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# MQPDHM01U1/12364A

1 Maintenance Guide—Shaker

MQPDHM01EN/20120905





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

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# Maintenance Guide— Shaker

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

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

5040SAL1    5040SA1R    5050SA1L    5050SA1R

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# Chapter 1

# Machine Description, Identification, and Certification

BIUUUF01 (Published) Book specs- Dates: 20120905 / 20120905 / 20120905 Lang: ENG01 Applic: PDH

## 1.1. About This Milnor® Machine—Shaker

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

**Laundering system machines** perform some process within a commercial or industrial laundering system. Laundering system machines manufactured by Milnor® include CBW® tunnel washers, centrifugal extractors, press extractors, pass-through dryers, lint collectors, and various types of conveyors including stationary, shuttle, load, discharge, and storage conveyors.

**Shaker** models are similar to dryers but do not supply heat to the linen. They only loosen the linen with mechanical action.

### 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.

— End of BIUUUF01 —

BIPDUL01 (Published) Book specs- Dates: 20120905 / 20120905 / 20120905 Lang: ENG01 Applic: PDH

## 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

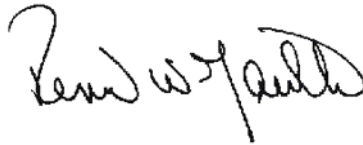
- ISO 10472-1:1997 - Safety requirements for industrial laundry machinery - Part 1: Common requirements
- ISO 10472-4:1997 - Safety requirements for industrial laundry machinery - Part 4: Air dryers
- ISO 13857:2008 - Safety of machinery - Safety distances to prevent hazard zones being reached by upper 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 BIPDUL01 —

# Chapter 2

## Safety

BIUUUS27 (Published) Book specs- Dates: 20120905 / 20120905 / 20120905 Lang: ENG01 Applic: PDH

### 2.1. Safety—Dryers, Conditioners, and Shakers

#### 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.



**CAUTION 3: Burn Hazards**—Contact with hot goods or machine components can burn you.

- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.

### 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.

### 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.



**DANGER 4: Entangle and Sever Hazards**—Contact with goods being processed can cause the goods to wrap around your body or limbs and dismember you.

- Do not attempt to open the door or reach into the cylinder until the cylinder is stopped.
- Do not touch goods inside or hanging partially outside the turning cylinder.
- Know the location of all emergency stop switches, pull cords, and/or kick plates and use them in an emergency to stop machine motion.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.



**WARNING 5: 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.

- 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.



**WARNING [6]: 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.



**CAUTION [7]: Burn Hazards**—Contact with hot goods or machine components can burn you.

- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Use care when handling recently-processed goods.

## 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



**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.

### 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 [12]: 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.



**CAUTION [13]: Goods Damage and Wasted Resources**—Entering incorrect cake data causes improper processing, routing, and accounting of batches.

- Understand the consequences of entering cake data.

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



**WARNING [14]: 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 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 [15]: 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 [16]: 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 —



# Chapter 3

## Routine Maintenance

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### 3.1. Routine Maintenance—Shaker



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** 18: **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**

Examine. If a component is damaged, missing, or not set, correct this immediately to prevent injury.									
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*	emergency stop mechanism	See <a href="#">Supplement 3</a> . Do a test of the control.

**Table 3: Filters, Screens, and Sensitive Components**

<b>Remove contamination from these components to prevent damage and unsatisfactory performance.</b>								
<b>Mark</b>						<b>Do this each</b>	<b>Component</b>	<b>More Data. See also Section 3.1.3 “How to Remove Contamination”</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>			
	x					40 to 60 hours	inverter fans, vents, filters	See Figure 3. Keep good air flow.
			x			600 hours	motors	Keep good air flow.
					x	2400 hours	entire machine	Remove excessive dust and dirt.
		x				200 hours	strainer(s) for air inlet	See Figure 4
x						day*	photoeyes	See Figure 6
					x	2400 hours	proximity switches	See Figure 7

**Table 4: 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 Supplement 1 and Figure 2
		x				200 hours	air seals. These include: <ul style="list-style-type: none"> <li>• T-seal around basket</li> <li>• Nomex, felt at front of basket</li> <li>• felt, rubber at top of load door</li> <li>• felt at bottom of load door</li> <li>• felt at unload door</li> <li>• rubber at access doors</li> </ul>	Examine. See Supplement 4, Figure 8
			x			200 hours	support wheels (4) under basket	Examine. If wheels are worn, repairs can be necessary. Speak to your dealer or Milnor. This is not routine maintenance.

**Table 5: Bearings and Bushings. See Table 6 for Motors.**

<b>Apply grease to these components 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				200 hours	support wheel bearings (4)	See Figure 9. Add 0.12 oz. (3.54 mL) of grease EPLF2 (Table 9).
			x			200 hours	drive chain	See Figure 10. Remove dirty grease with a cloth. Apply grease CG (Table 9).
						none	blower shaft bearings	These are sealed bearings. No grease maintenance is necessary.

**Table 6: 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 7: 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	compressed air mechanisms	See <a href="#">Supplement 2, Figure 5</a>		

### 3.1.3. How to Remove Contamination

**Table 8: 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 9 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 19: 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 9: Lubricant Identification**

Code	Type	Trademark Name	Application Example
CG	grease	Shell Alvania CG or equivalent AGMA CG-1 or CG-2	drive couplings
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

#### 3.1.4.1. Grease Gun Procedures



**CAUTION 20: 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:

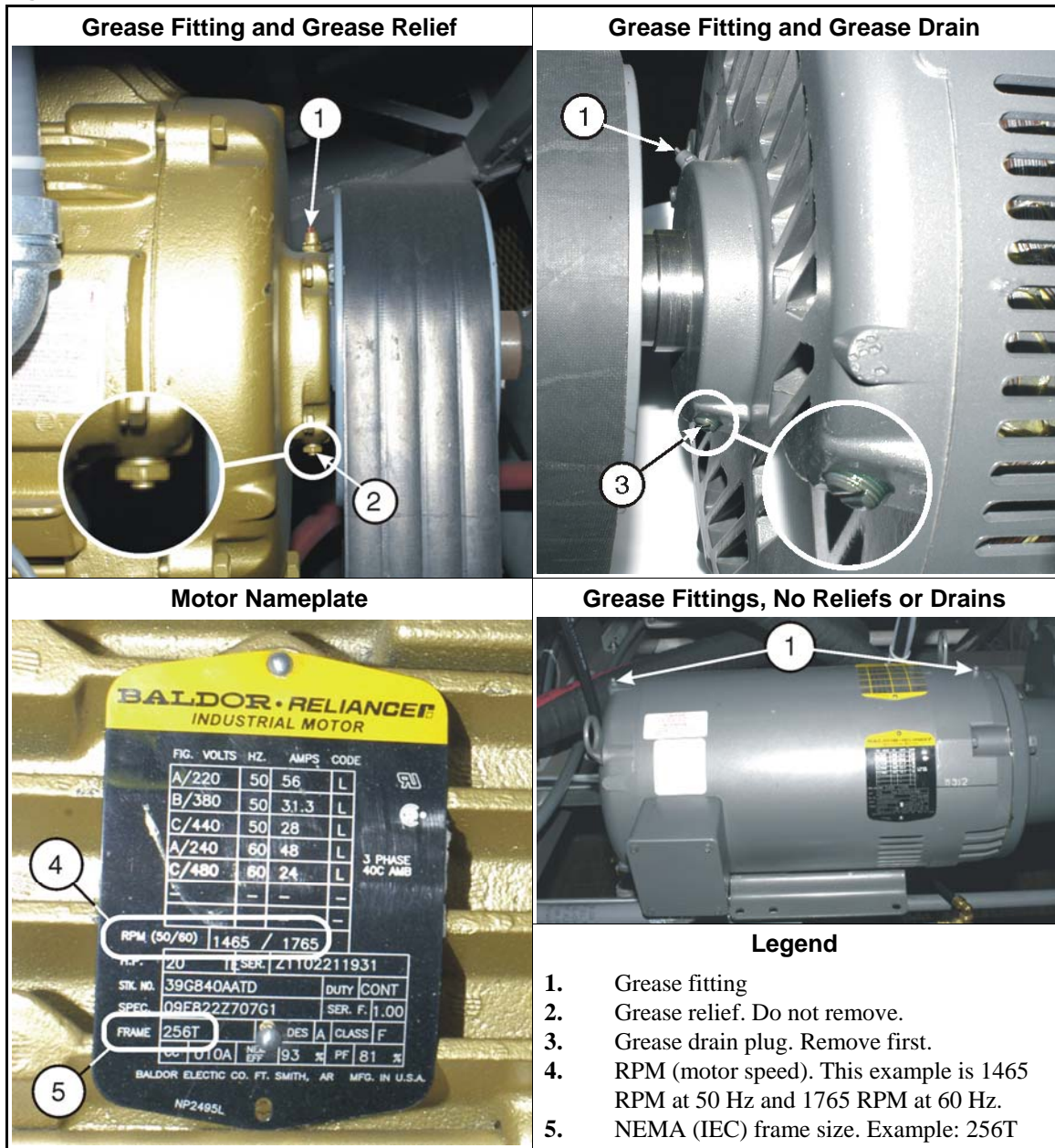
1. Make sure that the grease gun operates correctly.
2. Operate the grease gun to put grease into a small container with fluid ounce or milliliter increments. Pull the trigger fully and slowly.
3. Add a sufficient quantity of grease to measure accurately. Count the number of cycles of the grease gun (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 10](#) gives motor grease intervals and quantities for motors with specified frame sizes and speeds. You get this data from the motor nameplate. Use [Table 6 in Section 3.1.2](#) to record the data for the motors on your machine.

**Figure 1: Motor Grease Maintenance Conditions**



**CAUTION 21: 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 21](#) .
4. Add grease EM ([Table 9](#)) with the motor stopped. If the motor with the nameplate in [Figure 1](#) 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 10: Motor Grease Intervals and Quantities. Use grease EM ([Table 9](#))**

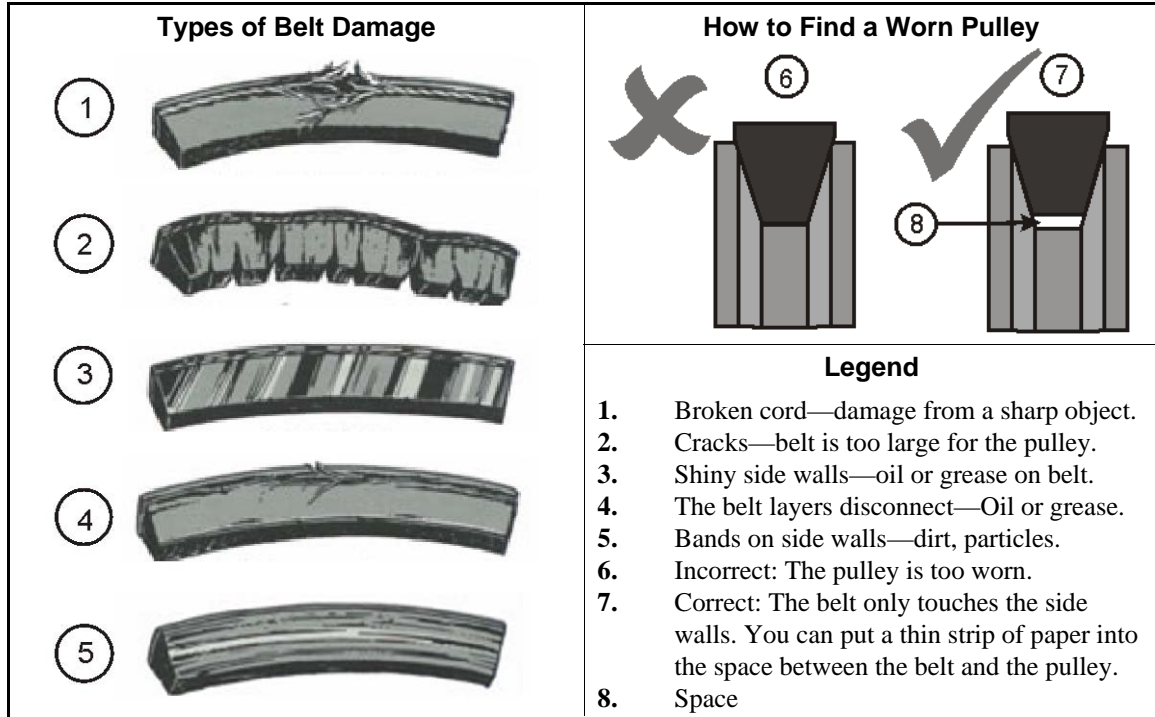
On Motor Nameplate (see <a href="#">Figure 1</a> )		Interval		Quantity	
NEMA (IEC) Frame Size	RPM Less Than or Equal To	Years	Hours	Fluid Ounces	mL
Up to 210 (132)	900	5.5	11000	0.34	9.5
	1200	4.5	9000		
	1800	3	6000		
	3600	1.5	3000		
>210 to 280 (132 to 180)	900	4.5	9000	0.65	18.4
	1200	3.5	7000		
	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		



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

[Document BIUUUM10]

Figure 2: 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 2](#).
- Look for worn pulleys as shown in [Figure 2](#).

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

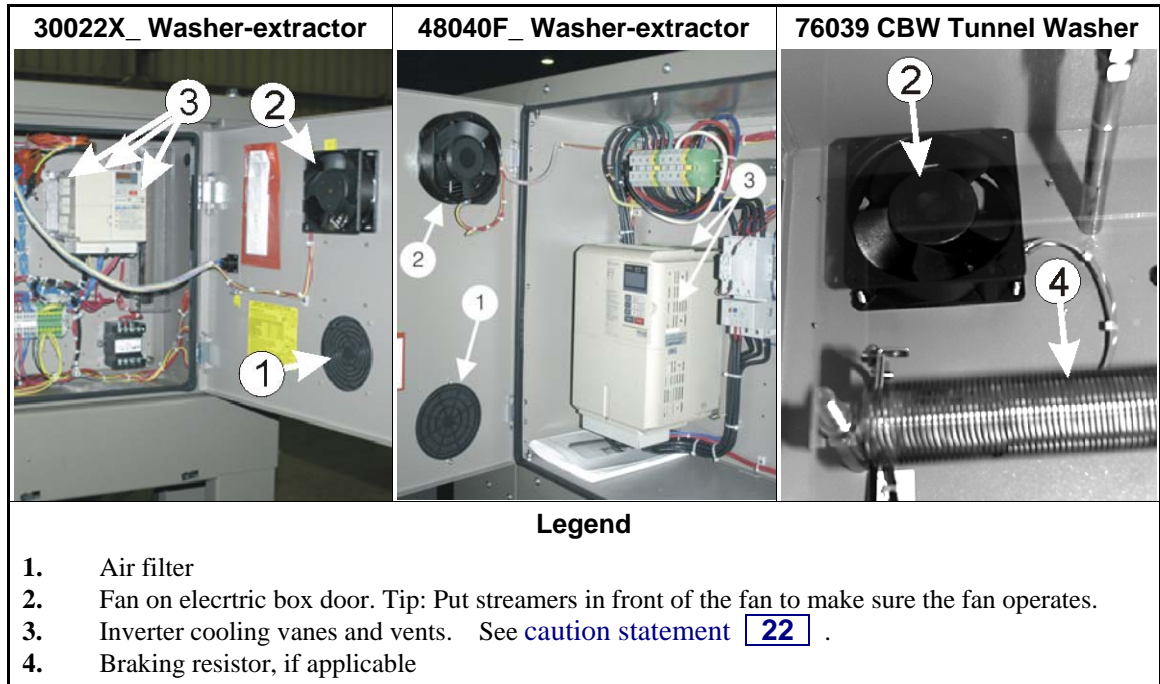
- A belt can have some vibration and not cause damage. It is necessary to correct this condition only if the vibration is large.
- A belt must have sufficient tension that there is no slippage on the pulley during operation. If slippage occurs, you can usually tell from the noise.

**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.

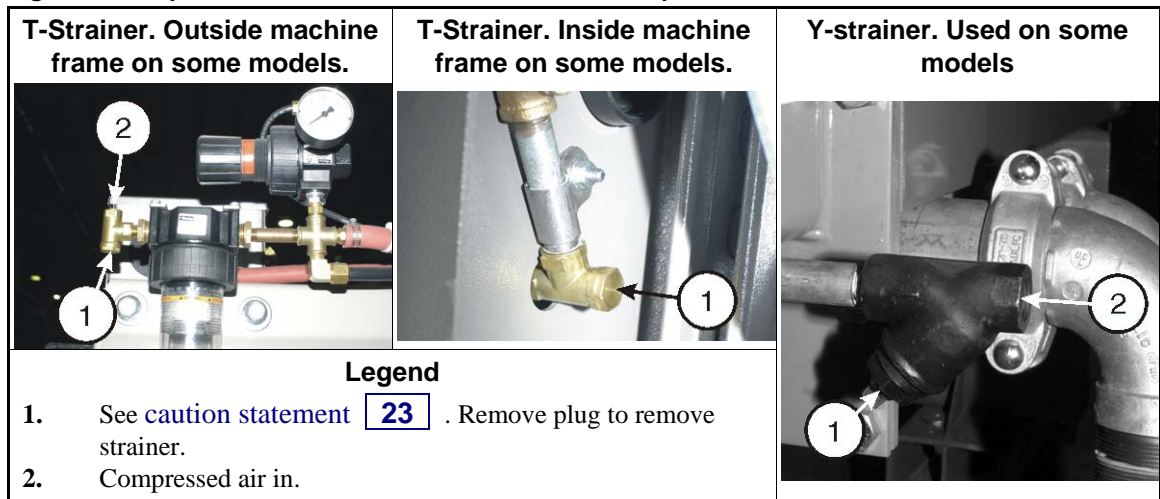
- Machines that use a spring to hold tension on the motor base—Use the belt tension sleeve supplied with the machine. Put the sleeve on the rod that the spring is attached to or remove the sleeve to increase or decrease tension. Replace the spring if necessary.

Figure 3: Electric Box and Inverter. These are examples. Your machine can look different.



- CAUTION 22: Risk of damage**—The inverter will burn out without sufficient airflow.
- Keep fans, filter, vents, and braking resistors clean.

Figure 4: Compressed Air Inlet Strainers. These are examples. Your machine can look different.



- CAUTION 23: Risks of injury and damage**—
- Close the external shutoff valve and release remaining pressure before you do maintenance.

**Supplement 2**

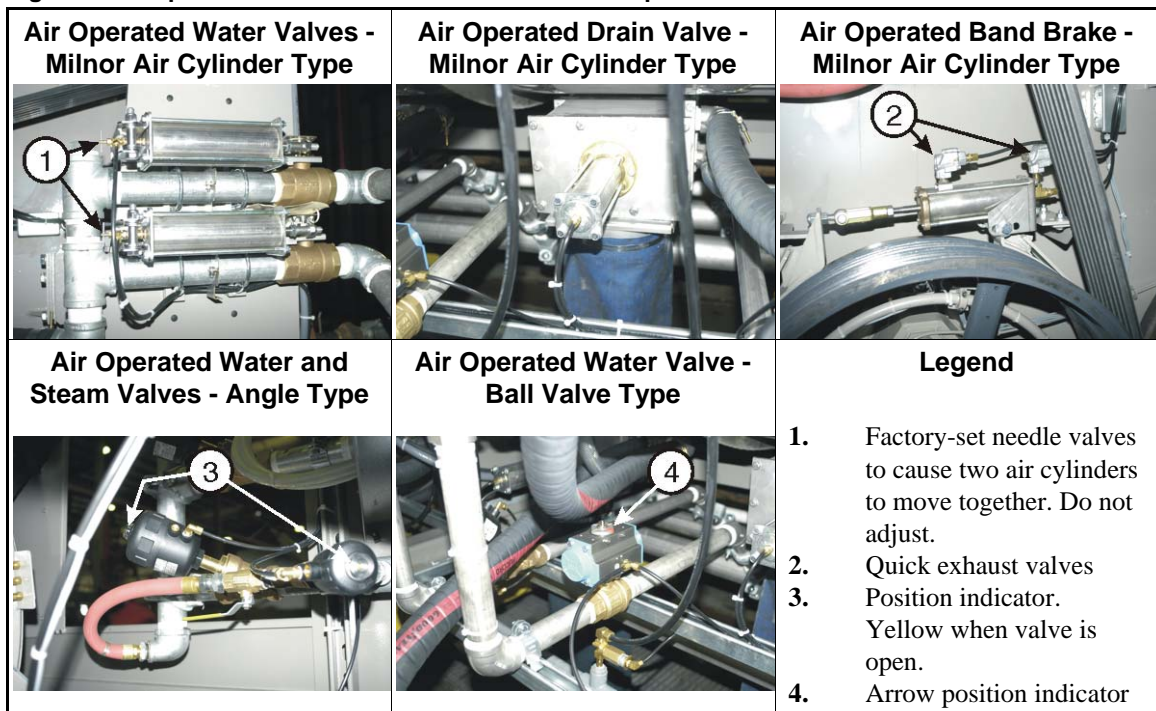
**How to Examine Compressed Air Mechanisms**

Your machine has one or more mechanisms that use compressed air for movement. **Figure 5** 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.

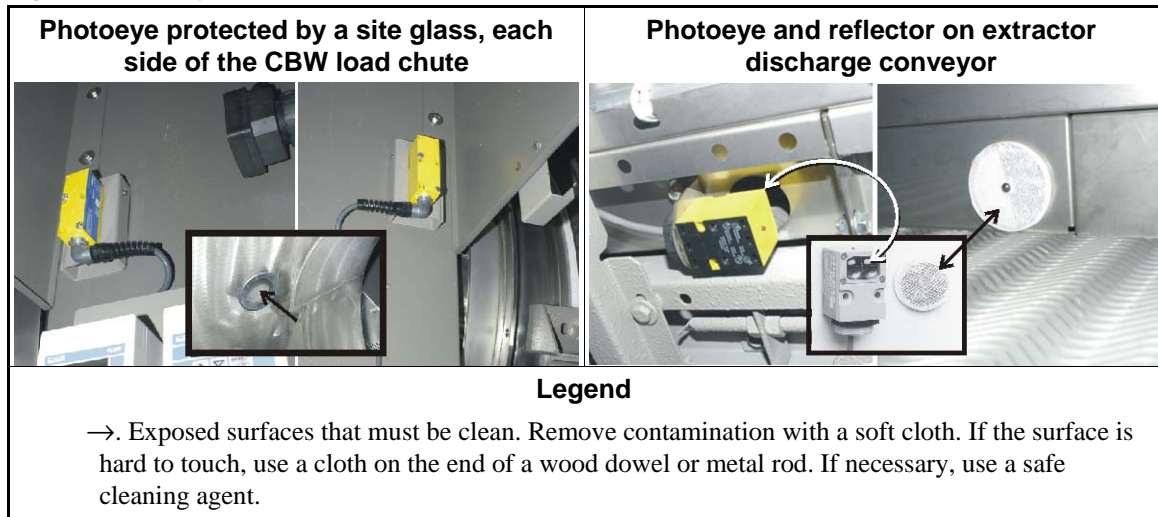
When a compressed air mechanism operates correctly, its time of movement is usually less than two seconds. The movement is smooth. It does not shake, change speed, or stop in the middle of travel. A mechanism that does not operate correctly will cause unsatisfactory performance. If the mechanism does 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.

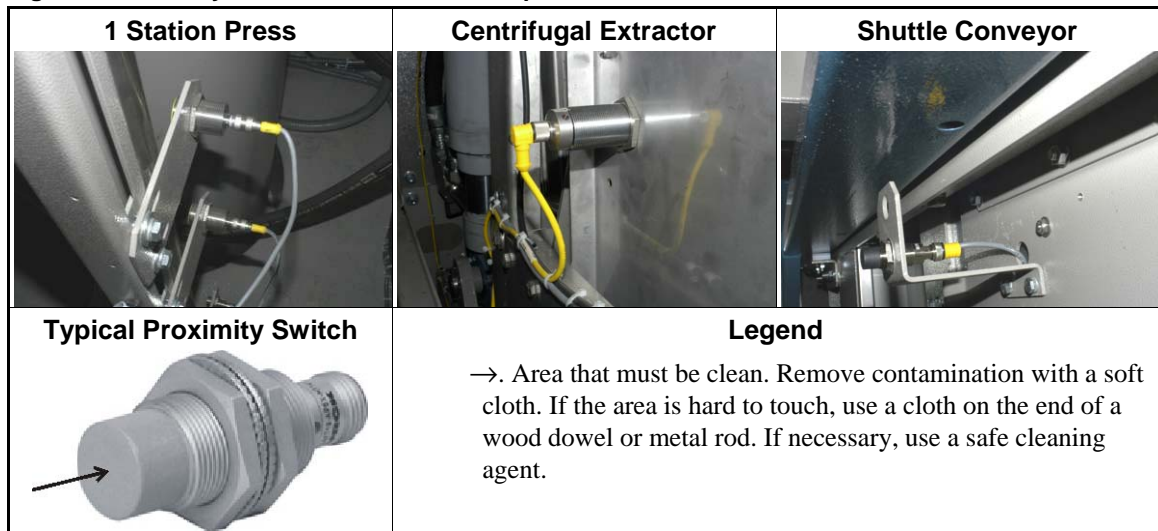
**Figure 5: Compressed Air Mechanisms. These are examples. Your machine can look different.**



**Figure 6: Photoeyes.** These are examples. Your machine can look different.



**Figure 7: 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 24:** 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—Dryer and Dryvac Group [Document BIPDUM02]

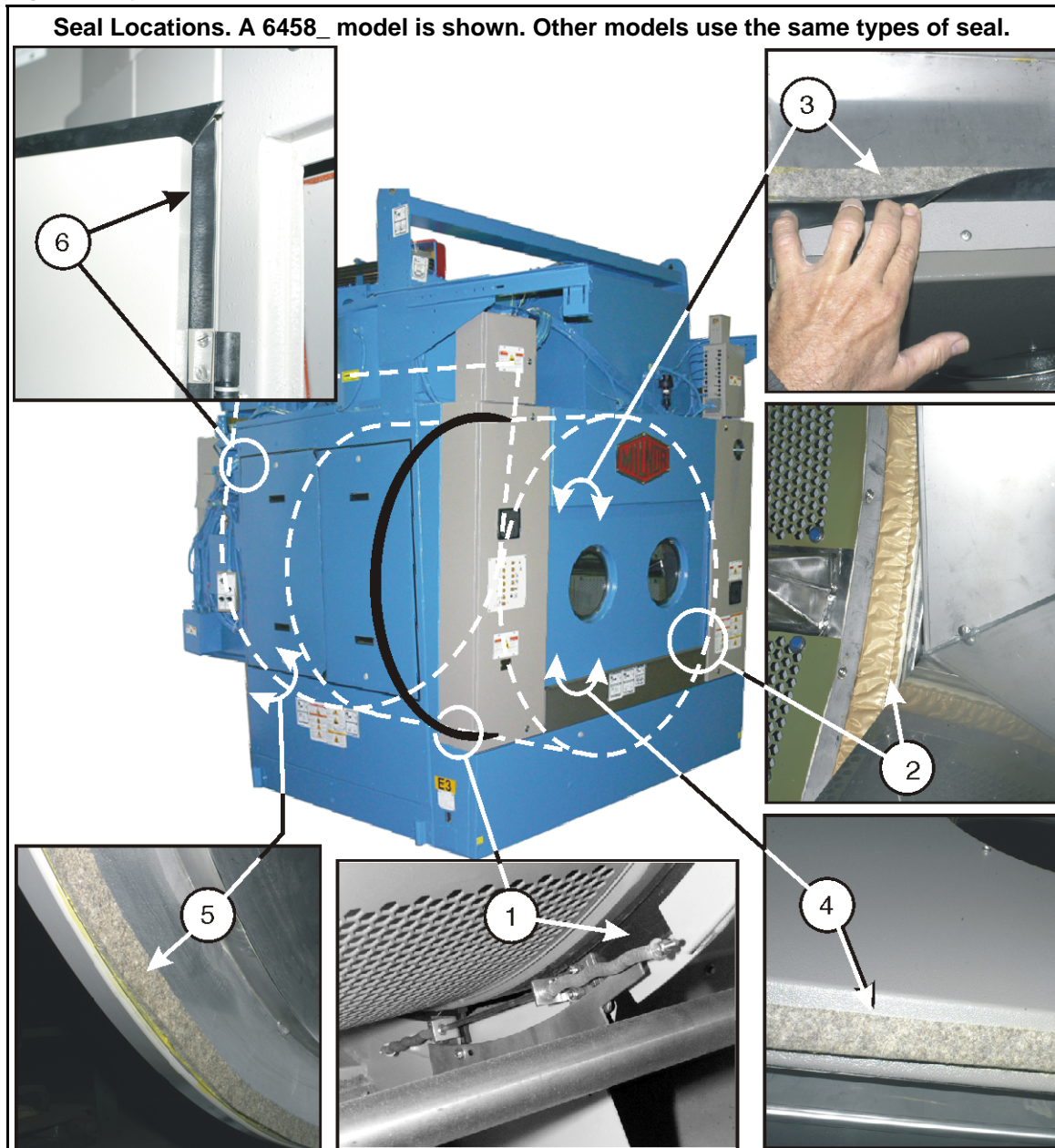
#### Supplement 4

#### The Dryer Air Seals

The air seals shown in [Figure 8](#) are necessary for correct dryer function. Examine the seals at the intervals given in the maintenance summary. After some time, a seal can become worn or damaged. When this occurs, it is necessary to repair the seal to keep good dryer function. Speak to your dealer or Milnor. This is not routine maintenance.

You can operate the doors in the *Manual* mode for access to the felt seals. But do not get in the machine with power connected. If necessary, use a board to hold a door open then remove power from the machine before you examine the seal.

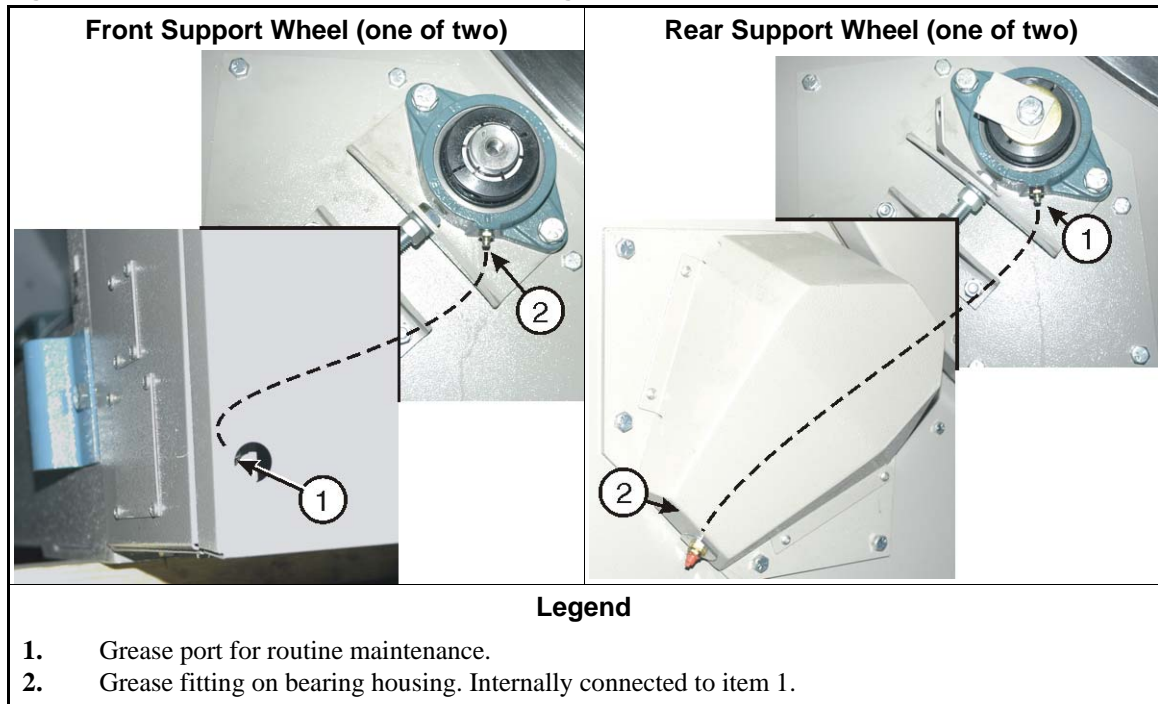
Figure 8: Dryer Air Seals



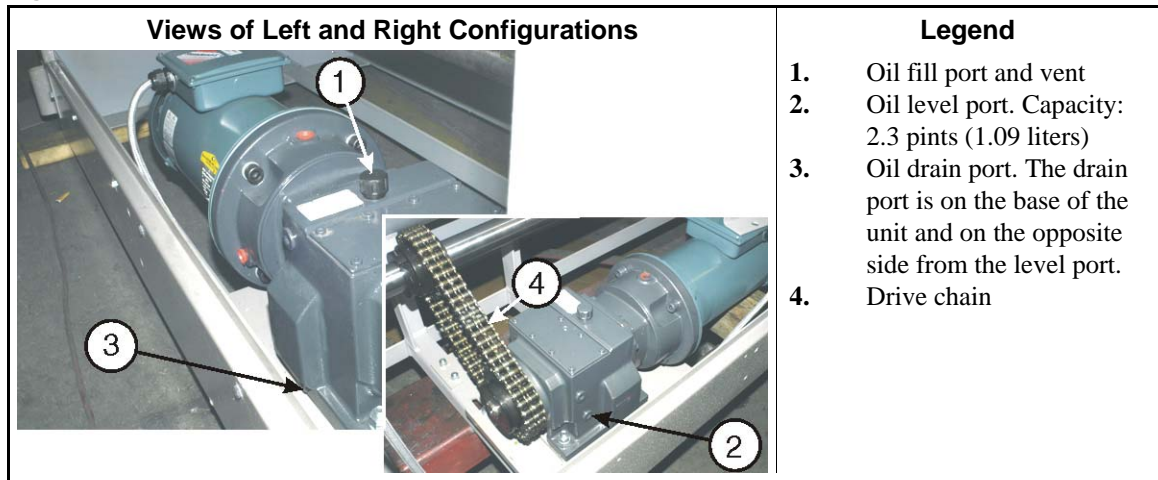
**Legend**

1. The plastic T-seal goes around the center of the basket. This seal causes the air to flow through the basket. Springs keep tension on the seal. If the springs are not compressed, the seal is damaged.
2. The Nomex and felt strip at the front of the basket makes a seal between the basket and the front wall.
3. The felt and rubber strips at the top of the door make a seal when the door closes.
4. The felt strip at the bottom of the door makes a seal between the door and the sill when the door closes.
5. The felt strip on the unload door makes a seal between the door and the shell when the door closes.
6. Make sure that the rubber strips on access doors (example: the doors on the lint screen chamber on dryers with the Milnor lint removal option) are in good condition.

**Figure 9: Grease Ports for Support Wheel Bearings**



**Figure 10: Lubrication of Basket Drive Components**



— End of BIUUM09 —