution, and crushing.

- Do not attempt unauthorized servicing, repairs, or modification.



**WARNING 6: Explosion and Fire Hazards**—Flammable substances can explode or ignite in the cylinder, drain trough, or sewer. The machine is designed for washing with water, not any other solvent. Processing can cause solvent-containing goods to give off flammable vapors.

- Do not use flammable solvents in processing.
- Do not process goods containing flammable substances. Consult with your local fire department/public safety office and all insurance providers.

## 2.1.5. Safety Alert Messages—Unsafe Conditions [Document BIUUUS14]

### 2.1.5.1. Damage and Malfunction Hazards

#### 2.1.5.1.1. Hazards Resulting from Inoperative Safety Devices



**DANGER 7: Entangle and Sever Hazards**—Cylinder door interlock—Operating the machine with a malfunctioning door interlock can permit opening the door when the cylinder is turning and/or starting the cycle with the door open, exposing the turning cylinder.

- Do not operate the machine with any evidence of damage or malfunction.



**WARNING 8: Multiple Hazards**—Operating the machine with an inoperative safety device can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.



**WARNING 9: Electrocution and Electrical Burn Hazards**—Electric box doors—Operating the machine with any electric box door unlocked can expose high voltage conductors inside the box.

- Do not unlock or open electric box doors.



**WARNING 10: Entangle and Crush Hazards**—Guards, covers, and panels—Operating the machine with any guard, cover, or panel removed exposes moving components.

- Do not remove guards, covers, or panels.

#### 2.1.5.1.2. Hazards Resulting from Damaged Mechanical Devices



**WARNING 11: Multiple Hazards**—Operating a damaged machine can kill or injure personnel, further damage or destroy the machine, damage property, and/or void the warranty.

- Do not operate a damaged or malfunctioning machine. Request authorized service.



**WARNING 12: Explosion Hazards**—Cylinder—A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Do not operate the machine with any evidence of damage or malfunction.



**WARNING 13: Explosion Hazards**—Inner door latches (divided cylinder machines)—A damaged or improperly seated latch can cause the inner door to open during operation, damaging the cylinder and shell. A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Ensure that the inner door is securely latched when loading and unloading.
- Do not operate the machine with any evidence of damage or malfunction.



**WARNING 14: Explosion Hazards**—Clutch and speed switch (multiple motor machines)—A damaged clutch or speed switch can permit the low speed motor to engage during extract. This will over-speed the motor and pulleys and can cause them to rip apart, discharging metal fragments at high speed.

- Stop the machine immediately if any of these conditions occur: • abnormal whining sound during extract • skidding sound as extract ends • clutches remain engaged or re-engage during extract

### 2.1.5.2. Careless Use Hazards

2.1.5.2.1. Careless Operation Hazards—Vital Information for Operator Personnel (see also operator hazards throughout manual)



**WARNING 15: Multiple Hazards**—Careless operator actions can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.
- Do not operate a damaged or malfunctioning machine. Request authorized service.
- Do not attempt unauthorized servicing, repairs, or modification.
- Do not use the machine in any manner contrary to the factory instructions.
- Use the machine only for its customary and intended purpose.
- Understand the consequences of operating manually.

2.1.5.2.2. Careless Servicing Hazards—Vital Information for Service Personnel (see also service hazards throughout manuals)



**WARNING 16: Electrocution and Electrical Burn Hazards**—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of any other overriding standard.



**WARNING 17: Entangle and Crush Hazards**—Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of

any other overriding standard.



**WARNING 18: Confined Space Hazards**—Confinement in the cylinder can kill or injure you. Hazards include but are not limited to panic, burns, poisoning, suffocation, heat prostration, biological contamination, electrocution, and crushing.

- Do not enter the cylinder until it has been thoroughly purged, flushed, drained, cooled, and immobilized.

— End of BIUUUS27 —

BIWUUI06 (Published) Book specs- Dates: 20160301 / 20160301 / 20160301 Lang: ENG01 Applic: HD7

## 2.2. Prevent Damage From Chemical Supplies and Chemical Systems



This document uses Simplified Technical English.  
Learn more at <http://www.asd-ste100.org>.

All Milnor® washer-extractors and CBW® tunnel washers use stainless steel with the AISI 304 specification. This material gives good performance when chemical supplies are correctly applied. If chemical supplies are incorrectly applied, this material can be damaged. The damage can be very bad and it can occur quickly.

Chemical supply companies usually:

- supply chemical pump systems that put the supplies in the machine,
- connect the chemical pump system to the machine,
- write wash formulas that control the chemical concentrations.

The company that does these procedures must make sure that these procedures do not cause damage. **Pellerin Milnor Corporation accepts no responsibility for chemical damage to the machines it makes or to the goods in a machine.**

### 2.2.1. How Chemical Supplies Can Cause Damage

**2.2.1.1. Dangerous Chemical Supplies and Wash Formulas**—Some examples that can cause damage are:

- a very high concentration of chlorine bleach,
- a mixture of acid sour and hypo chlorite,
- chemical supplies (examples: chlorine bleach, hydrofluosilicic acid) that stay on the stainless steel because they are not quickly flushed with water.

The book “Textile Laundering Technology” by Charles L. Riggs gives data about correct chemical supplies and formulas.

**2.2.1.2. Incorrect Configuration or Connection of Equipment**—Many chemical systems:

- do not prevent a vacuum in the chemical tube (for example, with a vacuum breaker) when the pump is off,
- do not prevent flow (for example, with a valve) where the chemical tube goes in the machine.

Damage will occur if a chemical supply can go in the machine when the chemical system is off. Some configurations of components can let the chemical supplies go in the machine by a siphon (Figure 2). Some can let chemical supplies go in the machine by gravity (Figure 3).

Figure 2: Incorrect Configurations That Let the Chemical Supply Go In the Machine by a Siphon

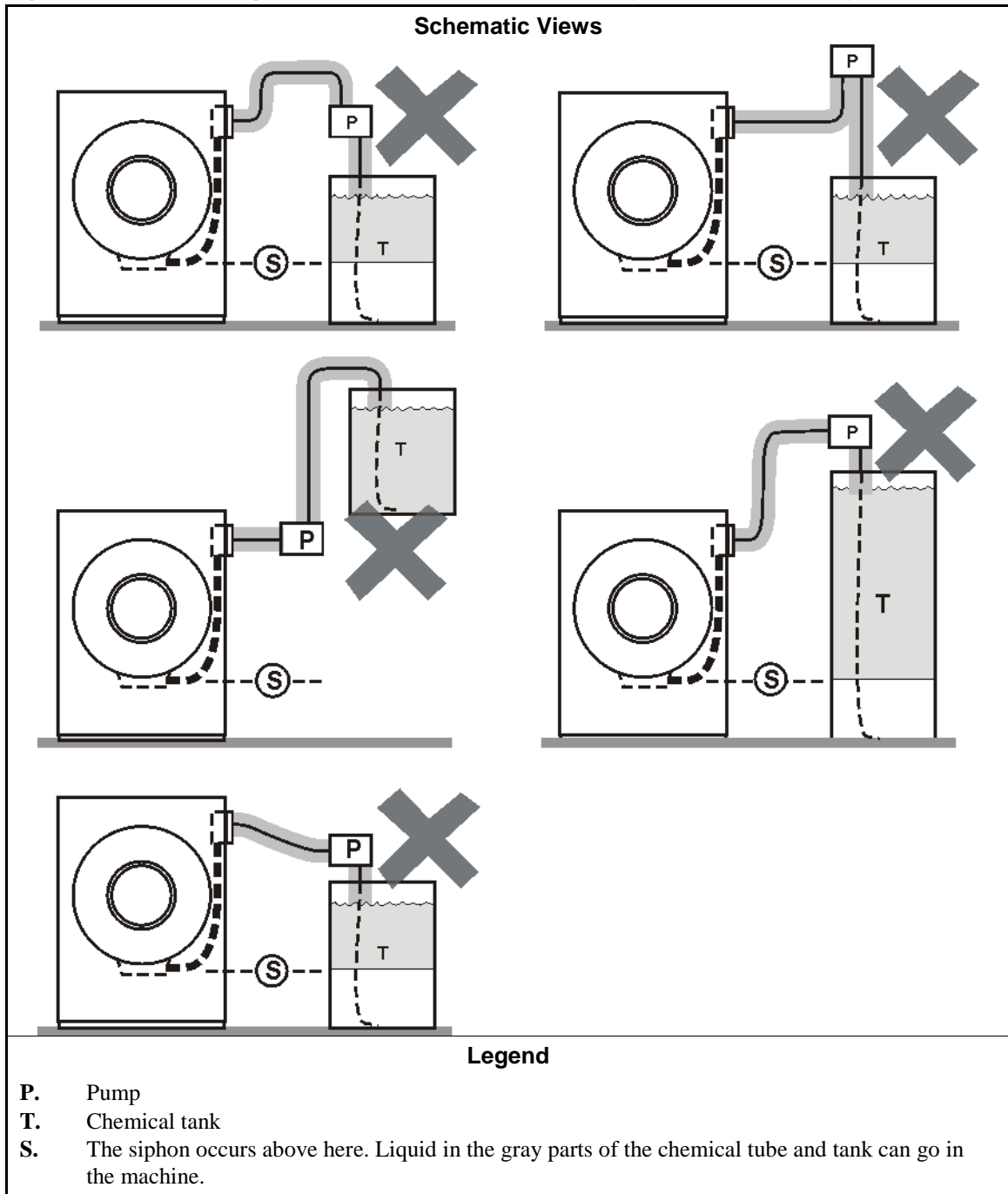
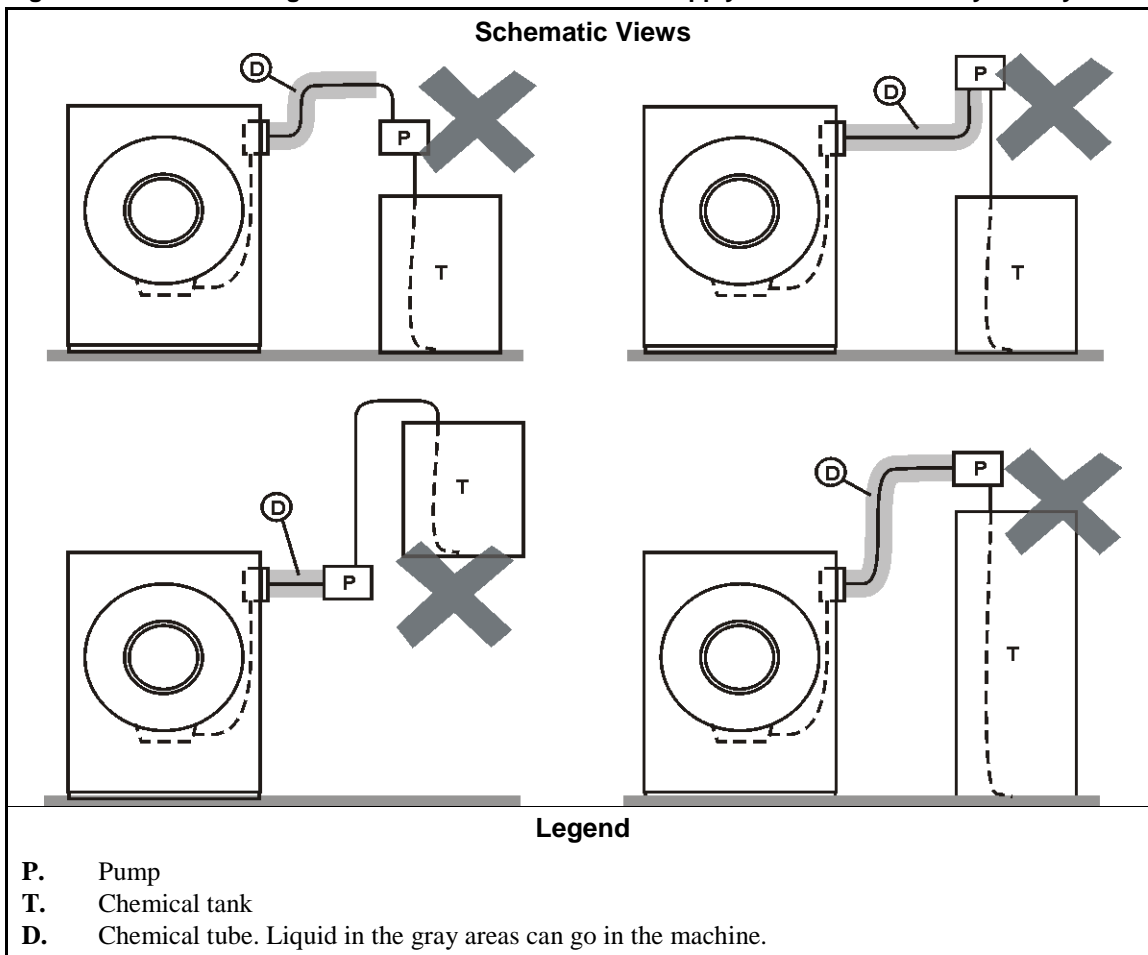


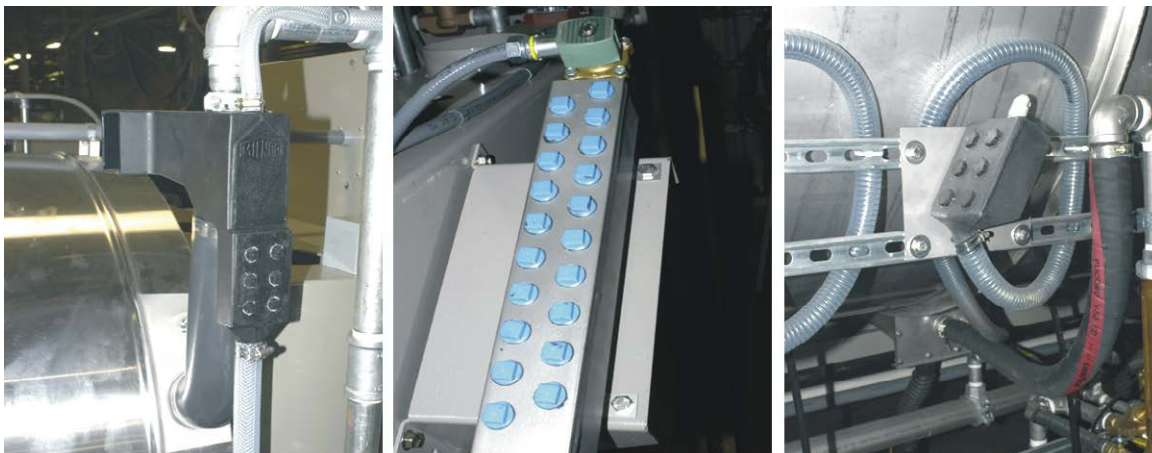
Figure 3: Incorrect Configurations That Let the Chemical Supply Go In the Machine by Gravity



## 2.2.2. Equipment and Procedures That Can Prevent Damage

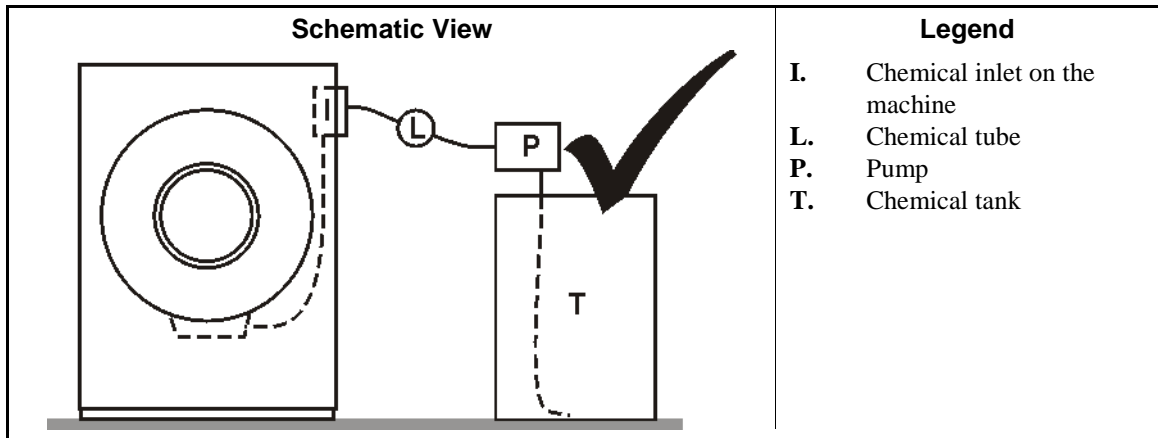
2.2.2.1. **Use the Chemical Manifold Supplied.**—There is a manifold on the machine to attach chemical tubes from a chemical pump system. Figure 3 shows examples. The manifold has a source of water to flush the chemical supplies with water.

Figure 4: Examples of Manifolds for Chemical Tubes. Your equipment can look different.



- 2.2.2.2. Close the line.**—If the pump does not always close the line when it is off, use a shutoff valve to do this.
- 2.2.2.3. Do not let a vacuum occur.**—Supply a vacuum breaker in the chemical line that is higher than the full level of the tank.
- 2.2.2.4. Flush the chemical tube with water.**—If the liquid that stays in the tube between the pump and the machine can flow in the machine, flush the tube with water after the pump stops.
- 2.2.2.5. Put the chemical tube fully below the machine inlet.**—It is also necessary that there is no pressure in the chemical tube or tank when the system is off. [Figure 5](#) shows this configuration.

**Figure 5: A Configuration that Prevents Flow in the Machine When the Pump is Off (if the chemical tube and tank have no pressure)**



- 2.2.2.6. Prevent leaks.**—When you do maintenance on the chemical pump system:
- Use the correct components.
  - Make sure that all connections are the correct fit.
  - Make sure that all connections are tight.

— End of BIWUUI06 —



# Chapter 3

## Routine Maintenance

BIUUUM09 (Published) Book specs- Dates: 20160301 / 20160301 / 20160301 Lang: ENG01 Applic: HD7

### 3.1. Routine Maintenance—72-series, Divided Cylinder Washer-extractor



This document uses Simplified Technical English. Learn more at <http://www.asd-ste100.org>.

Do the maintenance in [Section 3.1.2 “Maintenance Summary”](#) to make sure that the machine is safe, keeps the warranty, and operates correctly. This will also decrease repair work and unwanted shutdowns. Speak to your dealer or Milnor if repairs are necessary.



**WARNING** 21: **Risk of severe injury**—Mechanisms can pull in and mutilate your body.

- You must be approved by your employer for this work.
- Use extreme care when you must examine components in operation. Remove power from the machine for all other work. Obey safety codes. In the USA, this is the OSHA lockout/tagout (LOTO) procedure. More local requirements can also apply.
- Replace guards and covers that you remove for maintenance.

#### 3.1.1. How To Show the Maintenance On a Calendar

If you use software to keep the maintenance schedule for your plant, add the items in [Section 3.1.2](#) to that schedule. If not, you can put marks on a calendar that work with the tables in [Section 3.1.2](#). The marks are the numbers 2, 3, 4, 5, and 6. It is not necessary to show the number 1 (items you do each day) on the calendar. The number 2 = items you do each 40 to 60 hours, 3 = each 200 hours, 4 = each 600 hours, 5 = each 1200 hours, and 6 = each 2400 hours. These are the "Mark" numbers at the top of the narrow columns on the left of each table in [Section 3.1.2](#).

[Table 1](#) shows where to put the marks on a calendar. For example, if your machine operates between 41 and 60 hours each week, the first three marks are 2, 2, and 3. Put these marks on the first, second, and third weeks after the machine starts operation. If you do routine maintenance on a given day of the week, put the mark on that day of each week. Continue to put marks on the subsequent weeks. **It can be necessary to do the 40 to 60 hour (2) maintenance more than one time each week.** If the machine operates between 61 and 100 hours, put a 2 on two days of the week. If the machine operates 101 or more hours, put a 2 on three days of the week.

On each date with a 3, do the items with an x in the 3 or the 2 column of each table in [Section 3.1.2](#). On each date with a 4, do the items with an x in the 4, 3, or 2 column. Continue this pattern.

**Table 1: Where to Put Marks On a Calendar**

Hours / Week	Week Number																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Up to 40	2	2	2	2	3	2	2	2	2	3	2	2	2	2	4	2	2	2	2	3	2	2	2	2	3	2	2	2	2	5
41 - 60	2	2	3	2	2	2	3	2	2	4	2	2	3	2	2	2	3	2	2	5	2	2	3	2	2	2	3	2	2	4
61 - 80	2	2	3	2	3	2	4	2	2	3	2	2	3	2	5	2	3	2	2	3	2	4	2	2	3	2	2	3	2	6
81 - 100	2	3	2	3	2	4	2	3	2	3	2	5	2	3	2	3	2	4	2	3	2	3	2	6	repeat					
101 - 120	2	3	2	3	4	2	3	2	3	5	2	3	2	3	4	2	3	2	3	6	repeat									
121 - 140	2	3	2	3	4	3	2	3	5	2	3	2	3	4	3	2	3	6	repeat											
Hours / Week	Week Number, continued																													
	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Up to 40	2	2	2	2	3	2	2	2	2	3	2	2	2	2	4	2	2	2	2	3	2	2	2	2	3	2	2	2	6	
41 - 60	2	2	3	2	2	2	3	2	2	6	repeat																			

**3.1.2. Maintenance Summary**

The tables in this section give the routine maintenance items for your machine. Each table is for one type of procedure (example: apply grease to bearings and bushings). The top of the table gives the general procedure. The "More Data" column gives special instructions if necessary.

\* If the machine operates more than 12 hours each day, do the "day" items two times each day. Do the other items at the given hours or on the days that you show on a calendar (see Section 1). **Do all items in all tables for the maintenance intervals that apply (for example, day, 40 to 60 hours, and 200 hours).**

**Tip:** The sections that follow the maintenance summary give more data about the maintenance items. After you know this data, it is only necessary to look at the summary to do the maintenance.

**Table 2: Guards and Related Components**

<b>Examine. If a component is damaged, missing, or not set, correct this immediately to prevent injury.</b>								
Mark						Do this each	Component	More Data
1	2	3	4	5	6			
x						day*	guards, covers	Speak to your dealer or Milnor for replacement components.
x						day*	safety placards	
		x				200 hours	fasteners	Fasteners must be tight.
		x				200 hours	anchor bolts and grout	Grout must be good. Bolts must be tight.
x						day*	door interlock	If the machine operates with the door open: Immediately remove power. Do not permit operation. Speak to your dealer or Milnor.
x						day*	emergency stop mechanism	See <a href="#">Supplement 3</a> . Do a test of the control.
			x			600 hours	mechanical brake	See <a href="#">Supplement 7</a> . Do a test of the mechanical brake. If it does not operate correctly, repairs are necessary. Speak to your dealer or Milnor. This is not routine maintenance.

Table 3: Filters, Screens, and Sensitive Components

Remove contamination from these components to prevent damage and unsatisfactory performance.								
Mark						Do this each	Component	More Data. See also <a href="#">Section 3.1.3</a> “How to Remove Contamination”
1	2	3	4	5	6			
	x					40 to 60 hours	inverter fans, vents, filters	See <a href="#">Figure 8</a> . Keep good air flow.
			x			600 hours	motors	Keep good air flow.
					x	2400 hours	entire machine	Remove excessive dust and dirt.
x						day*	chemical inlet areas	Some chemical supplies that stay on machine surfaces will cause corrosion damage. See <a href="#">Figure 9</a> and <a href="#">Section 2.2</a> . “Prevent Damage From Chemical Supplies and Chemical Systems”
					x	2400 hours	strainer in water regulator for optional supply injector and pumped chemicals on some models.	See <a href="#">Figure 10</a>
		x				200 hours	strainer(s) for air inlet	See <a href="#">Figure 13</a>
		x				200 hours	strainer for steam inlet. (Steam is optional on some models.)	See <a href="#">Figure 12</a>
					x	2400 hours	proximity switches	See <a href="#">Figure 15</a>
	x					40 to 60 hours	breather for bearing housing—front and rear	See <a href="#">Figure 16</a>
		x				200 hours	grease relief ports—front and rear	See <a href="#">Figure 16</a>

**Table 4: Fluid Containers**

<b>Examine. Add fluid if necessary and keep components clean to prevent damage.</b>								
<b>Mark</b>						<b>Do this each</b>	<b>Component</b>	<b>More Data. See also Section 3.1.4 “Lubricant Identification and Procedures”</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>			
			x			600 hours	Hydrocushion™ cylinders	See <a href="#">Supplement 6</a> and <a href="#">Figure 21</a> . Examine the oil quality. Remove the used oil if contaminated. Add the oil given below to the height of the fill port.
					x	2400 hours		Remove the used oil. Add oil to the height of the fill port. Add the type of oil that applies to your machine type ( <a href="#">Table 10</a> ). 42044_, 60044_, 72044_ = oil 1030 M7_ centrifugal extractor = oil 220 M9_ centrifugal extractor = oil 32
		x				200 hours	Disk brake reservoir	See <a href="#">Figure 22</a> . Examine the oil level and quality. Add oil Dot3 ( <a href="#">Table 10</a> ) if necessary. If the oil is contaminated, it is necessary to bleed the brake system. Speak to your dealer or Milnor. This is not routine maintenance.
<b>72044SP2 and 72044WP2 models only. For the next three items, see <a href="#">Figure 19</a></b>								
						first 100 hours	speed reducer (gear reducer)	Remove used oil. Add oil 220 ( <a href="#">Table 10</a> ). See <a href="#">Section 3.1.4.3</a>
			x			1200 hours		Add oil 220 ( <a href="#">Table 10</a> ) if necessary.
					x	2400 hours		Remove used oil. Add oil 220 ( <a href="#">Table 10</a> ).

**Table 5: Components that Become Worn**

<b>Examine. Tighten or replace if necessary, to prevent shutdowns and unsatisfactory performance. Speak to your dealer for replacement parts</b>								
<b>Mark</b>						<b>Do this each</b>	<b>Component</b>	<b>More Data</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>			
		x				200 hours	drive belts and pulleys	See <a href="#">Supplement 1</a> and <a href="#">Figure 7</a>
		x				200 hours	tubes and hoses	Examine hoses and hose connections for leaks.
		x				200 hours	cylinder door latches	These components must be serviceable for safe operation. See <a href="#">Figure 18</a>
		x				200 hours	Staph barriers—Staph Guard® models only: internal barrier, flapper valve, and barrier around machine (by others)	These components must be serviceable to prevent air movement from the soil side to the clean side. See <a href="#">Figure 20</a>

**Table 6: Bearings and Bushings. See Table 7 for Motors.**

Apply grease to these components to prevent damage.								
Mark						Do this each	Component	More Data. See also Section 3.1.4 “Lubricant Identification and Procedures”
1	2	3	4	5	6			
		x				200 hours	top and bottom ball bushings, each Hydrocushion	See Figure 21. See also Figure 16. Add 0.12 oz (3.6 mL) of grease EPLF2 (Table 10)
<b>See Figure 16 for these drive maintenance items. All items take grease EPLF2 (Table 10).</b>								
		x				200 hours	drive bearings—two places (front and rear)	Add 0.37 oz (11 mL)
		x				200 hours	bearing seals—two places (front and rear)	Add 0.12 oz (3.6 mL)
		x				200 hours	jackshaft bearings (3 places)	Add 0.12 oz (3.6 mL)
		x				200 hours	idler shaft bearings on Staph Guard® models only—two places	Add 0.31 oz (9.2 mL)
		x				200 hours	bearing seal for disk brake assembly on idler shaft—60044SP2 and 72044SP2 only	Add 0.12 oz (3.6 mL)
		x				200 hours	brake band bushings—two places—60044WP2 and 72044WP2 only	Add 0.06 oz (1.8 mL)
<b>See Figure 17 for these door maintenance items. On Staph Guard® models, these items apply to soil side and clean side doors.</b>								
		x				200 hours	door hinge—60044SP2, 72044SP2 and 3-pocket models	Add 0.12 oz (3.6 mL) of grease EPLF2 (Table 10).
						none	door hinge—60044WP2 and 72044WP2 (Rapid Load™) models	no door hinge grease maintenance necessary
		x				200 hours	door latch plunger	Apply stick DE3 (Table 10) to surface.

**Table 7: Motor Grease Schedule. Use the data in Section 3.1.4.2 to complete this table.**

Motor Identification (example: main drive)	Interval		Quantity		Dates When Grease is Added							
	Years	Hours	fl oz	mL								

**Table 8: Mechanisms and Settings**

Make sure mechanisms are serviceable and settings are correct to prevent unsatisfactory performance.								
Mark						Do this each	Component	More Data
1	2	3	4	5	6			
					x	2400 hours	controller circuitry	Examine wiring and connections in electrical boxes. Look for corrosion, loose connections. See <a href="#">Section 3.1.3</a>
		x				200 hours	water pressure regulator for optional supply injector	See <a href="#">Figure 10</a> . Value: 28 PSI (193 kPa).
		x				200 hours	compressed air mechanisms	See <a href="#">Supplement 2, Figure 14</a>
		x				200 hours	bath level sensor that uses air pressure	Examine the air tube and connections. See <a href="#">Figure 11</a>
			x			600 hours	push-down system that uses compressed air	Look at the shell when the machine operates to make sure there is no irregular movement of the shell. See <a href="#">Supplement 5</a>
			x			600 hours	door seal system that uses compressed air	Look at the doors when the machine operates to make sure there is no evidence of a door leak. See <a href="#">Supplement 4</a>

### 3.1.3. How to Remove Contamination

**Table 9: Contamination Types, Cleaning Agents, and Procedures**

Material or Component	Usual Contamination	Example	Cleaning Agent	More Data
machine housing	dust, dirt	—	compressed air or shop vacuum	Air—no more than 30 psi (207 kpa). Do not push dust in mechanisms.
fans and vents on electrical components	dust	motors, inverters, braking resistors	shop vacuum, soft bristle brush, canned air for electrical components	Do not push dust in mechanisms.
electric box interior	dust	all electric boxes		
electrical connections	corrosion, varnish	spade connector, molex connector, plug-in relay	spray solvent for electrical components	Disconnect then connect it again. Use solvent if the bad connection continues.
electronic sensors	dust	photoeye lens, reflector, laser, proximity switch, temperature probe	none	Use a clean, soft, dry cloth.
	dirt		warm water with soap, then water flush	Use clean, soft cloths.
stainless steel	chemical spill	shell, supply injector	water	Use a hose to flush the chemical supply from the surface fully. Do not get water on electrical components or mechanisms.
300 series stainless steel	chemical corrosive attack	shell interior, cylinder	pickling and passivation	Speak to your dealer or Milnor. This is not routine maintenance.
painted metal, unpainted aluminum	dust, dirt, grease	frame members	warm water with soap, then water to flush	Use clean cloths. Do not get water in electrical components.
rubber	dirt, oil, grease	drive belts, hoses	warm water with soap, then water to flush	Use clean cloths. Flush fully. Oil or soap must not stay on drive belts. Make sure that drive belts are serviceable.
clear plastic, acrylic	discoloration (yellowing)	compressed air filter bowl, visual flow meter	warm water with soap, then water to flush, then acrylic cleaner. Do not use ammonia.	Use only the necessary cleaning agents. Wash and rinse with clean, soft cloths. Follow instructions on acrylic cleaner.
glass	discoloration (yellowing)	door glass, site glass	ammonia and water solution and water rinse then acetone	Use clean, soft cloths. Use only the necessary cleaning agents. If necessary, soak in cleaner.
soft air filter, lint filter,	dust, lint	on inverter electric box door, in air line filter bowl, in dryers	shop vacuum	Replace the used with a new filter when the vacuum cannot remove contamination.
rigid strainers, screens for water, steam	mineral particles	in water line, y-strainer	water	Use a rigid bristle brush. Flush with a flow of water.
rigid strainers, screens for oil	metal shavings	in hydraulic line	carburetor cleaner or equivalent solvent	Soak. Use a rigid bristle brush.
steel drive components	dirt, hardened lubricant	bearings, roller chains, sprockets, gears	carburetor cleaner or equivalent solvent	Soak. Use a cloth or soft bristle brush.

### 3.1.4. Lubricant Identification and Procedures

**Table 10** identifies the lubricant for each lubricant code given in the maintenance summary. Get these or equivalent lubricants from your local lubricant supplier.

When you add grease, always use the procedures given in [Section 3.1.4.1](#). When you add grease to motors, also use the procedures given in [Section 3.1.4.2](#).



**CAUTION 22: Risk of damage**—Bad lubricant will decrease the life of components.

- Make sure that all equipment and fittings used to apply lubricants are clean.
- Use only the given lubricants or equivalent lubricants that have the same specifications.

**Table 10: Lubricant Identification**

Code	Type	Trademark Name	Application Example
EM	grease	Mobil Polyrex EM or as given on the motor nameplate	motor bearings
EPLF2	grease	Shell Alvania EP (LF) Type 2	drive shaft bearings and bushings, ball joints, chain drives
DOT3	oil	NAPA SuperHeavy Duty Brake Fluid DOT 3	disk brakes
220	oil	Shell Morlina 220	small bearing housings, gear reducers, Hydrocushions™, isolators
1030	oil	Shell Rotella T 10W30	Hydrocushions™, isolators
DE3	stick	AGS Door-Ease DE-3	door latch plunger

#### 3.1.4.1. Grease Gun Procedures



**CAUTION 23: Risk of damage**—Hydraulic pressure can push out seals and push grease into unwanted areas (example: motor windings).

- Use a hand grease gun. A power grease gun gives too much pressure.
- Know the quantity of grease your grease gun gives each cycle (each stroke).
- Operate the grease gun slowly (10 to 12 seconds for one cycle).
- Add only the specified quantity. Stop if new grease come out of a drain port or other opening.
- Remove spilled grease from belts and pulleys.

The tables give grease quantities in fluid ounces (fl oz) and milliliters (mL). You can also use grease gun cycles (strokes). A cycle is each time that you pull the trigger. One cycle is usually approximately 0.06 fl oz (1.8 mL). Your grease gun can give more or less than this. Measure the output of your grease gun as follows:

1. Make sure that the grease gun operates correctly.
2. Operate the grease gun to put grease into a small container with fluid ounce or milliliter increments. Pull the trigger fully and slowly.
3. Add a sufficient quantity of grease to measure accurately. Count the number of cycles of the grease gun (the number of times that you pull the trigger).
4. Calculate the quantity for each cycle of the grease gun.

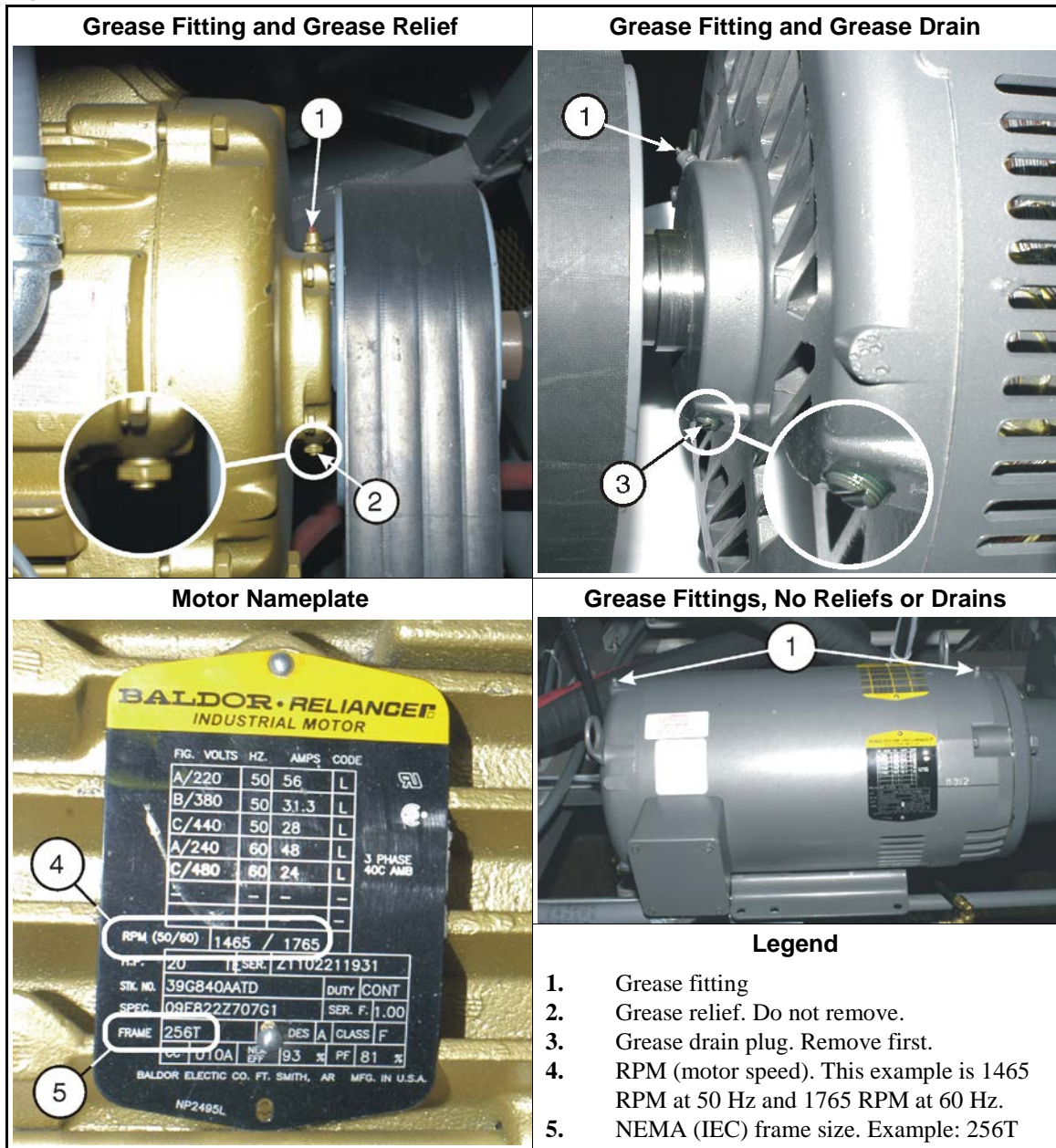
*Example: 2 fl oz / 64 cycles = 0.031 fl oz for each cycle*

*Example: 59 mL / 64 cycles = 0.92 mL for each cycle*



**3.1.4.2. Procedures for Motors**—If a motor on your machine does not have grease fittings, no grease maintenance is necessary. If a motor on your machine has grease fittings, it is necessary to add grease. But the interval is usually longer than for other maintenance. [Table 11](#) gives motor grease intervals and quantities for motors with specified frame sizes and speeds. You get this data from the motor nameplate. Use [Table 7 in Section 3.1.2](#) to record the data for the motors on your machine.

**Figure 6: Motor Grease Maintenance Conditions**



**CAUTION 24: Risk of damage**—You can push grease into the windings and burn out the motor if you fail to remove the grease drain plugs.

- If the motor has grease drain plugs, remove them before you add grease. If the motor has grease relief fittings, it is not necessary to remove them.

Apply grease as follows:

1. Operate the machine or use manual functions to operate the motor until it is warm.
2. Remove power from the machine.
3. If the motor has grease drain plugs, remove them. See [caution statement 24](#) .
4. Add grease EM ([Table 10](#)) with the motor stopped. If the motor with the nameplate in [Figure 6](#) operates at 60 Hz, the specified grease quantity for each grease fitting is 0.65 fl oz (18.4 mL).
5. If the motor has a grease drain plugs, operate the machine or use manual functions to operate the motor for two hours. Replace the drain plug.

**Table 11: Motor Grease Intervals and Quantities. Use grease EM ([Table 10](#))**

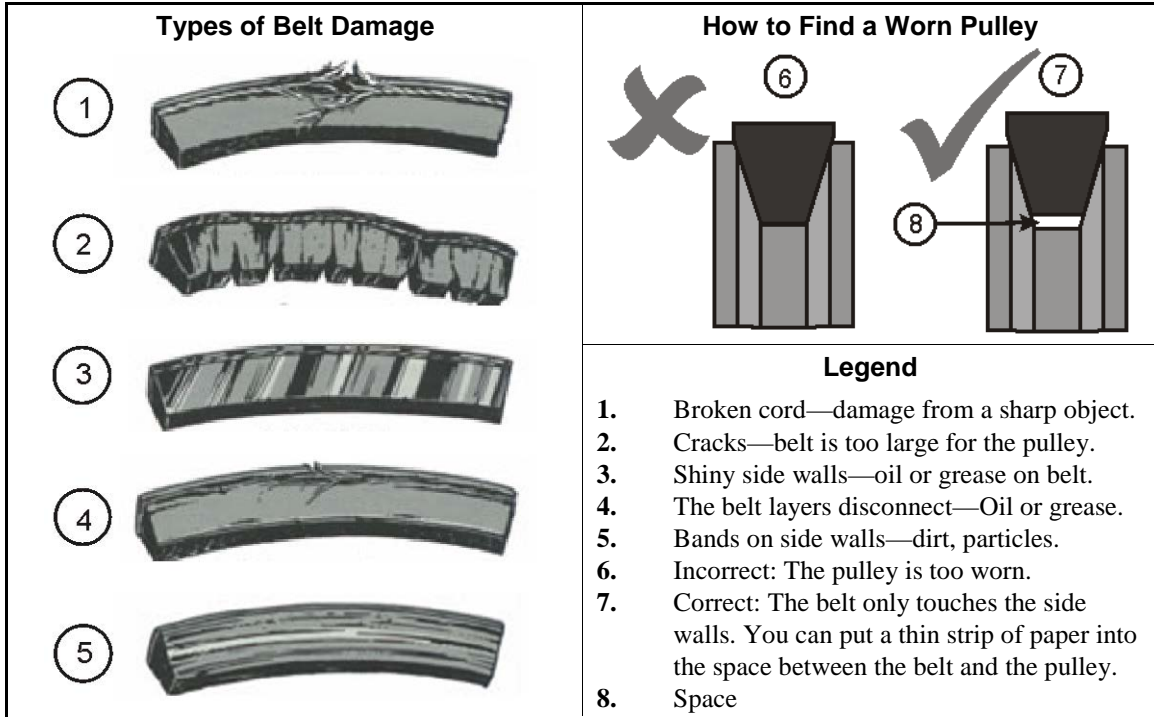
On Motor Nameplate (see <a href="#">Figure 6</a> )		Interval		Quantity	
NEMA (IEC) Frame Size	RPM Less Than or Equal To	Years	Hours	Fluid Ounces	mL
Up to 210 (132)	900	5.5	11000	0.34	9.5
	1200	4.5	9000		
	1800	3	6000		
	3600	1.5	3000		
>210 to 280 (132 to 180)	900	4.5	9000	0.65	18.4
	1200	3.5	7000		
	1800	2.5	5000		
	3600	1	2000		
>280 to 360 (180 to 200)	900	3.5	7000	0.87	24.6
	1200	3	6000		
	1800	2	4000		
	3600	0.5	1000		
>360 to 5000 (200 to 300)	900	2.5	5000	2.23	63.2
	1200	2	4000		
	1800	1	2000		
	3600	0.5	1000		

**3.1.4.3. First Time Oil Procedure for Speed Reducers (Gear Reducers)**—The oil in a speed reducer can deteriorate faster when this mechanism is new. Replace the oil in the speed reducer after the first 100 hours of operation. Do this maintenance one time, in addition to the periodic oil maintenance given in the table for fluid containers in the maintenance summary.

### 3.1.5. Maintenance Components—Machines and Controls Group

[Document BIUUUM10]

Figure 7: Belt and Pulley Conditions To Look For. See [Supplement 1](#).



#### Supplement 1

##### How to Examine Belts and Pulleys

###### With power removed:

- Look for dirt, dust, oil, and grease. Remove contamination.
- Look for belt damage as shown in [Figure 7](#).
- Look for worn pulleys as shown in [Figure 7](#).

###### With the machine in operation—Do not touch the machine. Look and listen:

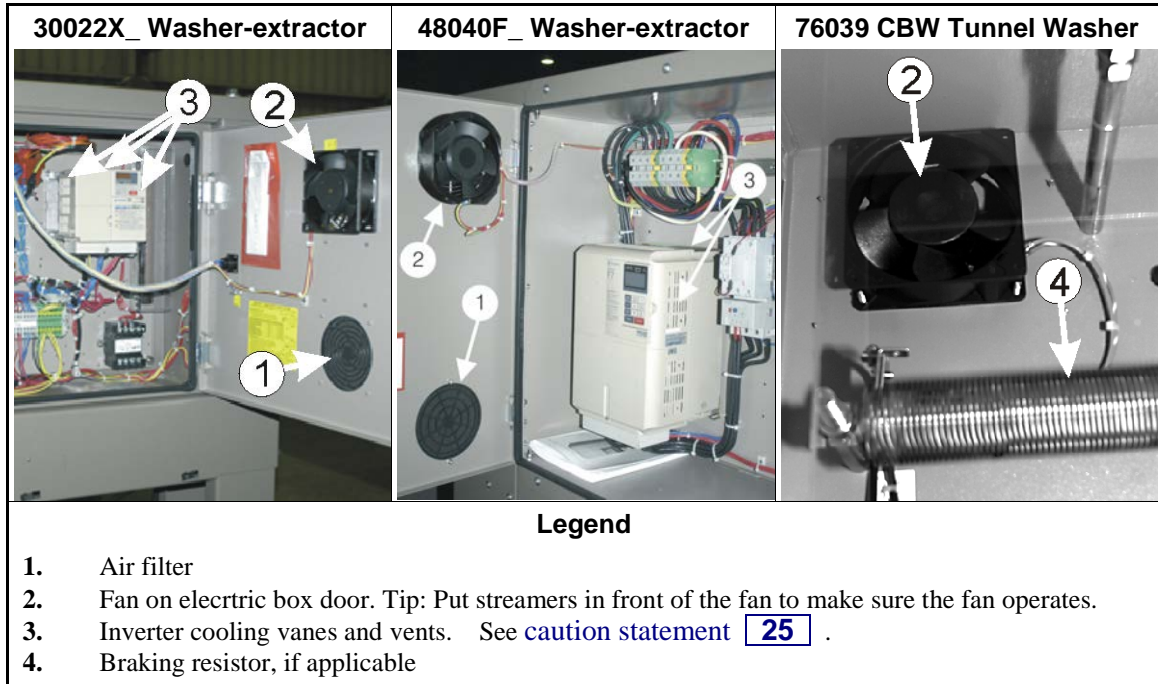
- A belt can have some vibration and not cause damage. It is necessary to correct this condition only if the vibration is large.
- A belt must have sufficient tension that there is no slippage on the pulley during operation. If slippage occurs, you can usually tell from the noise.

**About Component Replacement and Tension Adjustment**—Correct adjustment is very important to the service life of components and operation of the machine. Your Milnor dealer can do this work. If you know how to do this work (for example, correctly align belts and pulleys), and you want to do it, speak to your dealer or Milnor for part numbers. Replace worn components before you make tension adjustments.

- Machines that use rods with full threads and nuts to hold the position of the motor base—Turn the nuts on the rods as necessary to adjust tension. Tighten the nuts.

- Machines that use a spring to hold tension on the motor base—Use the belt tension sleeve supplied with the machine. Put the sleeve on the rod that the spring is attached to or remove the sleeve to increase or decrease tension. Replace the spring if necessary.

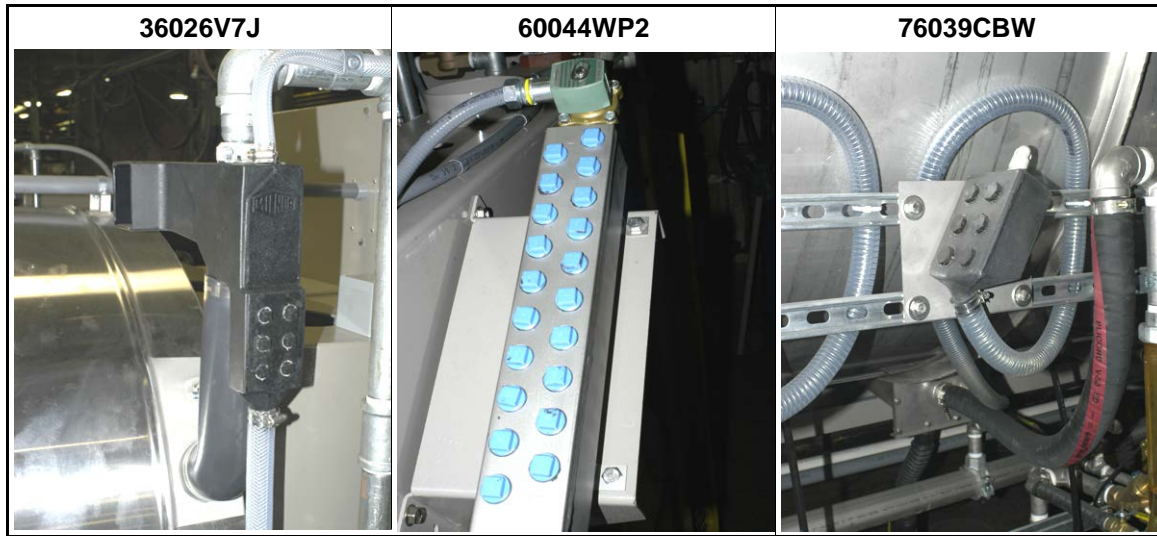
Figure 8: Electric Box and Inverter. These are examples. Your machine can look different.



**CAUTION 25: Risk of damage**—The inverter will burn out without sufficient airflow.

- Keep fans, filter, vents, and braking resistors clean.

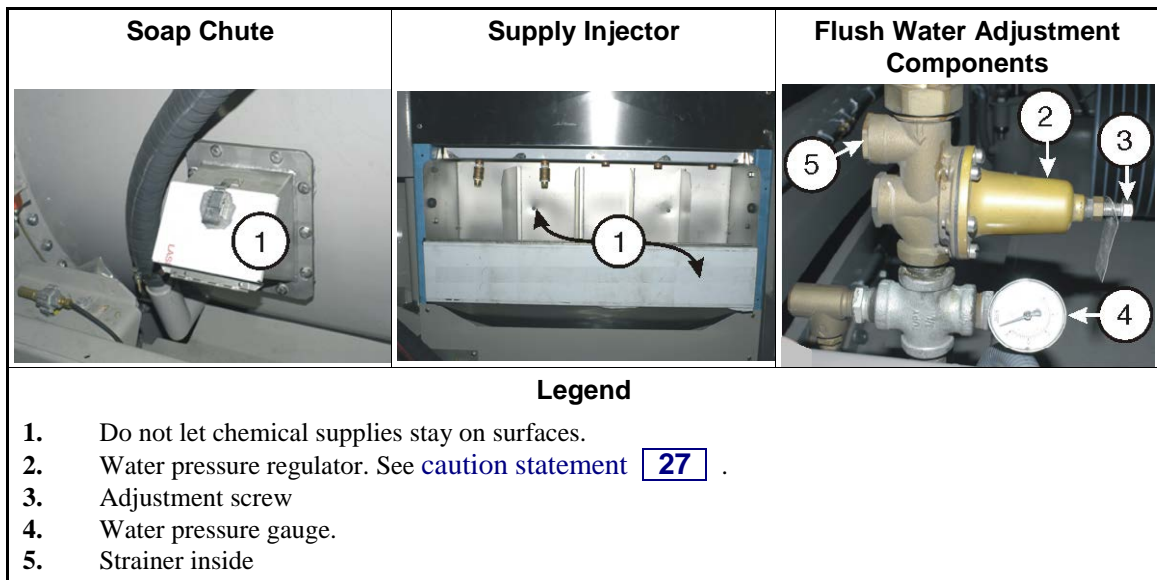
**Figure 9: Chemical Inlet Manifolds for Chemical Pump Systems.** See [caution statement 26](#) . These are examples. Your machine can look different.



**CAUTION 26: Risk of corrosion damage to the machine and the goods—**

- Connect chemical tubes only to chemical manifold inlets.
- Stop leaks. Remove leaked supplies from surfaces.
- Speak to your dealer or Milnor if you see corrosion damage.

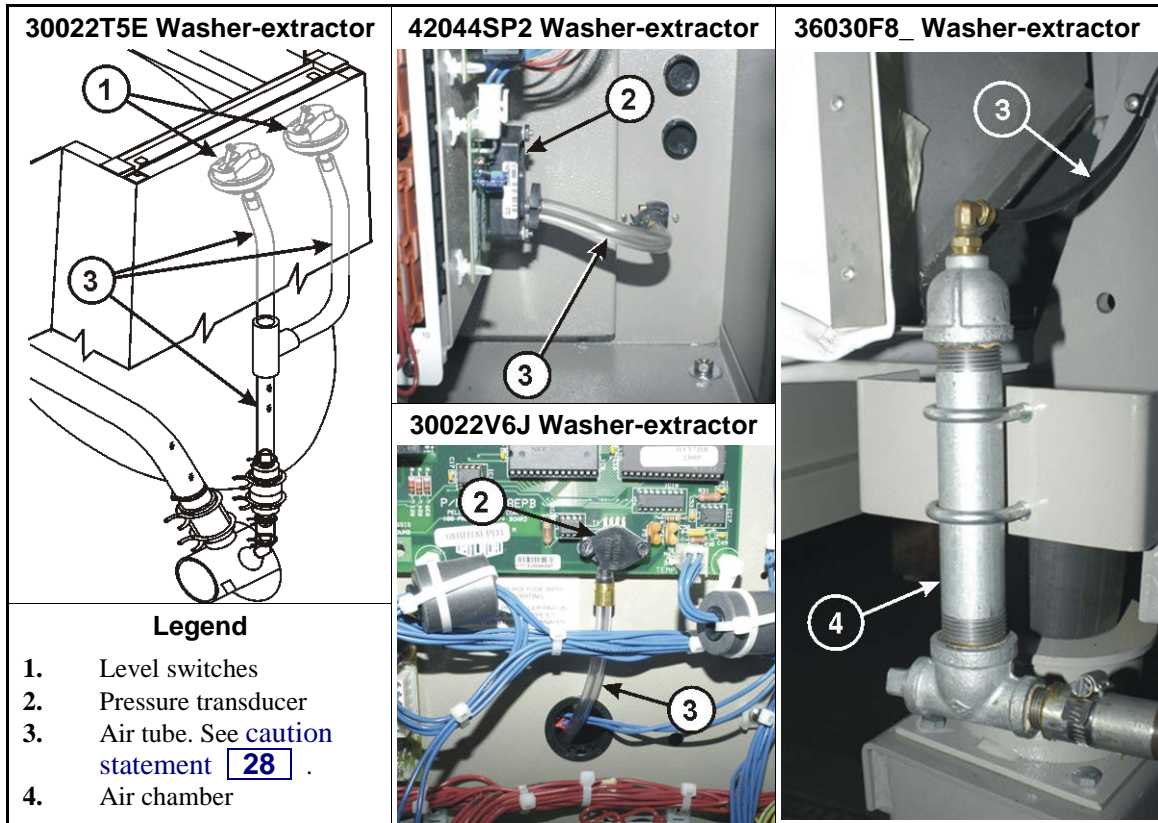
**Figure 10: Soap Chute and Optional 5-compartment Supply Injector.** These are examples. Your machine can look different.



**CAUTION 27: Risk of injury and damage—**Chemical supplies can splash on personnel and machine surfaces if water pressure is too high.

- Make sure the pressure is set as told in the maintenance summary.

Figure 11: Air Tube for the Water Level Sensor. These are examples. Your machine can look different.



**CAUTION 28: Risk of malfunction**—The level sensor must give correct data.

- Keep the connecting tube or hose free of blockages and leaks.
- Make sure that the connections are tight.

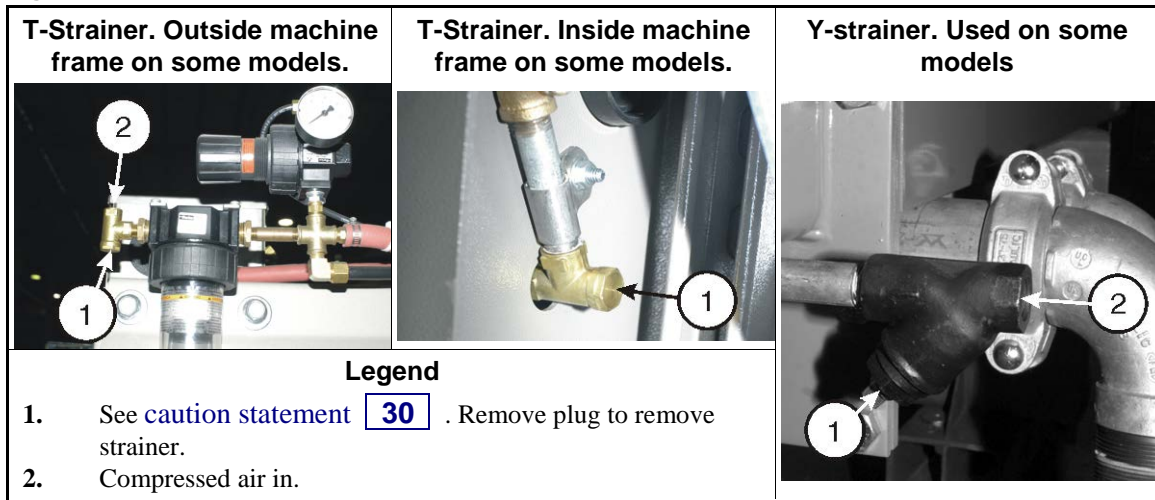
Figure 12: Steam Inlet Strainer. These are examples. Your machine can look different.



**WARNING 29: Risk of severe injury**—You can accidentally release pressurized steam.

- Close the external shutoff valve and release remaining pressure before you do maintenance.

**Figure 13: Compressed Air Inlet Strainers. These are examples. Your machine can look different.**



**CAUTION 30: Risks of injury and damage—**

- Close the external shutoff valve and release remaining pressure before you do maintenance.

**Supplement 2**

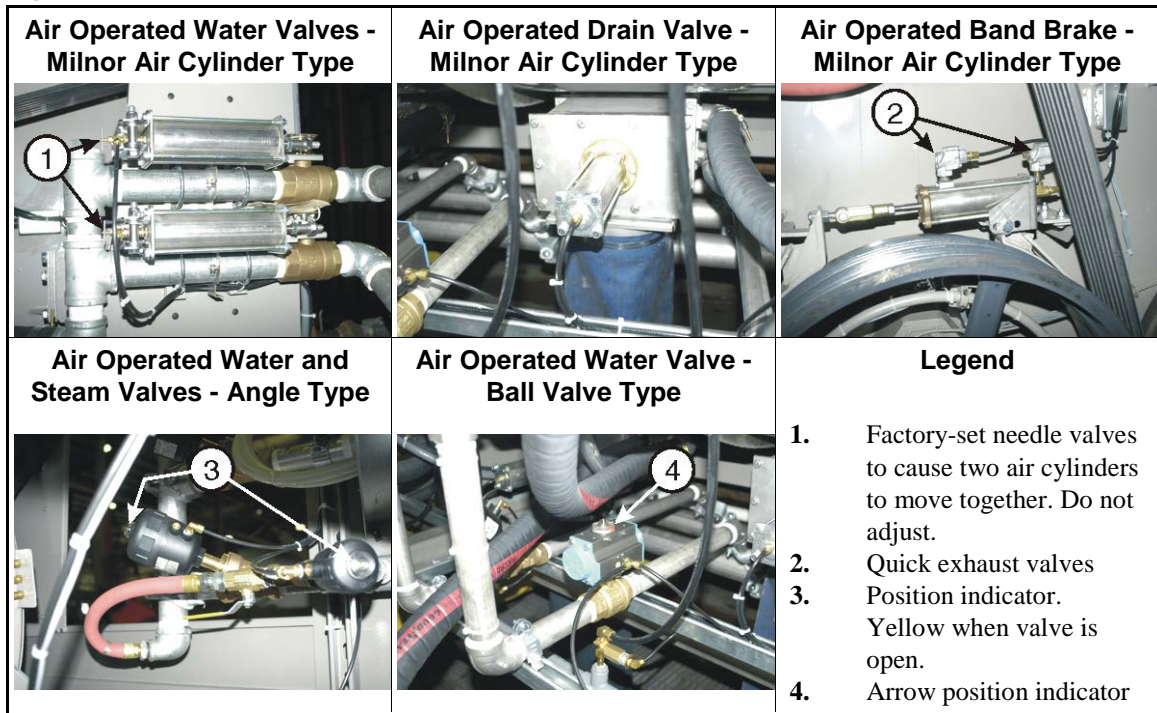
**How to Examine Compressed Air Mechanisms**

Your machine has one or more mechanisms that use compressed air for movement. [Figure 14](#) shows some examples. To examine a compressed air mechanism, look at the mechanism and listen to it in operation. **Do not touch the mechanism or put your hand in the machine.** Usually you can see movement directly or on a position indicator. Frequently, you can hear a valve open and close. When a signal from the controller to operate the mechanism occurs, the air pressure must increase sufficiently before movement occurs. When the signal stops, the system must release the compressed air. You can usually hear the sound of the exhaust air for a short time.

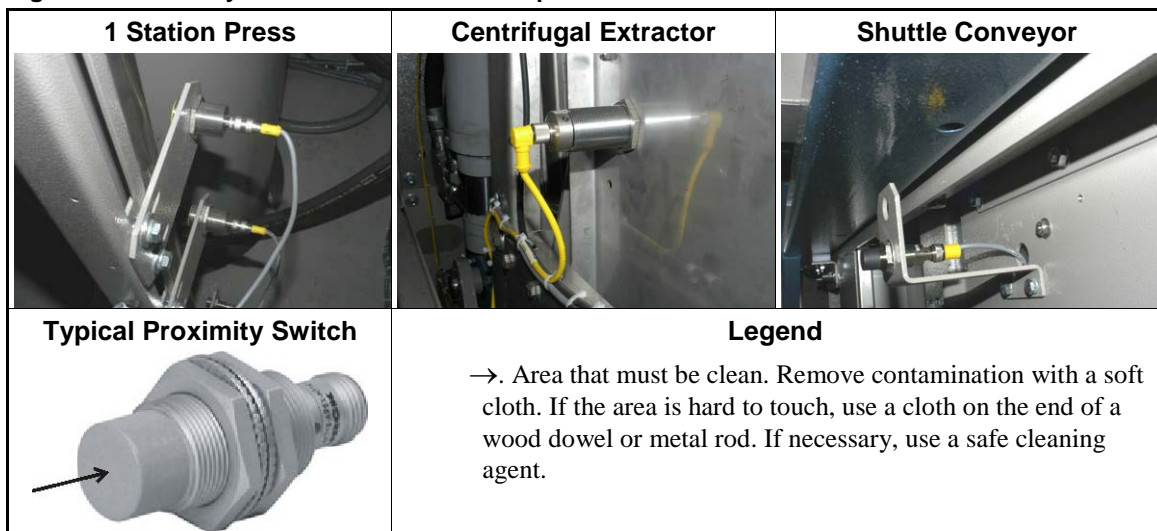
When a compressed air mechanism operates correctly, its time of movement is usually less than two seconds. The movement is smooth. It does not shake, change speed, or stop in the middle of travel. A mechanism that does not operate correctly will cause unsatisfactory performance. If the mechanism does not operate correctly and you cannot repair the problem, speak to your dealer or Milnor. Possible causes are as follows:

- a blockage or a leak in the air tube,
- a worn pilot air valve,
- worn components in the mechanism,
- air pressure supplied to the machine is not sufficient,
- a component used to remove contamination from the air line is clogged,
- a quick exhaust valve or muffler is clogged,
- on machines with an air line lubricator, a malfunction or incorrect adjustment prevents sufficient lubrication.

**Figure 14: Compressed Air Mechanisms. These are examples. Your machine can look different.**



**Figure 15: Proximity Switches These are examples. Your machine can look different.**



**Supplement 3**

**How to Do a Test of Emergency Stop Mechanisms**

This test applies to machines that have one or more stop mechanisms in addition to the Stop button (⓪). Do this test at the intervals given in the maintenance summary.

Definitions:

**3-wire circuit**—a series electrical circuit on a Milnor machine that must close before the machine can operate. If a switch in the circuit opens, machine movement stops and the operator alarm (a buzzer and a display message) comes on. When you push the start button (Ⓛ), this closes the 3-wire circuit, which stops the operator alarm and lets the machine



operate.

**emergency stop mechanism**—a manual control that opens the 3-wire circuit when a person or object operates the control. Examples - emergency stop button, kick plate, pull cord.

**emergency stop button**—a red push button on a yellow field that locks when a person pushes it (the electrical contacts stay open). It is necessary to turn the button clockwise to unlock it. A machine can have zero or more emergency stop buttons.

**kick plate**—a metal plate on a shuttle conveyor that operates a switch when an object applies sufficient force to the plate. The kick plate is usually the first component of the shuttle to hit an object in the shuttle path. All Milnor shuttles that go left/right on a path have kick plates on the two sides of the machine.



**WARNING 31:** You can be killed or severely injured if a shuttle strikes you even if you come in contact with the kick plate first.

- Never do a test of the kick plate when the shuttle operates.

**pull cord**—a wire on a conveyor that operates a switch when a person pulls the wire. All Milnor free-stand conveyors (a conveyor that is not a component of a larger machine) have pull cords on the two sides of the conveyor.

Do a test of all emergency stop mechanisms on the machine as follows:

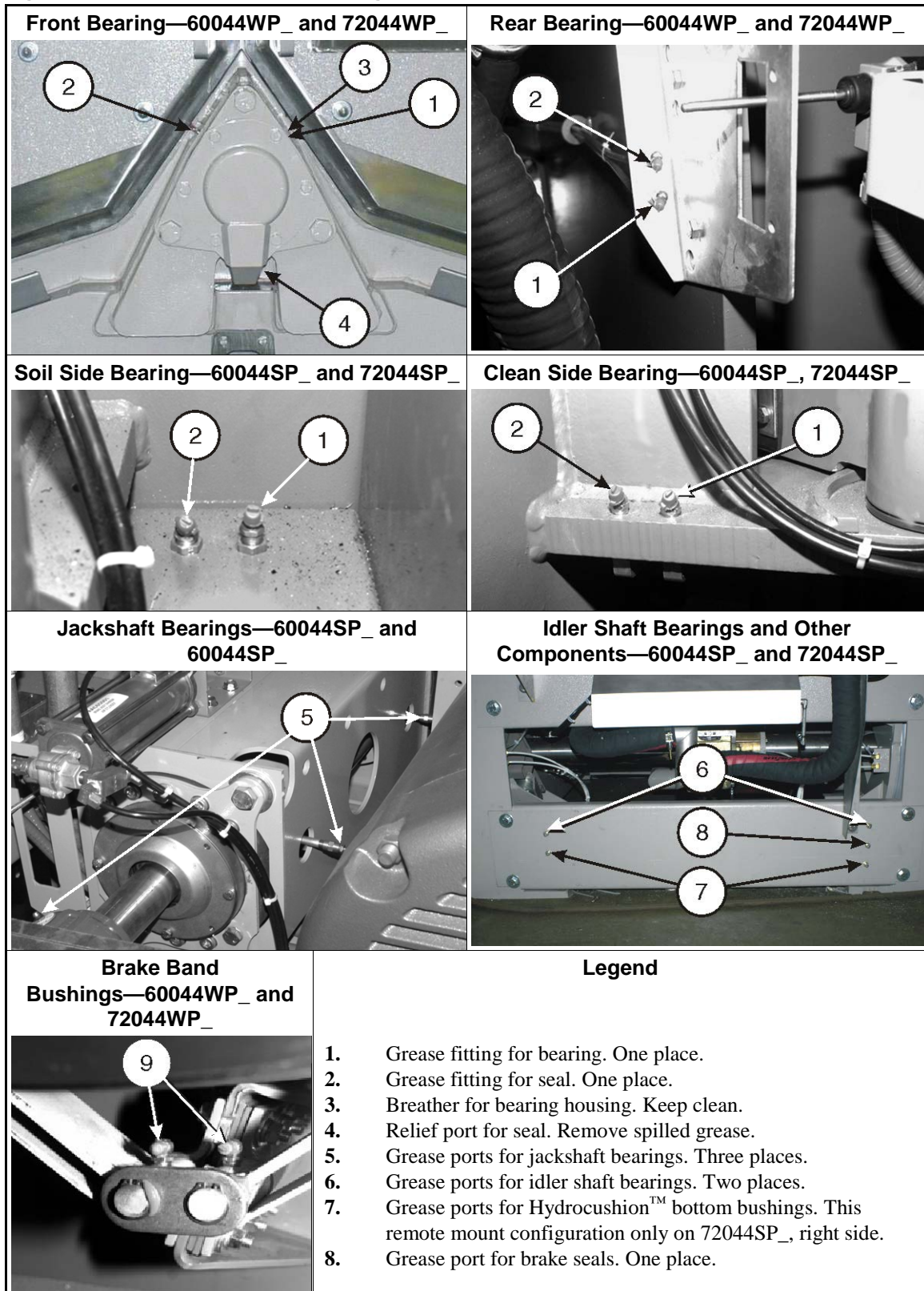
1. Apply power to the machine (⊖).
2. Push the start button (Ⓢ). **Do not cause the machine to operate.** For example, do not start a formula or operate the machine manually. It is not necessary to do the test when the machine operates.
3. Operate an emergency stop mechanism (examples - button, kick plate, pull cord). If the mechanism operates correctly, the operator alarm comes on. Did this occur?

**Yes**—Release the emergency stop mechanism if necessary. For example, if this is an emergency stop button, turn the button clockwise to unlock it. Push the start button (Ⓢ). Do the test on a different emergency stop mechanism. Continue until you do the test on all emergency stop mechanisms on the machine.

**No**—An electrical component is defective. Shut down the machine. Do not let the machine operate until you correct the problem.

### 3.1.6. Maintenance Components—Large Extractors [Document BIWUUM03]

Figure 16: Grease Ports for Drive Bearings—60044\_ and 72044\_ Models



9. Grease ports for brake band bushings. Two places.

Figure 17: Grease ports for Shell Doors—Divided Cylinder Models (one or two outer doors)

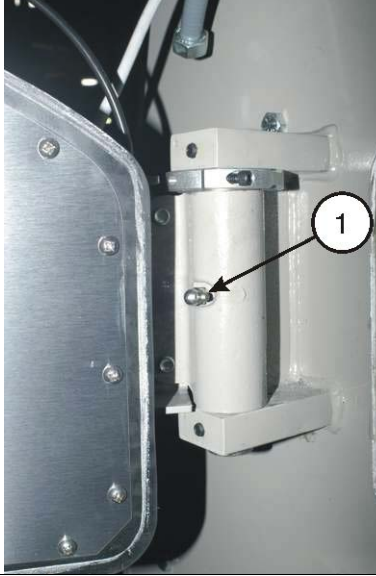
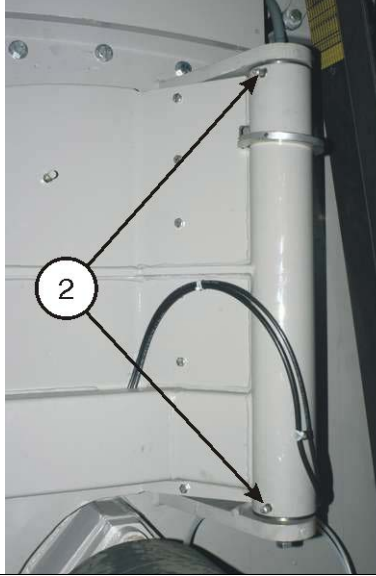

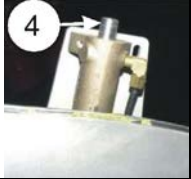
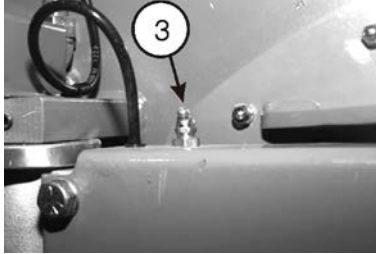
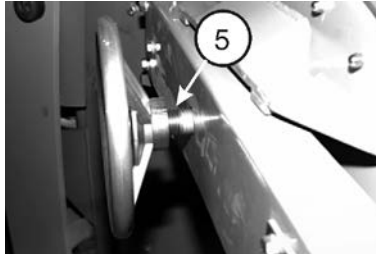
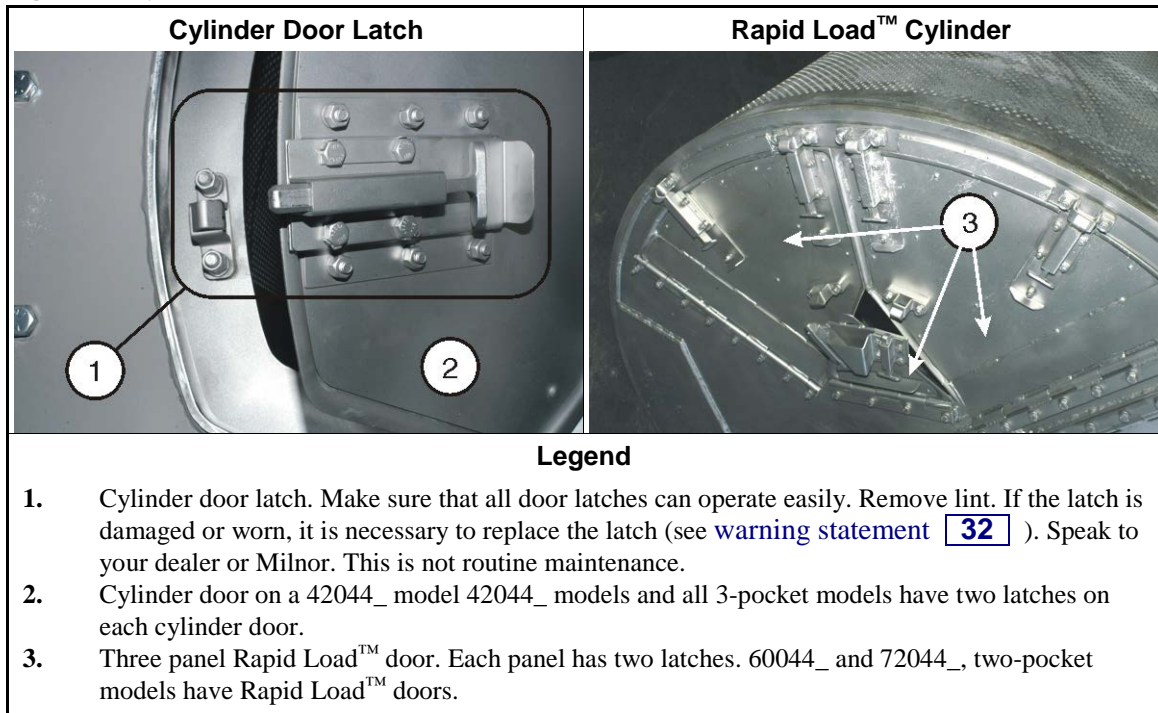
<p><b>Door Hinge—42044SP_ and 42044WP_</b></p>	<p><b>Door Hinge—60044SP_, 72044SP_ and 72044WP_. See Item 2 for 60044WP2.</b></p>	<p><b>Door Latch Plunger—most models</b></p>	<p><b>Door Latch Plunger—60044WP2</b></p>
			
<p><b>Door Stop Grease port—42044SP_ and 42044WP_</b></p>	<p><b>Door Hand Wheel—42044SP_ and 42044WP_</b></p>	<p><b>Legend</b></p> <ol style="list-style-type: none"> <li>1. Grease port, one place for each door. Door must be open for access.</li> <li>2. Grease ports, two places for each door. No lubrication is necessary on 60044WP2 (Rapid Load) models.</li> <li>3. Grease port, one place on each door.</li> <li>4. Apply a thin film of grease to plunger surface, one place on each door.</li> <li>5. Apply oil to threads, one place on each door.</li> </ol>	
			

Figure 18: Cylinder Door Latches



**WARNING 32: Explosion Hazards**—Inner door latches (divided cylinder machines)—A damaged or improperly seated latch can cause the inner door to open during operation, damaging the cylinder and shell. A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Do not operate the machine with any evidence of damage or malfunction.

Figure 19: Speed Reducer—72044SP\_ and 72044WP\_ Models

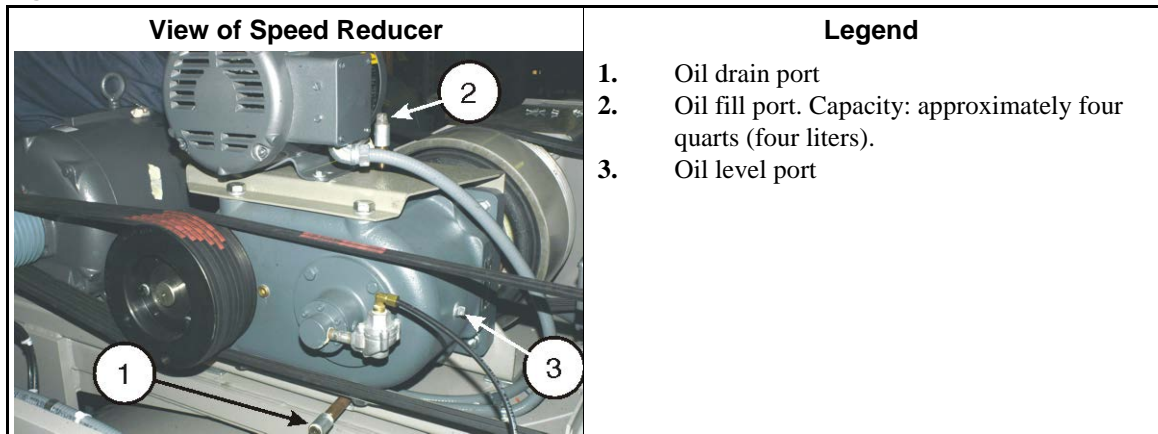
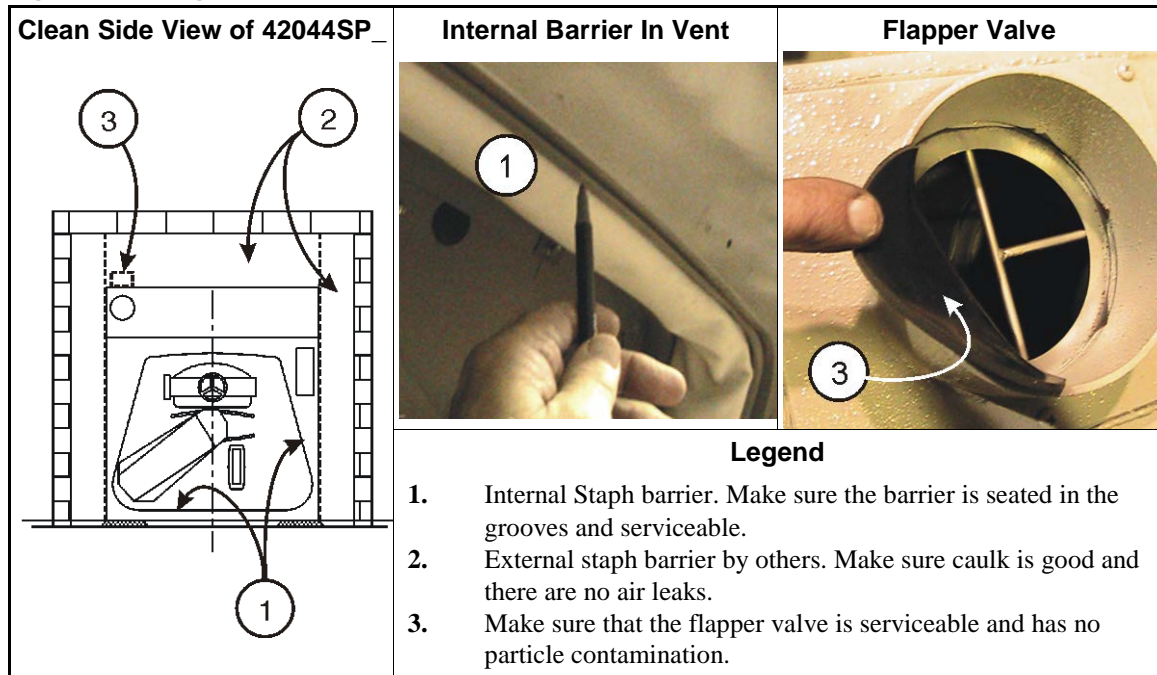


Figure 20: Air Tight Staph Barriers—42044SP\_, 60044SP\_, and 72044SP\_ Models

**Supplement 4****About the Door Seal System On 60044\_ and 72044\_ Divided Cylinder Models**

Your machine uses a compressed air system to hold the shell door against the shell when the machine operates. On Rapid Load™ models, the system operates at 28 PSI (193 kPa). On Staph-Guard® models, the system operates at 22 PSI (151 kPa). The pressure is set on a pressure regulator. At this pressure, the system must push the door against the shell with sufficient force to prevent a door leak. If a component of this system is severely worn or damaged, a door leak can occur. At the intervals given in the maintenance summary, look at the machine in operation. If there is an indication of a door leak, it is necessary to repair the door seal system. Speak to your dealer or Milnor. This is not routine maintenance.

**Supplement 5****About the Push-down System On Divided Cylinder Models**

Your machine uses a compressed air system to hold the shell tight against the base most of the time that the machine operates. The shell is released when the machine is in the extract sequence. This system operates at line pressure. When this system starts or stops, the shell must smoothly move down or up approximately three inches (approximately 80 mm). If a component of this system is severely worn or damaged, these conditions can occur:

- The shell goes down or up with an irregular movement.
- The shell hits the housing when it moves in the wash sequence.

At the intervals given in the maintenance summary, look at the machine when it operates. If one or the two of these conditions occur, it is necessary to repair the push-down system. Speak to your dealer or Milnor. This is not routine maintenance.

**Supplement 6****Hydrocushion™ Oil Maintenance**

The four Hydrocushion™ suspension cylinders on your machine (see Figure 7) must contain the

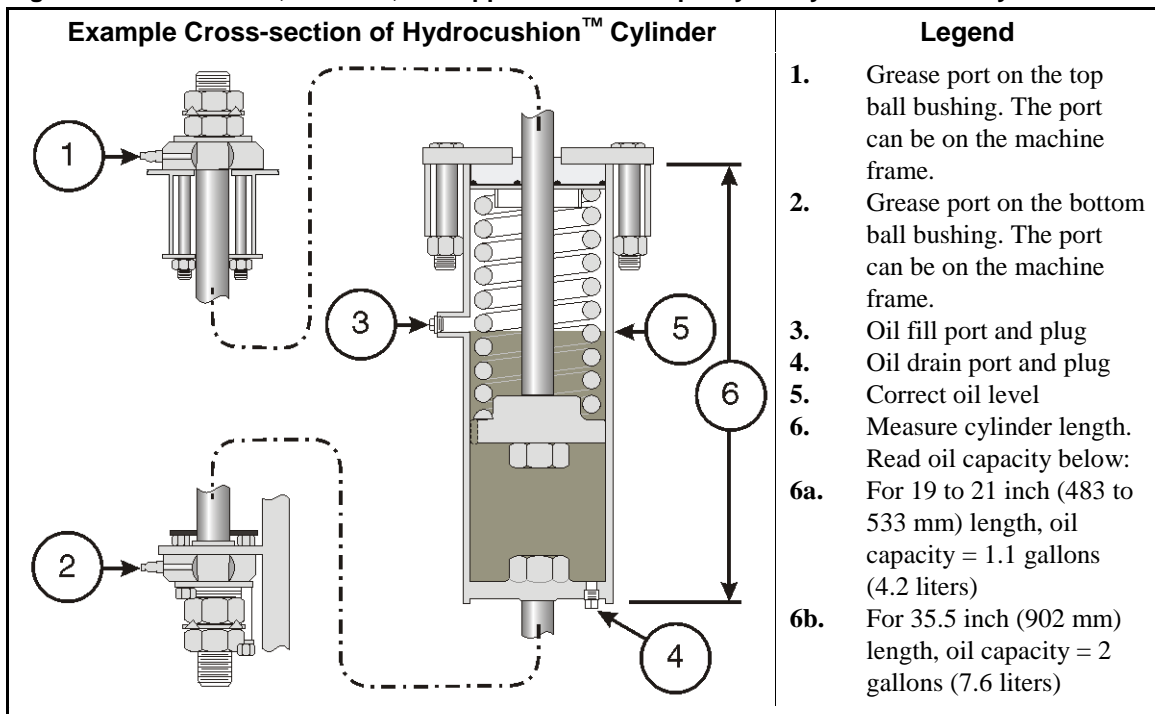
correct quantity and quality of oil for correct operation. The oil level can decrease and the oil can become dirty as a result of operation.

**Change the oil** at the intervals given in the maintenance schedule. You can slowly add oil through the fill port with a tube and hand pump. It can be hard to put the tube fully in the cylinder because of the internal spring. You can add oil quickly through the drain port. Put a needle valve on the drain port and connect a hand pump. The Hydrocushion™ cylinders on 72044WP2 and 72044SP2 models have a port below the fill port with a valve on it. Connect a hand pump to this port to add oil easily.

**Examine the oil** at the intervals between oil changes given in the schedule. Examine the oil as follows:

1. Do not remove the oil fill plug. When you open the drain port, this will help to prevent a fast release of oil.
2. Release a small quantity of oil into a cup from the drain port.
3. If the oil is dirty or does not look correct, change the oil.
4. If the oil is good, add oil through the fill or drain port until oil comes out of the fill port.

**Figure 21: Grease Ports, Oil Ports, and Approximate Oil Capacity for Hydrocushion™ Cylinders**



**Supplement 7**

**How to Do a Test of the Mechanical Brake**



**WARNING 33: Crush and sever hazards**—The goods in the cylinder can cause it to turn when the machine is stopped.

- Do not let the machine operate with a defective mechanical brake.

The disk or band brake holds the cylinder while the operator puts goods in, or removes goods from the machine. Although the mechanical brake does not usually stop the cylinder during operation ([Note 2](#) tells more), it can do so if an unusual condition occurs. Examples are

when electrical power is removed and when a stop switch is pushed. To make sure the machine operates safely, do this test at the intervals given in the maintenance schedule:

1. If the machine contains goods, remove them.
2. Start a wash formula. Move forward in the sequence to a drain (see [Note 1](#)). You must do the test when the cylinder turns at drain speed. Wash speed is too slow. Extract speed will cause deterioration of the brake components that is not necessary.
3. Look at the cylinder through the door glass or site glass.
4. Push the Emergency Stop switch (⓪). Confirm that the cylinder stops in the time appropriate for the type of machine:

Divided cylinder and Staph Guard®—4 seconds.

Open cylinder—10 seconds

**Note 1:** On most machines, there is no manual output for drain speed. If your machine has a drain speed output in *Manual Mode*, use it instead of a formula.

If the cylinder does not stop in the given time, repairs are necessary. Speak to your dealer or Milnor. This is not routine maintenance.

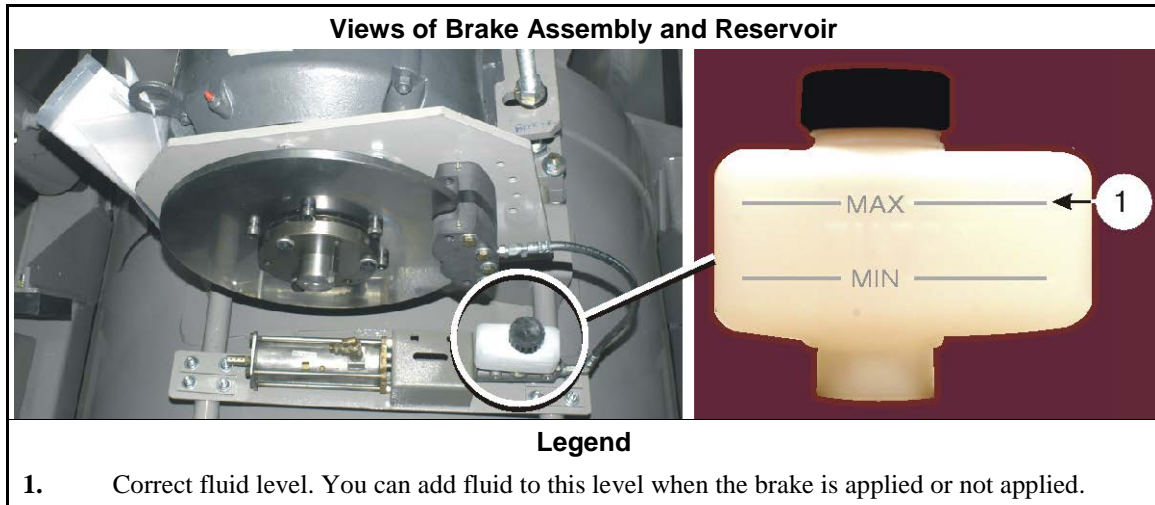


**CAUTION 34: Risk of damage**—Brake components will wear out quickly if the operator misuses it to stop the machine during automatic operation.

- During operation, always permit the cylinder to stop automatically.

**Note 2:** In automatic operation, the drive motor, inverter, and resistors stop the cylinder. If the cylinder does not stop in the correct length of time, an error message occurs. If this condition continues, repairs are necessary. Speak to your dealer or Milnor. This is not routine maintenance.

**Figure 22: Example of Disk Brake. Your machine can look different.**



— End of BIUUM09 —