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DRYVAC2 and DRYVAC3



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

MQPDVM01U1/15412A

1	1. English
3	Maintenance Guide—DRYVAC Lint Collector

MQPDVM01EN/20120229

English

1



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

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Maintenance Guide— DRYVAC Lint Collector

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

Applicable Milnor® products by model number:

DRYVAC02 DRYVAC03

Table of Contents

Sections	Figures, Tables, and Supplements
Chapter 1. Machine Description, Identification, and Certification	
1.1. About This Milnor® Machine—DRYVAC Lint Collector (Document BIUUUF01)	
1.1.1. Functional Description	
1.1.2. Machine Identification	Figure 1: Machine Data Plate
1.2. General Content of the EC-Declaration of Conformity (Document BIPDUL01)	
Chapter 2. Safety	
2.1. Safety— (Document BIUUUS27)	
2.1.1. General Safety Requirements—Vital Information for Management Personnel (Document BIUUUS04)	
2.1.1.1. Laundry Facility	
2.1.1.2. Personnel	
2.1.1.3. Safety Devices	
2.1.1.4. Hazard Information	
2.1.1.5. Maintenance	
2.1.2. Safety Alert Messages—Internal Electrical and Mechanical Hazards (Document BIUUUS11)	
2.1.3. Safety Alert Messages—Unsafe Conditions (Document BIUUUS14)	
2.1.3.1. Damage and Malfunction Hazards	
2.1.3.1.1. Hazards Resulting from Inoperative Safety Devices	
2.1.3.1.2. Hazards Resulting from Damaged Mechanical Devices	
2.1.3.2. Careless Use Hazards	
2.1.3.2.1. Careless Operation Hazards—Vital Information for Operator Personnel (see also operator hazards throughout manual)	
2.1.3.2.2. Careless Servicing Hazards—Vital Information for Service Personnel (see also service hazards throughout manuals)	
2.2. Fire Safety System Operation and Maintenance (Document BIPDUM01)	

Sections	Figures, Tables, and Supplements
2.2.1. Fire Safety Functions and Components	Table 1: Fire Safety Functions for 6458xxxx and 7272xxxx Dryer Models Figure 2: Component Locations for 6458_ Models Figure 3: View of ST550A, ST550B and T2 Figure 4: View of ST225-1 Figure 5: View of ST225-2 and T3 Figure 6: View of STBB
2.2.2. About the <i>Min Fire</i> and <i>Outlet Temperature Exceeded 220°</i> Faults	
2.2.2.1. Min Fire (MINF)	
2.2.2.2. Outlet Temperature Exceeded 220° (degrees Fahrenheit)	
2.2.3. How to Prevent Water Flow When No Fire Occurs	
2.2.4. How to Do a Test of the Fire Safety System	Chart 1: How to Do a Test of the Fire Safety System Chart 2: If Water Flow Occurs
2.2.5. If Water Flow Occurs	
 Chapter 3. Routine Maintenance	
3.1. Routine Maintenance—DRYVAC Lint Collector (Document BIUUM09)	
3.1.1. How To Show the Maintenance On a Calendar	Table 2: Where to Put Marks On a Calendar
3.1.2. Maintenance Summary	Table 3: Guards and Related Components Table 4: Filters, Screens, and Sensitive Components Table 5: Components that Become Worn Table 6: Bearings and Bushings. See Table 7 for Motors. Table 7: Motor Grease Schedule. Use the data in Section 3.1.4.2 to complete this table. Table 8: Contamination Types, Cleaning Agents, and Procedures Table 9: Lubricant Identification
3.1.3. How to Remove Contamination	
3.1.4. Lubricant Identification and Procedures	
3.1.4.1. Grease Gun Procedures	
3.1.4.2. Grease Procedures for Motors	Figure 7: Motor Grease Maintenance Conditions Table 10: Motor Grease Intervals and Quantities. Use grease EM (Table 9)

Sections	Figures, Tables, and Supplements
3.1.5. Maintenance Components—Machines and Controls Group (Document BIUUUM10)	<p>Supplement 1: How to Examine Belts and Pulleys</p> <p>Figure 8: Belt and Pulley Conditions To Look For. See Supplement 1.</p> <p>Figure 9: Electric Box and Inverter. These are examples. Your machine can look different.</p> <p>Figure 10: Compressed Air Inlet Strainers. These are examples. Your machine can look different.</p>
3.1.6. Maintenance Components—Dryer and Dryvac Group (Document BIPDUM02)	<p>Supplement 2: How Particle Contamination Occurs in the Dryvac™ Lint Collector</p> <p>Figure 11: Dryvac™ Maintenance Areas (Model DRYVAC02 shown)</p>

Chapter 1

Machine Description, Identification, and Certification

BIUUUF01 (Published) Book specs- Dates: 20120229 / 20120229 / 20120229 Lang: ENG01 Applic: PDV

1.1. About This Milnor[®] Machine—DRYVAC Lint Collector

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.

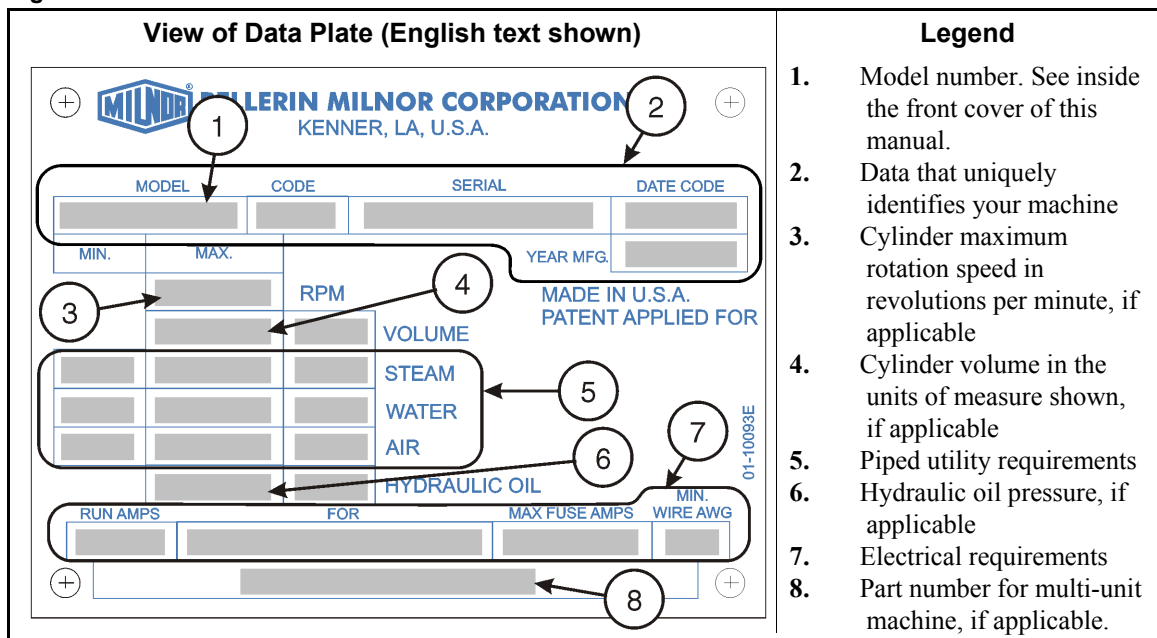
1.1.1. Functional Description

DRYVAC Lint Collector models remove lint from a bank of pass-through dryers sequentially by a vacuum applied to the dryer lint screen.

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 —

BIPDUL01 (Published) Book specs- Dates: 20120229 / 20120229 / 20120229 Lang: ENG01 Applic: PDV

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 Machinery Directive (89/392 EEC) as amended.

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/DIS 10 472-1 of June 1994 Safety Requirements for Industrial Laundry Machine, Part One, Common Requirements for All Types, ISO/DIS 10 472-4 of June 1994, Safety Requirements for Industrial Laundry Machine, Part Four: Air Dryers, BS EN 294 of 1992 Safety of Machinery, Safety Distances to Prevent Danger Zones Being Reached by the Upper Limbs, and EN 60204-1 of October 1992, Safety of Machinery, Electrical Equipment of Machines, Part One, General Requirements. EN50081-1,2 Electromagnetic Compatibility. Safety compliance to the standard is described in detail in MILNOR manual (see the declaration for your machine).

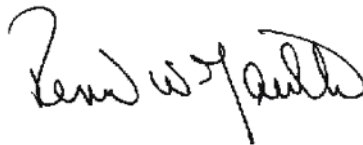
This letter confirms that the machine(s) only meets the required aforementioned standards. It is the responsibility of the installer/owner of the machine(s) to ensure compliance with all requirements for on-site preparation, installation, and operation.

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

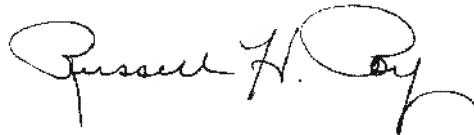
Place Kenner, Louisiana, 70063, USA

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: 20120229 / 20120229 / 20120229 Lang: ENG01 Applic: PDV

2.1. Safety—

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.

2.1.3. Safety Alert Messages—Unsafe Conditions [Document BIUUUS14]

2.1.3.1. Damage and Malfunction Hazards

2.1.3.1.1. Hazards Resulting from Inoperative Safety Devices



WARNING 3: 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 4: Electrocutation 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.

2.1.3.1.2. Hazards Resulting from Damaged Mechanical Devices



WARNING 5: 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.

2.1.3.2. Careless Use Hazards

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



WARNING 6: 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.

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



WARNING 7: 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.

— End of BIUUUS27 —

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2.2. Fire Safety System Operation and Maintenance

Notice 8: If the fire safety system is on is in operation (if there is a flow of water from the rear of the dryer)—go to [Section 2.2.5 “If Water Flow Occurs”](#).

fire safety system—the water nozzles and related equipment that put water in the dryer to stop a fire in the basket.

Water flow will start automatically if the temperature becomes too high, as told in [Section 2.2.1 “Fire Safety Functions and Components”](#). You can also start it manually. Pull the operation handle or use the control panel as told in [Section 2.2.4 “How to Do a Test of the Fire Safety System”](#). The system will start a flow of water. The water will go into the basket through the perforations. Do a test of this system at the intervals given in the routine maintenance schedule.

2.2.1. Fire Safety Functions and Components

This section gives the fire safety functions and components for 6458_ models. Components and their locations can be different on other dryer models but the functions are the same.

Table 1: Fire Safety Functions for 6458xxxx and 7272xxxx Dryer Models

Sensor type	Temperature switch (closes at specified temperature)			Thermocouple (gives continuous temperature data to the controller)		
Sensor name	ST225-1 & 2	ST550A & B	STBB	T3		
Location	Basket/outlet duct (Figures 1, 3, 4)	Inlet duct (Figures 1, 2)	At burner (Figures 1 and 5)	Outlet duct (Figure 3)		
Safety limit (the temperature or condition that causes the given result)	225° F (107° C)	550° F (288° C)	175° F (79° C)	–Three safety limits in software–		
				5° F increase for 15 seconds or 15° F increase for 5 seconds during min fire*	Higher than 220° F (104° C) for 5 seconds**	240°F (116°C)
Occurs when temperature is too high	Water flows and all dryer functions stop.	Flame goes off. If the flame will not come on, see the line below this one.		Each step before the cooldown is subsequently cancelled while the condition continues.		Water flows and all dryer functions stop.
Display when temperature is too high	THREE WIRE DISABLED error and operator alarm	Initially none. If the flame will not come on, the CHECK ERROR LIGHTS error and operator alarm occur.		The controller shows “MINF” and puts data in the record of dry cycle details	The controller shows “>220” and puts data in the record of dry cycle details	OUTLET TEMP EXCEEDED 240 Df - POWER DOWN error and operator alarm
Necessary procedure	See Section 2.2.5 “If Water Flow Occurs”	If the error given in the line above this one occurs, see “Error Messages” in the operator guide.		See Section 2.2.2 “About the <i>Min Fire</i> and <i>Outlet Temperature Exceeded 220°</i> Faults”		See Section 2.2.5 “If Water Flow Occurs”
* This does not apply to steam dryers						
** This does not apply to steam dryers if they do not use modulation.						

Figure 2: Component Locations for 6458_ Models

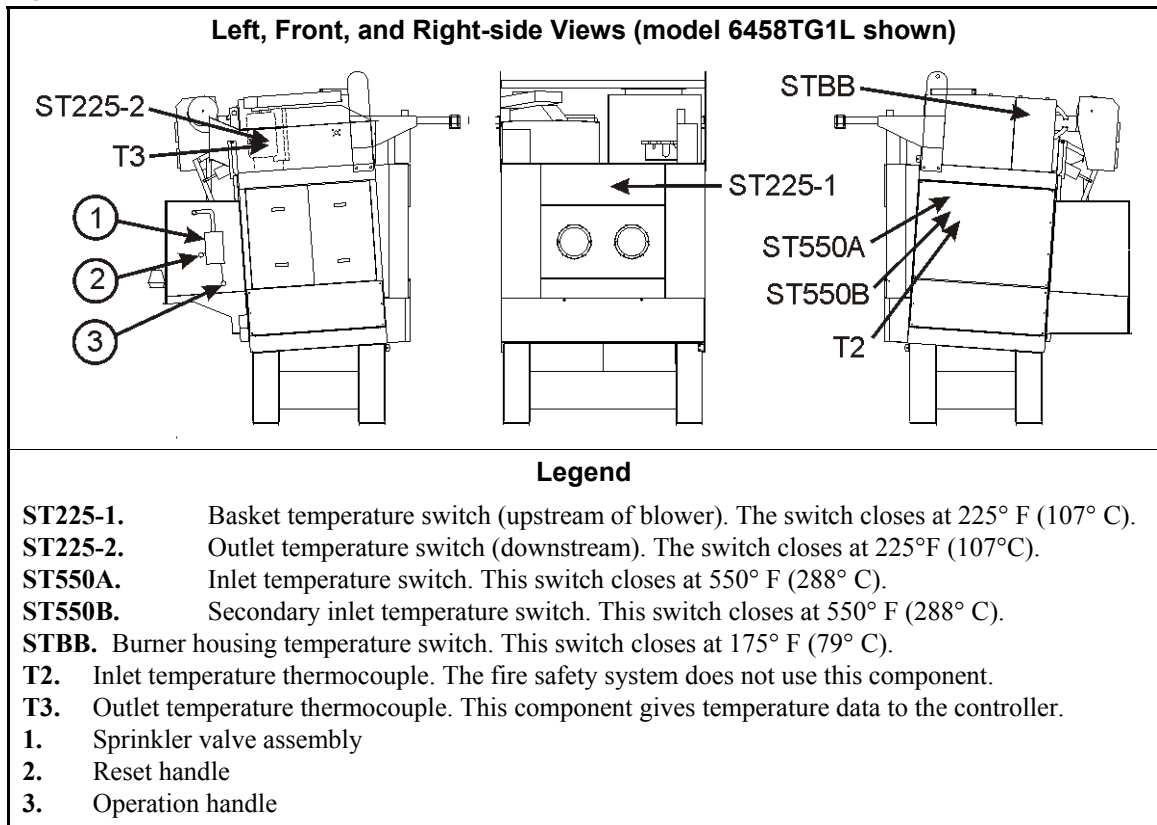


Figure 3: View of ST550A, ST550B and T2

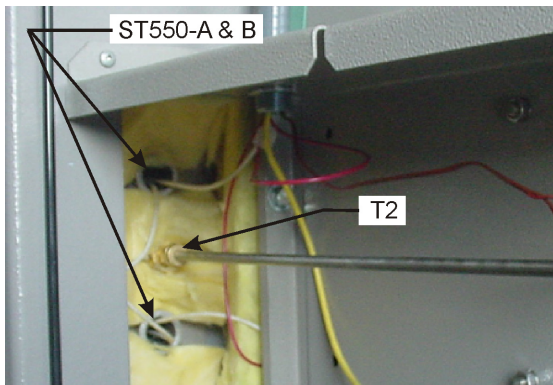


Figure 4: View of ST225-1

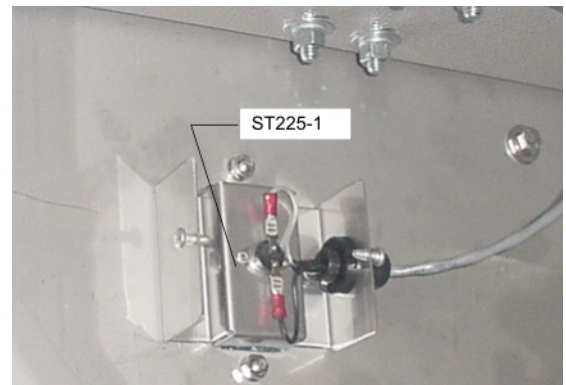


Figure 5: View of ST225-2 and T3

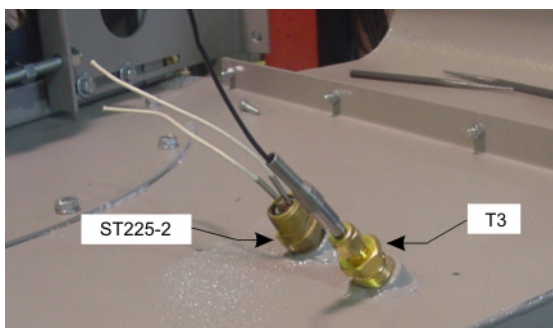


Figure 6: View of STBB



2.2.2. About the *Min Fire and Outlet Temperature Exceeded 220°* Faults

The function of these faults is to prevent conditions that can cause a fire. The controller does the necessary steps. There are no other steps for the operator to do immediately. But the controller puts data about the fault in the record of dry cycle details. These faults usually cause unsatisfactory operation. To prevent these faults, it can be necessary to change some procedures as told in the subsequent sections. Heat system adjustments and repairs are not routine maintenance. Speak to your dealer or Milnor.

2.2.2.1. Min Fire (MINF)—This condition applies to dryers that use gas or propane. Minimum fire is when the controller tells the modulating gas valve to go to the position 000. The correct condition is when the gas valve is open a small, stable increment. Under this condition, a *min fire* fault occurs if the controller senses that the outlet temperature increases. This fault usually shows that the goods became too hot and could catch fire. (One more symptom is if the goods have a burned smell.) When this fault occurs, the controller immediately goes to the subsequent cool down step. Some causes of min fire faults include:

- **The goods are held against the basket**—The correct condition is that the goods tumble in the basket. If the basket speed is too high, centrifugal force can hold the goods against the basket. Then the part of the goods that is against the basket can become too hot.
- **The gas valve does not operate correctly**—For example, the valve throttle cannot move down fully because it is damaged. This can prevent the min fire position.
- **Min fire is set too high**—The min fire position must be adjusted correctly when the gas and air as told in the procedure to set the heat system. Damage to components can cause this adjustment to change.

2.2.2.2. Outlet Temperature Exceeded 220° (degrees Fahrenheit)—This fault applies to all dryers except those with steam valves that do not modulate. The value 220° F (104° C) is 5°F (3° C) below the temperature that will close the outlet temperature switches (Fenwal switches) and start water flow. It cancels each subsequent heat step if the outlet temperature is higher than 220° F (104° C) for five seconds or more at the start of the step. This fault can also occur if the goods are held against the cylinder or the gas valve is damaged. The function of this fault is to make water flow not necessary, if the goods are not on fire. But if the goods catch fire, the temperature switches will quickly close to start water flow.

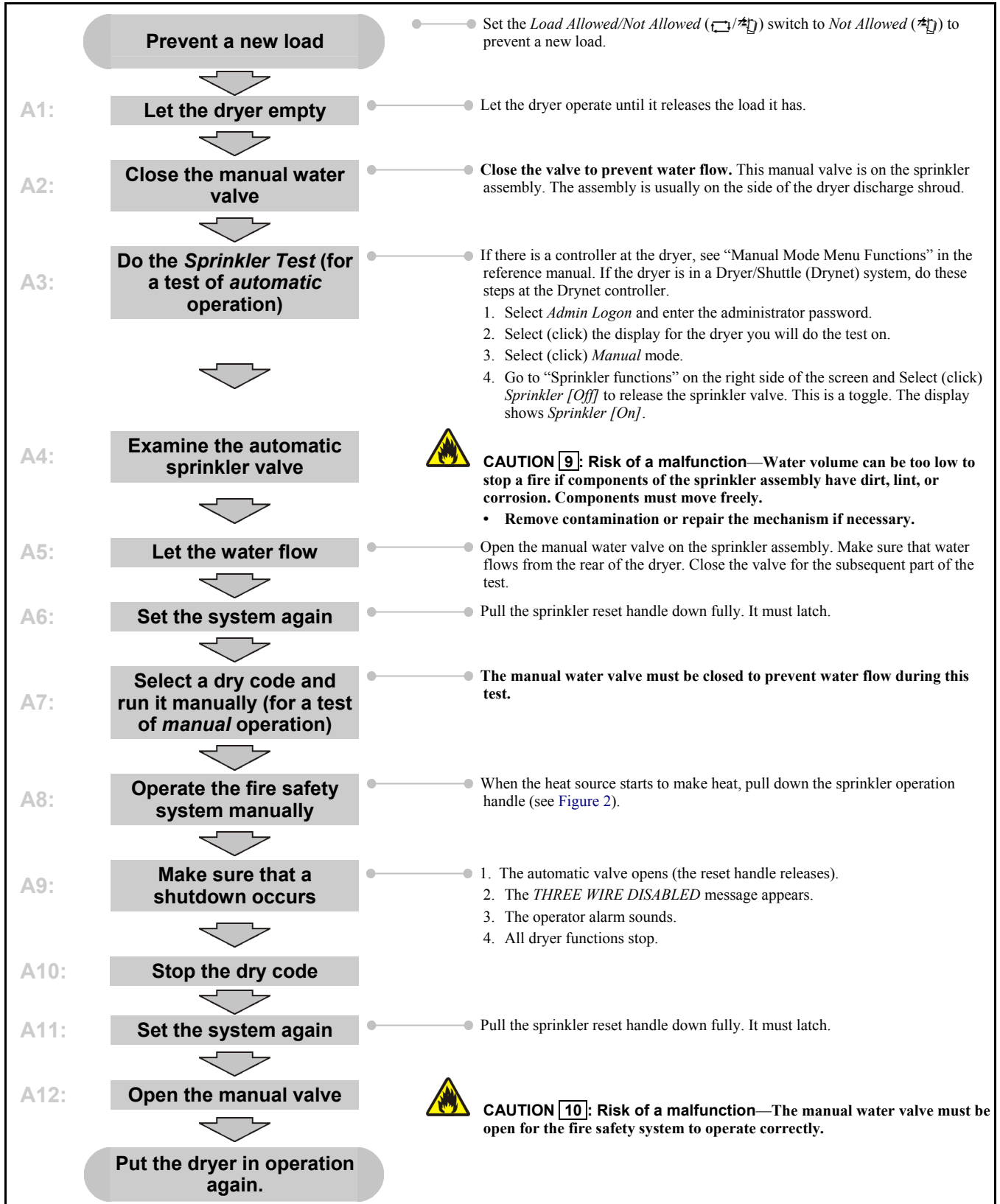
2.2.3. How to Prevent Water Flow When No Fire Occurs

If water flow occurs when there is no fire, two possible causes are:

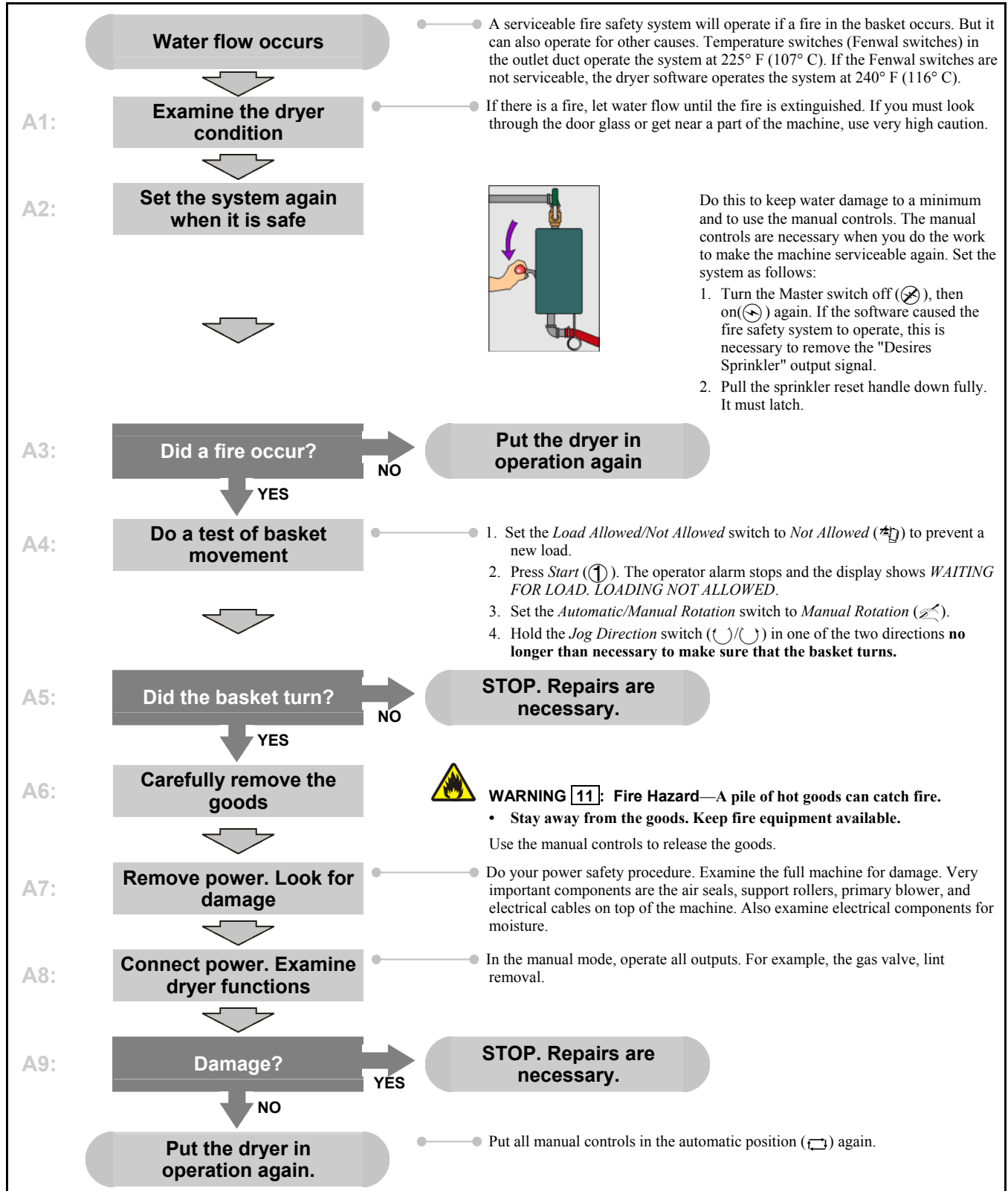
- **A temperature switch is damaged.** This is the usual cause. For example, material can hit a temperature probe and bend it. This can be a piece of goods that goes through a space where seals are worn. It is necessary to replace a damaged probe. The probe can also give an incorrect value if it has plastic contamination. It is necessary to remove the contamination.
- **Temperatures are not in the correct range.** The conditions described in [Section 2.2.2.1](#) can cause water flow if they are severe enough.

If water flow occurs when there is no fire, correct the cause. **Do not remove the fire safety system from operation.** If a fire occurs, this system is your first and best protection against a fire that is out of control.

2.2.4. How to Do a Test of the Fire Safety System



2.2.5. If Water Flow Occurs



— End of BIPDUM01 —

Chapter 3

Routine Maintenance

BIUUUM09 (Published) Book specs- Dates: 20120229 / 20120229 / 20120229 Lang: ENG01 Applic: PDV

3.1. Routine Maintenance—DRYVAC Lint Collector



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 13: 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 2](#) 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 2: 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 3: 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	fire safety system (sprinkler)	Do a test of the system. See the instruction on fire safety system operation and maintenance.
x							day*	machine area	Examine this area for materials that can burn or explode. Remove them.
x							day*	door interlock	See Figure 11 . Repair immediately if the machine does not stop when you open the door to remove lint.

Table 4: 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 Section 3.1.3 “How to Remove Contamination”
1	2	3	4	5	6			
	x					40 to 60 hours	inverter fans, vents, filters	See Figure 9 . Keep good air flow.
			x			600 hours	motors	Keep good air flow.
					x	2400 hours	entire machine	Remove excessive dust and dirt.
	x					40 to 60 hours	Dryvac cabinet	See Figure 11
			x			600 hours	lint bag	Turn the bag inside out to remove dust and dirt. Use a vacuum or use compressed air to push the lint out. If necessary, remove dirt with soap and water. Flush the bag with water. Make sure that it is fully dry before operation.

Table 5: Components that Become Worn

Examine. Tighten or replace if necessary, to prevent shutdowns and unsatisfactory performance. Speak to your dealer for replacement parts								
Mark						Do this each	Component	More Data
1	2	3	4	5	6			
		x				200 hours	drive belts and pulleys	See Supplement 1 and Figure 8

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			
						none	blower shaft bearings	These are sealed bearings. No grease maintenance is necessary.

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									

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.
vains 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.

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 14: 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
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

3.1.4.1. Grease Gun Procedures



CAUTION 15: 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:

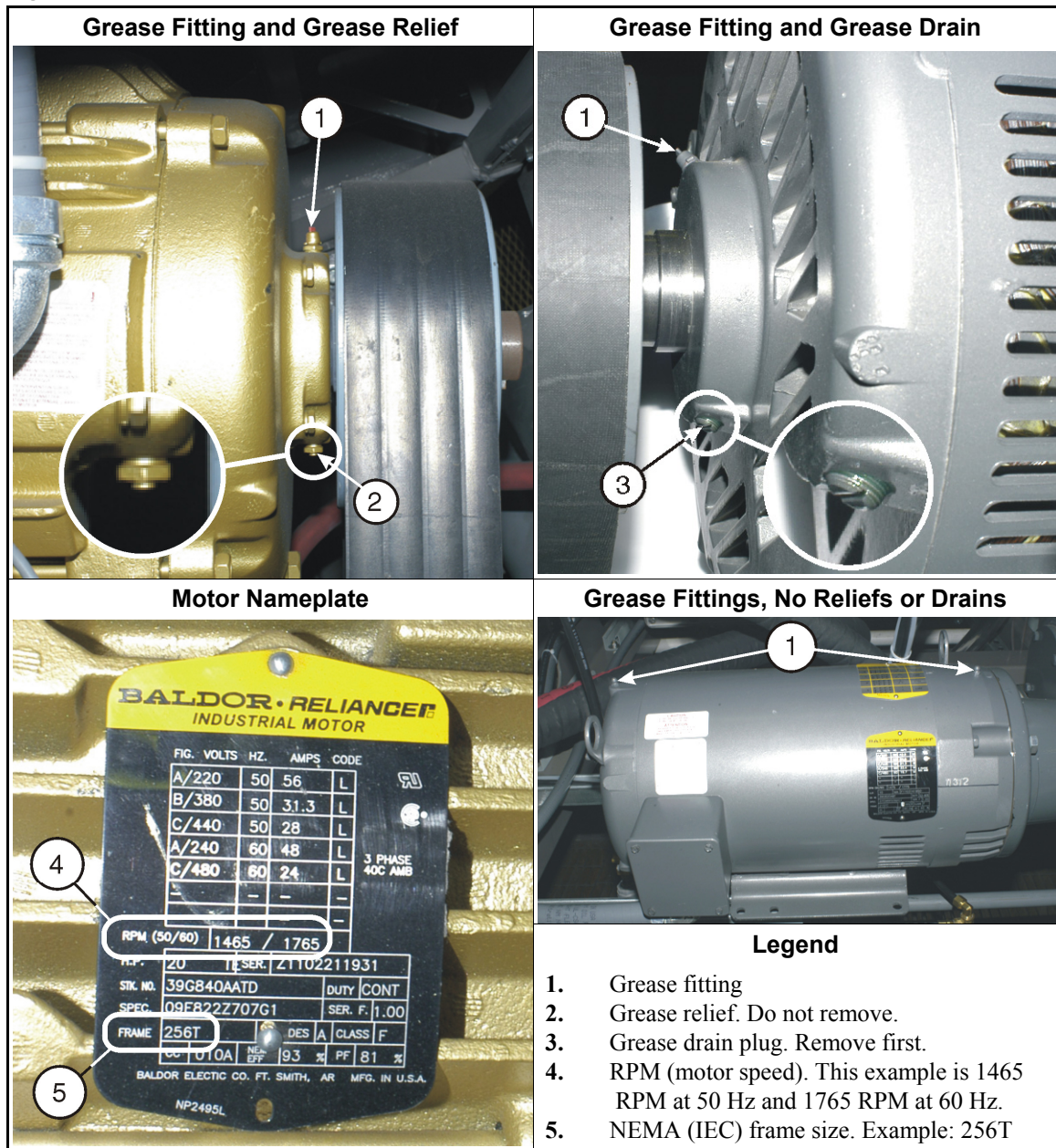
1. Make sure that the grease gun operates correctly.
2. Operate the grease gun to put grease into a small container with fluid ounce or milliliter increments. Pull the trigger fully and slowly.
3. Add a sufficient quantity of grease to measure accurately. Count the number of cycles of the grease gun (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. Grease 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 7 in Section 3.1.2](#) to record the data for the motors on your machine.

Figure 7: Motor Grease Maintenance Conditions



CAUTION 16: 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 16](#).

4. Add grease EM (Table 9) with the motor stopped. If the motor with the nameplate in Figure 7 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 Figure 7)		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]

Supplement 1

How to Examine Belts and Pulleys

Examine belts and pulleys when power is removed and look at them when the machine is in operation as explained below. If belts are damaged or pulleys are worn, speak to your dealer or Milnor.

With power removed:

- Look for dirt, dust, oil, and grease. Remove contamination.
- Look for belt damage as shown in Figure 8.
- Look for worn pulleys as shown in Figure 8.

With the machine in operation—Do not touch the machine. Look at the components and listen to them:

- 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.

Figure 8: Belt and Pulley Conditions To Look For. See Supplement 1.

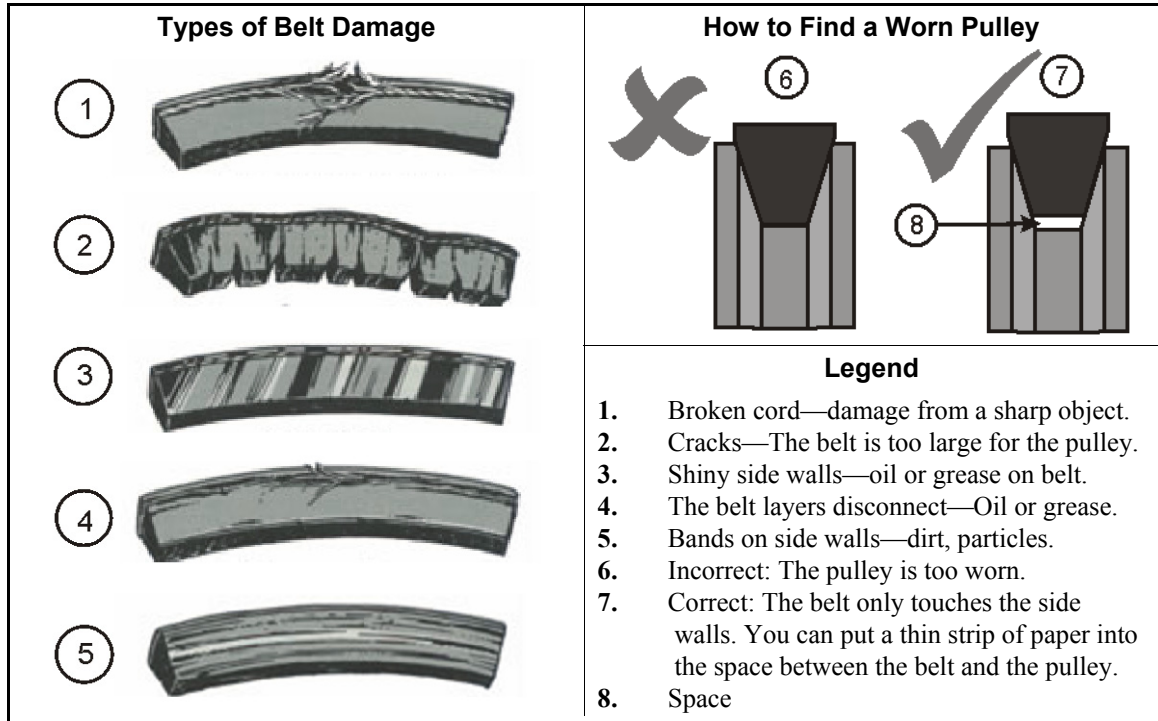
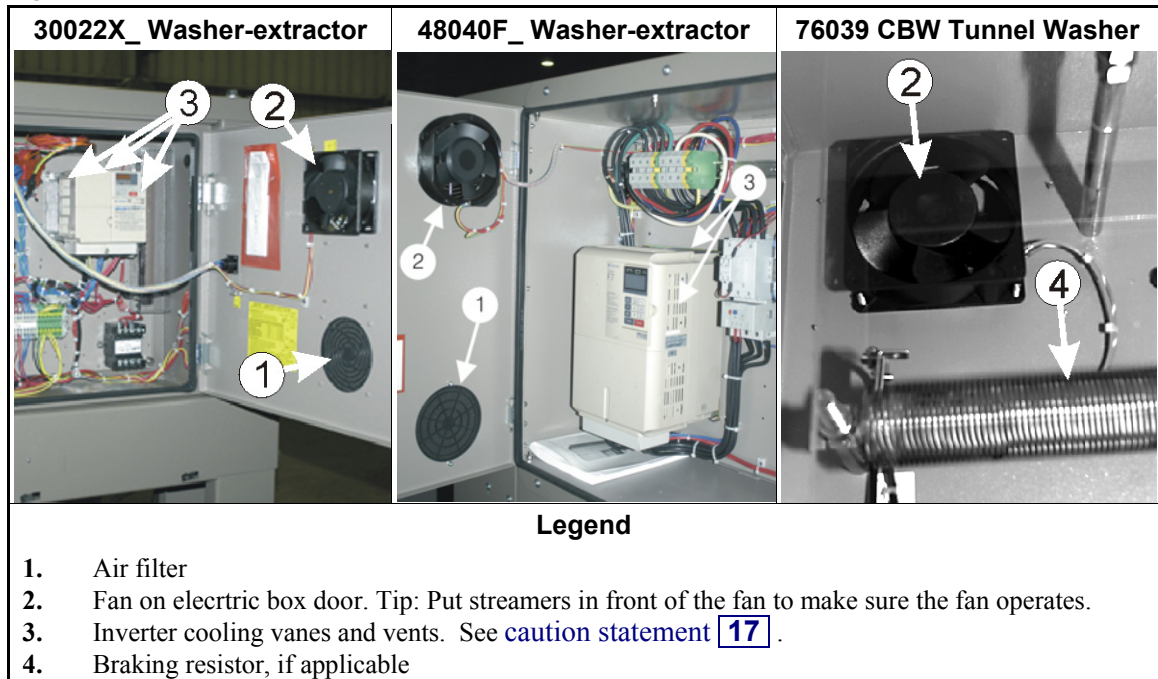


Figure 9: Electric Box and Inverter. These are examples. Your machine can look different.





CAUTION 17: Risk of damage—The inverter will burn out without sufficient airflow.

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

Figure 10: Compressed Air Inlet Strainers. These are examples. Your machine can look different.

T-Strainer. Outside machine frame on some models.	T-Strainer. Inside machine frame on some models.	Y-strainer. Used on some models
<p style="text-align: center;">Legend</p> <p>1. See caution statement 18. Remove plug to remove strainer.</p> <p>2. Compressed air in.</p>		



CAUTION 18: Risks of injury and damage—

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

3.1.6. Maintenance Components—Dryer and Dryvac Group [Document BIPDUM02]

Supplement 2

How Particle Contamination Occurs in the Dryvac™ Lint Collector

When the Dryvac controller senses that the lint bag is full, it gives a signal. When this occurs, it is necessary to replace the lint bag with an empty one or dryer operation will stop. When the system operates correctly, all of the lint goes in the bag and the signal occurs when the bag is full. Particle contamination occurs when lint goes in the cabinet, not in the bag. The signal can occur before the bag is full or not at all.



WARNING 19: Multiple Hazards—A strong flow of hot air, lint, and other material goes in the cabinet when the Dryvac unit operates. When you open the cabinet door, the interlock switch on the door prevents or stops operation. If you remove the grill on the exhaust outlet for the blower fan, this does not stop operation. The blower fan is a strong, high speed fan.

- If the door interlock switch does not operate correctly, repair the machine immediately.
- Remove power to the machine before you do maintenance in the blower housing.

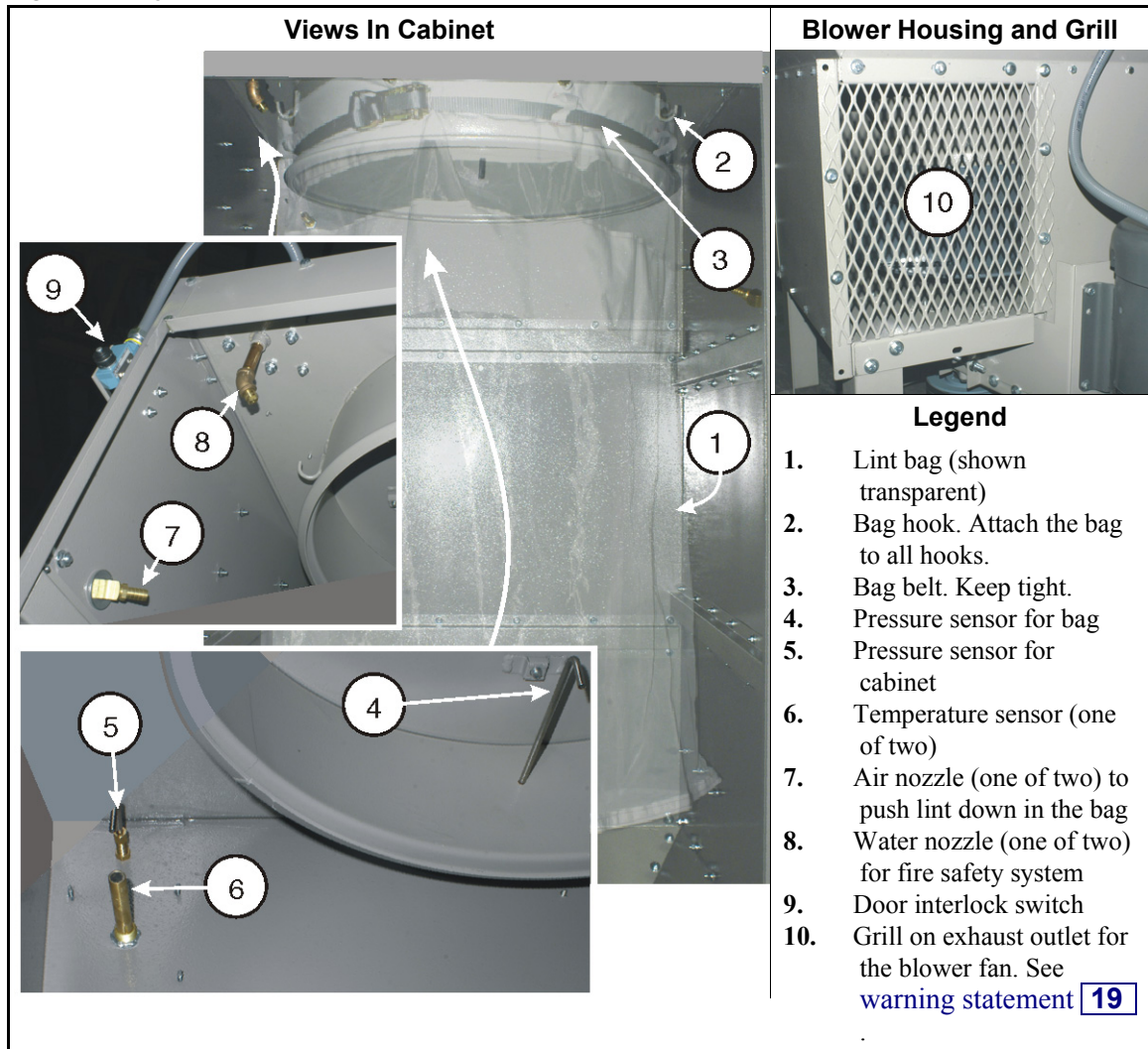
The maintenance summary gives the intervals to examine the Dryvac cabinet. Look at [Figure 11](#). Correct any of these conditions:

- clogged pressure sensors
- lint or other material on temperature sensors, air nozzles, or water nozzles
- lint bag dirty or worn

- a large quantity of lint in the cabinet (not in the bag). Possible causes are:
 - » damage to the lint bag
 - » bag not held by all hooks
 - » belt at the top of the bag not tight

If a large quantity of lint is in the Dryvac cabinet, the lint is also in the blower fan and housing. See [warning statement 19](#). Remove the lint from the blower fan and housing.

Figure 11: Dryvac™ Maintenance Areas (Model DRYVAC02 shown)



— End of BIUUM09 —