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- **Applicability: 42044SP2 42044SP3**
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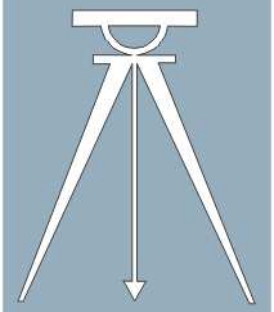
Installation—

42044 Staph Guard® Washer-extractors



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

Applicable Milnor® products by model number:

42044SP2 42044SP3

Preface

BIWUUI05 (Published) Book specs- Dates: 20130927 / 20130927 / 20130927 Lang: ENG01 Applic: 42044SP2 42044SP3

i. About This Installation Manual

This installation manual explains how to handle, locate, anchor, and un-restrain the machine, connect utilities, and check the installed machine for safety. It also discusses two important aspects of the facility and supporting equipment that can have major detrimental effects, if disregarded. These include:

- how extraction forces are imparted to the foundation,
- corrosion risks associated with pumped chemical systems.

Apart from the above, this manual defines only basic requirements (e.g., water pressure). It does not provide facility planning information (e.g., water usage). Installers who have facility design responsibilities involving:

- utility demands, or sizing of plant electrical wiring, water, steam, or sewer piping,
- supporting equipment such as water heaters, boilers, water softeners, air compressors, lint collectors, water reuse systems, effluent treatment systems, ventilators, utility stub-ins, vacuum breakers, or steam traps,
- floor drain troughs or building structural elements, particularly foundations,
- code compliance or environmental accommodations such as heat, noise, or vibration control,

will need to consult with the appropriate parties, as follows:

Local Milnor dealer—The dealer, in conjunction with the Milnor factory, can provide detailed information on those aspects of Milnor equipment affecting facility design. The dealer is also familiar with local conditions. However, neither Milnor nor the dealer can serve as the facility architect or engineer.

Design professionals—Architects and engineers are the only parties qualified to assess the structural, energy, ergonomic, and environmental considerations of the machine, as these apply to the overall facility.

Chemical supplier—The local chemical supplier who services the facility is the best source of information on laundering chemicals and chemical supply systems. Most suppliers are knowledgable in Milnor products, built-in wash formulas, formula programming methods, and chemical system connection methods and precautions.

Other equipment manufacturers—Consult the manufacturer or local distributor for any non-Milnor equipment you are installing in conjunction with the Milnor machine. These parties can consult with Milnor to address sizing or compatibility issues.

Commercial code enforcement entity—This local government entity can advise you of restrictions and requirements regarding fire prevention, effluent discharge, and other environmental concerns.

— End of BIWUUI05 —

BIUUUD13 (Published) Book specs- Dates: 20130927 / 20130927 / 20130927 Lang: ENG01 Applic: 42044SP2 42044SP3

ii. How to Identify this Manual and its Included Documents

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

Use the specifications on the front cover of this manual to identify this manual or the included documents. This section tells about these specifications.

Published manual number—The primary identification number for the manual.

Specified date—The first assembly date for the machine or change about which this manual gives data.

As-of date—The company makes new manuals about items that are not new. These new manuals will include data started before this date.

Access date—The date Milnor prepared the manual for its publication.

Depth—"Detail" manuals show the maximum available data. "Synopsis" manuals show the minimum necessary data. A manual with more data goes with a synopsis manual.

Custom—A value of "n/a" here shows that this manual applies to all machines identified on the inner front cover of the manual. Other values show the laundry name and a code for the specified machine.

Applicability—Each value here shows the machines or model numbers that this manual applies to. The inner front cover shows the full list of the applicable models. If this value is "not used," this manual has a different function.

Language Code—The value here shows the language and dialect of this manual. "Eng01" shows that the manual uses United States English.

Refer to a **document** in this manual with all of the specifications shown on the front cover. Replace the published manual number with the document number.

— End of BIUUUD13 —

Table of Contents

Sections	Figures, Tables, and Supplements

Sections	Figures, Tables, and Supplements

Chapter 1

Facility and Supporting Equipment Considerations

BIWUUI02 (Published) Book specs- Dates: 20130927 / 20130927 / 20130927 Lang: ENG01 Applic: 42044SP2 42044SP3

1.1. About the Forces Transmitted by Washer-extractors

During washing and extracting, all washer-extractors transmit both static and dynamic (cyclic) forces to the floor, foundation, or any other supporting structure. During washing, the impact of the goods as they drop imparts forces which are quite difficult to quantify. Size for size, both rigid and flexibly-mounted machines transmit approximately the same forces during washing. During extracting, rigid machines transmit forces up to 30 times greater than equivalent flexibly-mounted models. The actual magnitude of these forces vary according to several factors:

- machine size,
- final extraction speed,
- amount, condition, and type of goods being processed,
- the liquor level and chemical conditions in the bath preceding extraction, and
- other miscellaneous factors.

Estimates of the maximum force normally encountered are available for each model and size upon request. Floor or foundation sizes shown on any Milnor® document are only for on-grade situations based only on previous experience without implying any warranty, obligation, or responsibility on our part.

1.1.1. Foundation Considerations

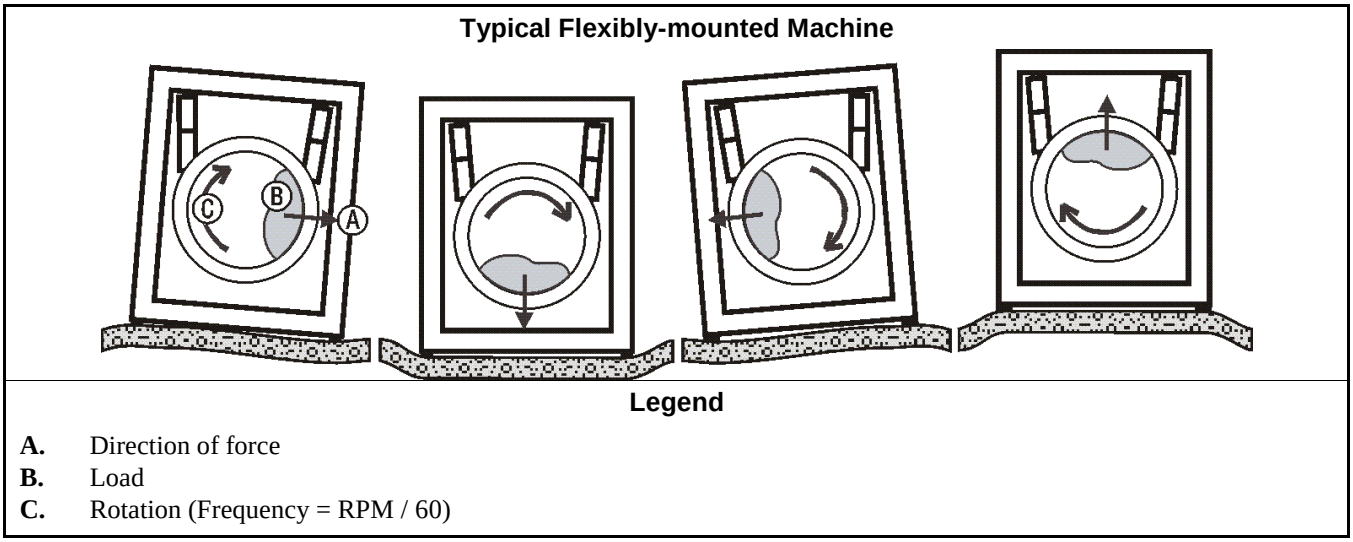
Size for size, flexibly-mounted machines generally do not require as strong a floor, foundation, or other supporting structure as do rigid machines. However, a floor or other supporting structure having sufficient strength and rigidity, as described in Section 1.1.2, is nonetheless vitally important for these models as well.

1.1.2. How Strong and Rigid?

Many building codes in the U.S.A. specify that laundry floors must have a minimum live load capacity of 150 pounds per square foot (732 kilograms per square meter). However, even compliance with this or any other standard does not necessarily guarantee sufficient rigidity. In any event, it is the sole responsibility of the owner/user to assure that the floor and/or any other supporting structure exceeds not only all applicable building codes, but also that the floor and/or any other supporting structure for each washer-extractor or group of washer-extractors actually has sufficient strength and rigidity, plus a reasonable factor of safety for both, to support the weight of all the fully loaded machine(s) including the weight of the water and goods, and

including the published 360-degree rotating sinusoidal RMS forces that are transmitted by the machine(s). Moreover, the floor, foundation, or other supporting structure must have sufficient rigidity (i.e., a natural or resonant frequency many times greater than the machine speed with a reasonable factor of safety); otherwise, the mentioned 360-degree rotating sinusoidal RMS forces can be multiplied and magnified many times. It is especially important to consider all potential vibration problems that might occur due to all possible combinations of forcing frequencies (rotating speeds) of the machine(s) compared to the natural frequencies of the floor and/or any other supporting structure(s). A qualified soil and/or structural engineer must be engaged for this purpose.

Figure 1: How Rotating Forces Act on the Foundation



The figure(s) above depict(s) both on-grade and above-grade installations as well as models installed directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available from Milnor® upon request. All data is subject to change without notice and may have changed since last printed. It is the sole responsibility of every potential owner to obtain written confirmation that any data furnished by Milnor® applies for the model(s) and serial number(s) of the specific machines.

— End of BIWUUI02 —

BIWUUI03 (Published) Book specs- Dates: 20130927 / 20130927 / 20130927 Lang: ENG01 Applic: 42044SP2 42044SP3

1.2. Avoiding Damage From Allied Remote Chemical Delivery Systems

Milnor® does not manufacture or supply remote chemical delivery systems and this document is meant only to illustrate some of the possible problems that can be minimized during installation of such systems by the chemical supply company. Milnor washer-extractors and CBW® batch washers (tunnels) are available with convenient inlets for such systems (see Figure 2). Most common of the types of systems currently used in commercial laundering operations are pumped chemical systems. Other types, such as constant pressure, re-circulating ring main systems have also been, and may continue to be used with Milnor equipment.

This document warns about some of the possible hazards posed by chemical systems and lists certain requirements needed to minimize those hazards. The procedures for interfacing with allied chemical systems and information pertinent to chemical use in general are provided elsewhere in the product manuals (see Note 1).

Figure 2: Pumped Chemical Inlets on CBW Batch Washer

Note 1: Misuse of laundering chemicals (such as injecting excessive concentrations of chlorine bleach or permitting acid sours to react with hypo chlorite) due to incorrect formulation can also be hazardous. Information pertinent to chemical use is provided elsewhere in the product manuals.

1.2.1. How a Chemical System Can Damage the Machine It Serves

Milnor has manufactured washer-extractors and tunnel washers with the same stainless steel specification since its founding. Every batch of steel used is certified and documented by the steel mill. Testing of samples damaged by corrosion have, in every case, proven the steel to be well within the AISI 304 specification.

Chemical products commonly found in the laundry industry, when used in **established** dosages and proper operating parameters, under the auspices of an experienced chemical specialist, should produce satisfactory results, with no consequential detrimental effects. The industry has published standards in Riggs and Sherrill, “Textile Laundering Technology”. However, the stainless steel can be damaged and even destroyed by **abnormal** contact with chlorine bleach, hydrofluosilicic acid and other commonly used chemicals, as will occur if chemicals are unintentionally leaked into the machine, particularly when it is no longer in use and especially when machine surfaces are dry.

Some chemical systems have been found to permit chemicals to dribble from the supply lines, or worse, to siphon from the supply tank into the machine, during operation and long after the system is shut down—as after working hours and during weekends. If this occurs, **deterioration (rusting) of the stainless steel and damage to any textiles therein will inevitably result. If this condition goes undetected, machine damage is likely to be catastrophic.** No machine is immune to such damage.

CAUTION 2: Equipment and Textile Damage Hazards—Chemicals leaked into the machine, particularly when it is idle can destroy machine components and textiles left in the

machine. **Pellerin Milnor Corporation accepts absolutely no responsibility for damage to its equipment or to textiles therein from abnormal contact with chemicals.**

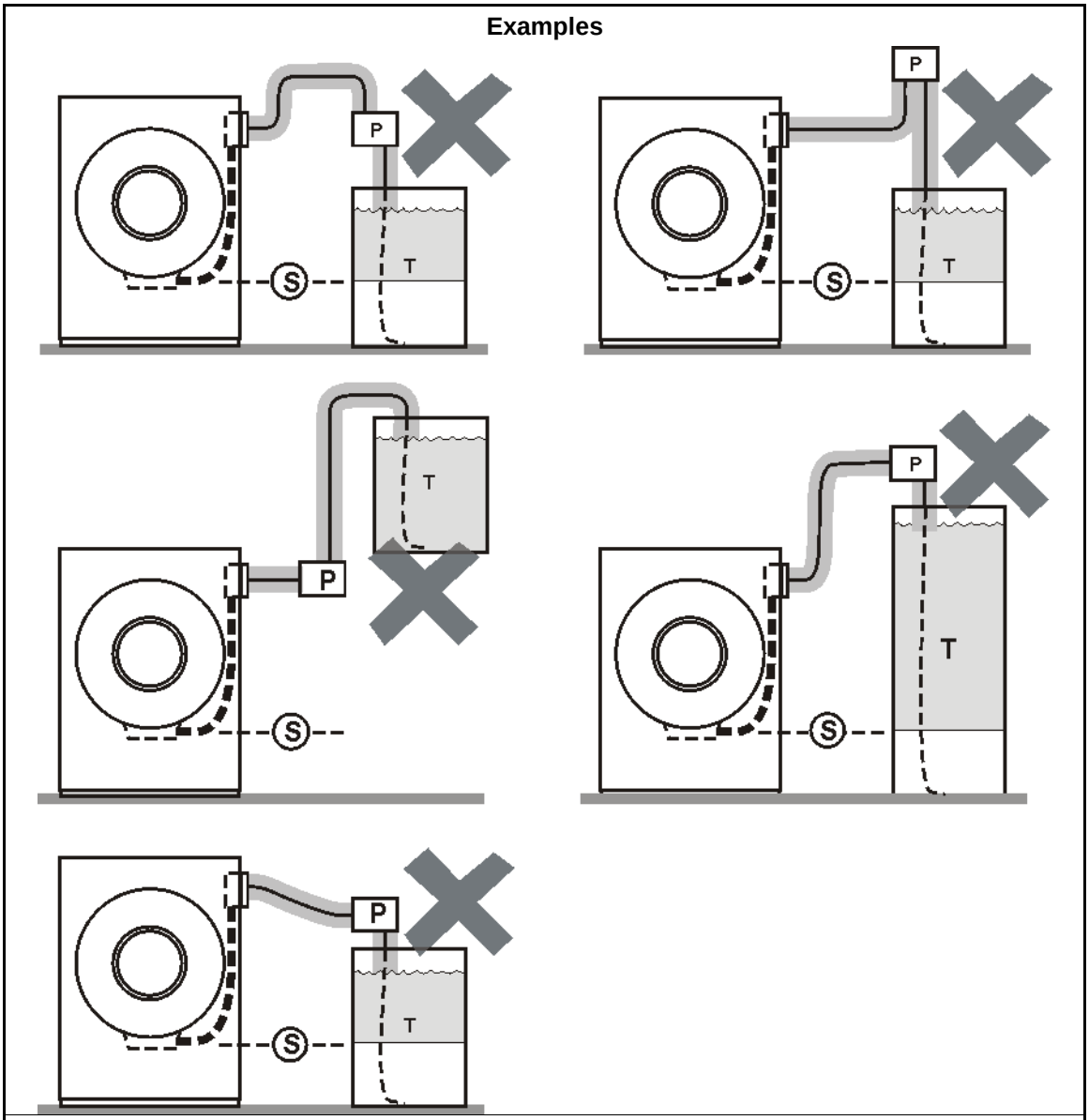
- Ensure that the chemical system prevents unintentional release of chemicals.
- Inspect regularly for proper operation and evidence of damage.

1.2.2. Requirements for Chemical Systems Used With Milnor Machines

It is the responsibility of the chemical system manufacturer and supplier to ensure that their system is safe for personnel and equipment. Some important points are described below.

1.2.2.1. Ensure the System Cannot Siphon.—The supply system must be designed to counteract any siphoning that could occur as a result of having a sealed supply line between the bottom of the chemical tank and the internal machine connection at the drain trough. As shown in the Figure 3 examples, if the pump (P) and/or the valving does not provide positive closure and there is no vacuum breaker protection, siphoning is likely to occur. In each of the Figure 3 illustrations, the volume of chemical in the tank above the siphon level (S), and indicated by shading, will flow into the machine.

Figure 3: Siphoning From the Chemical Tank into the Machine

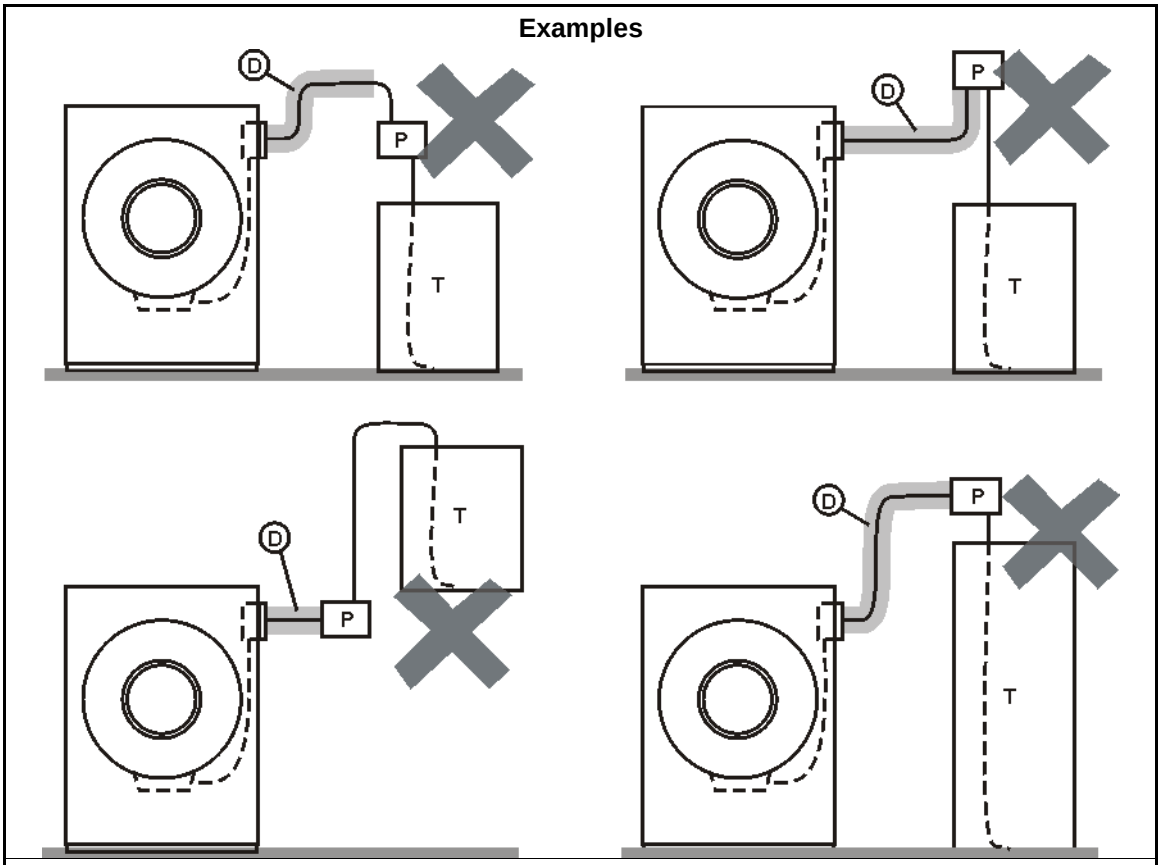


Legend

P. Pump
S. Siphon level. Shading indicates the chemical delivery line and tank content that can siphon into the machine.
T. Chemical tank

1.2.2.2. **Ensure the Chemical Lines Cannot Dribble**—The pumped chemical system may provide a means of positively closing the chemical line at the pump location, but not at the injection site. Hence, any concentrated chemical that remains in the injection line between the pump and the machine is free to flow into the machine. Some examples of this are shown in Figure 4.

Figure 4: Dribbling From Chemical Supply Line Into Machine (assumes positive closure at the pump)



Legend

D. Portion of supply line, the contents of which can dribble into the machine
P. Pump
T. Chemical tank

1.2.3. Design and Installation Recommendations

It is the responsibility of the chemical system manufacturer and supplier to use whatever measures are necessary to ensure that their system is safe for personnel and equipment. The following are some of the possible methods the manufacturer or supplier may wish to use, as appropriate.

1.2.3.1. Siphoning: Positively close the line.—If the pump does not provide positive closure when the system is off, employ a shutoff valve in the line to serve this purpose.

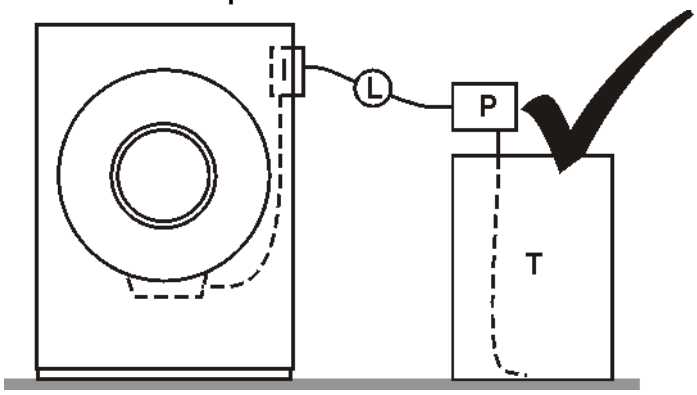
1.2.3.2. Siphoning: Break the siphon.—Provide an air gap or vacuum breaker in the chemical delivery line. This must be located above the "full" line of the tank.

1.2.3.3. Dribbling: Flush the entire chemical delivery line.—If any concentrated chemical that remains in the injection line between the pump and the machine is free to flow into the machine, employ a system that flushes the entire line between the pump and the injection point with fresh water after each injection.

1.2.3.4. Dribbling: Locate the entire chemical line below the machine inlet.—

Assuming the chemical system does not retain any line pressure and that the pump provides positive closure when the system is off, locate the entire chemical delivery line below the level of the chemical inlet. An example of this is shown in Figure 5.

Figure 5: Locating a Pumped Chemical System With Positive Closure To Protect Against Machine Damage



1.2.4. Guarding Against Leaks

All personnel who may work with the chemical system (e.g., chemical system manufacturer, chemical system supplier, chemical supplier, operator, maintenance personnel) should be vigilant in observing for leaks in the system. When connecting, or reconnecting chemical lines, whether at installation, after taking samples, or when replacing components, at a minimum ensure that:

1. the proper components are used,
2. all connections are the proper fit, and
3. all components are securely connected.

CAUTION 3: Injury and Damage Hazards—Chemicals leaking from a chemical system may be corrosive or toxic. Such chemicals can injure personnel and damage equipment.

- Use care when connecting chemical lines.
- Inspect regularly for leaks.

— End of BIWUUI03 —

Chapter 2
Handling the Machine

BIUUUI01 (Published) Book specs- Dates: 20130927 / 20130927 / 20130927 Lang: ENG01 Applic: 42044SP2 42044SP3

2.1. Handling Industrial Laundry Machines

An industrial laundry machine can be damaged during handling, due to the influences of weight, center of gravity, and momentum. This machine should be handled only by skilled equipment movers who understand how to protect it during transit.

2.1.1. Inspecting for Shipping Damage

Milnor neither warrantees the machine for, nor administers claims for transportation damage. These must be resolved between the consignee and the carrier. However, consult Milnor or your Milnor dealer to determine the cost (parts and labor) to repair any such damage and ensure that these costs are included with your claim to the carrier.

If a claim for transportation damage is to be filed with the carrier, generally, the carrier expects to receive such a claim:

- immediately after receipt by the consignee, if the claim is for **apparent** damage (damage that is visible without removing the machine from its protective covering), or
- within 15 days, if it is for **concealed** damage.

Before the machine is off-loaded from the transportation trailer, inspect for apparent damage. Describe any such damage on the shipping receipt and file a timely claim with the carrier. After the machine is off-loaded, remove the protective covering and thoroughly inspect for any concealed damage. Notify the carrier of any such damage, within 15 days, to initiate an inspection by the carrier. Consult the carrier for more information on claim requirements.

2.1.2. Common Risks and Precautions when Handling

CAUTION 4: Risks of costly damage—The machine is susceptible to damage while handling, particularly as described in Table 1.

- Observe the precautions explained in Table 1.
- Use the handling aids explained in Section 2.1.4.

Table 1: Common Risks and Precautions When Handling

Risk	Precautions
Certain machine components will quickly deteriorate if exposed to the elements.	Do not store unprotected (e.g., outdoors, uncovered).
	After receiving and inspecting the machine for shipping damage, replace the shipping covering until ready to install.
Components protruding from the frame, such as the shell front and door, chemical inlet manifold, and electric boxes, can easily bend or break on impact.	Ensure that facility doors and corridors are large enough for the machine, with a reasonable safety factor.
	Ensure that movable components on the machine are secured. For example, ensure that doors cannot swing open.
	Consult the Milnor factory for guidance on temporarily removing protruding components.
Movable internal components can malfunction if they are shaken, re-positioned, or remain restrained. Temporary restraints are painted red and/or tagged.	Leave shipping restraints in place until the machine is in its final position, then remove the restraints.
	Do not tilt, or upend the machine. For example, the shell of a suspended washer-extractor must be properly blocked before the machine housing can be tilted or turned on its side. Consult the Milnor factory.
Major components such as the frame and shell weldment can be bent (structurally damaged) if the weight of the machine is not evenly distributed.	Do not lift or jack only one corner, nor two opposite corners.
	Do not attach a lifting cable to any component other than a lifting eye or one marked for this purpose.
	Make sure lifting cables are rigged with a steep (closer to vertical than horizontal) angle. Use spreader bars if necessary.
	Do not set the machine, or tighten down anchor bolts on an uneven floor surface.
	Use moving equipment appropriate for the size, weight and center of gravity of the machine.
	Leave the machine on the pallet or skids until it is near its final position. Then lift only from beneath major frame members.
Linen can be damaged by rough metal surfaces.	Ensure that the stainless steel surfaces that come in contact with the goods are not nicked by tools or other objects.

2.1.3. Handling Weight

The following are the approximate non-skidded and skidded weights of applicable machine models. Refer to the machine nameplate for the model number of your machine. These are the empty weights (without goods or water) and will vary by a small percentage, depending on the options provided. You can also find the shipping weight on the bill of lading.

Do not use this information for facility design, which must take into account, static and dynamic loading, and other factors. Consult the Milnor factory for more information.

Table 2: Approximate Handling Weights for Applicable Machine Models

Model Number	Empty Weight				Comments
	Net (not skidded)		Skidded		
	Pounds	Kilograms	Pounds	Kilograms	
Divided Cylinder, Hydrocushion Suspended Models					
42044SP2	6156	2791	6406	2905	
42044WP2	5699	2584	5943	2695	
60044SP2	12074	5476	13110	5947	
60044WP2	11994	5439	12610	5720	
72044SP2	18954	8596	19610	8893	
72044WP2	17260	7827	17916	8125	

2.1.4. How to Use the Handling Aids

The machine is provided with the following temporary handling aids, all of which should remain on the machine until it is at or near its final position:

Pallet or skids—With the exception explained in Note 2, the machine will be either palletized and boxed (small machines) or skidded and plastic-wrapped (larger machines). Although the protective covering will need to be removed for inspection when the machine arrives on site, replace the covering if the machine will be stored for any length of time. In most cases, the machine is oriented on the pallet or skids so that it can be fork-lifted from the front. This is generally the best handling condition. However, it is sometimes necessary to orient the skids the other way, as, for example, when the machine will only fit in a shipping container side first. In such case, use care because the center of gravity will probably be somewhat off center of the fork blades.

> **Note 2:** Machines that are containerized for shipping via boat, will be palletized or skidded if the machine will fit this way in the container. Otherwise, the pallet or skid is omitted. However, in all cases, the machine is provided with protective covering.

Lifting components (painted red)—Larger models are provided with flat steel lifting eyes. These are placed at the best locations for crane lifting (usually the four corners of the machine). Ensure that all lifting eyes are secure and lift from all points provided. Rig equal-length, steeply angled (closer to vertical than horizontal) chains. Use spreader bars if provided or necessary.

Shipping restraints (painted red or otherwise marked)—Internal machine components that can be damaged by transit motion are held in position with temporary blocking, strapping, bracketry, etc. These restraints must be removed once the machine is in it's final location. Damage and malfunctions can occur if the machine is operated with the restraints in place.

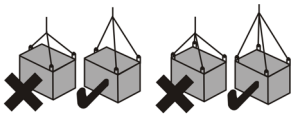
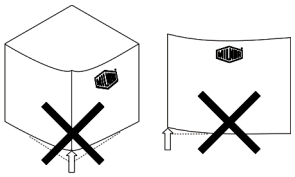
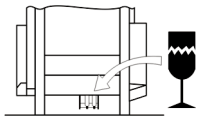
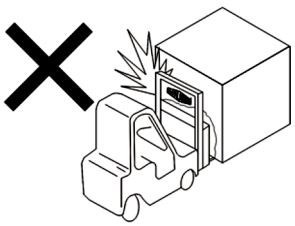
Installation tags—These mostly symbolic, tie-on, and white, adhesive tags alert the installer to important installation requirements. These are described in the next section.

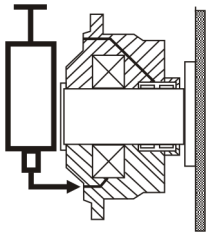
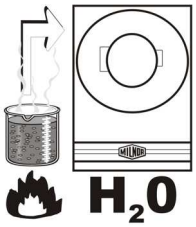
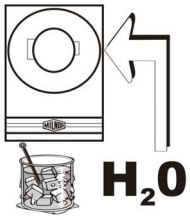
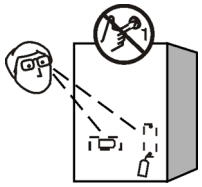
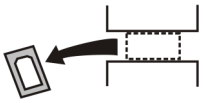
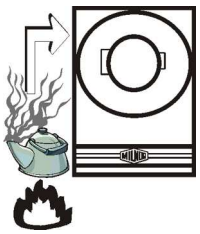
2.1.5. Understanding the Tag Guidelines for the Models Listed Below

[Document BIUUUI02]

Several installation guidelines and precautions are displayed symbolically, on tags placed at the appropriate locations on the machine. Some are tie-on and others are adhesive tags. Tie-on tags and white, adhesive tags may be removed after installation. Yellow adhesive tags must remain on the machine.

Most tags contain only symbols (no words). A few are worded. The explanations below, start with the tag part number (displayed on the tag). If a tag contains no words, the meaning of the tag is explained below. If the tag contains words, the explanation below simply repeats the wording.

Display or Action	Explanation
	Read the manual before proceeding. This symbol appears on most tags. The machine ships with a complete set of manuals. The safety, installation, and electrical schematic manuals are particularly important to installers.
	B2TAG88005: This carefully built product was tested and inspected to meet Milnor® performance and quality standards by
	B2TAG94078: Do not forklift here; do not jack here; do not step here—whichever applies.
	B2TAG94079: Rig for crane lifting (either 3-point or 4-point, depending on the number of lifting eyes provided) using a steep angle on the chains (closer to vertical than horizontal).
	B2TAG94084: Do not lift from one corner of the machine, as this can cause the frame to rack, damaging it.
	B2TAG94117: The brake assembly under the machine is fragile. Fork lift only under main structural supports. (Used only on 60044SP2/SP3 & 72044SP2.)
	B2TAG94118: Do not strike shipping container during fork-lifting. Fragile components inside.

Display or Action	Explanation
	B2TAG96007: Add grease here. Refer to the preventive maintenance schedule in the service manual.
	B2T2001013: Hot water connection.
	B2T2001014: Cold water connection.
	B2T2001028: Look for tags inside the machine. These tags may identify shipping restraints to be removed or components to be installed. Do not start the machine until these actions are completed.
 	B2T2002013: Do not start the machine until shipping restraints are removed. This tag will appear on the outside of the machine to alert you to the presence of internal shipping restraints. A tag will also appear on the restraint to help identify it. Most, but not all shipping restraints display the color red. Some shipping restraints are also safety stands. Do not discard these.
	B2T2004027: Steam connection (optional)

— End of BIUUUI01 —

Chapter 3
Installing the Machine

BIHD4F01 (Published) Book specs- Dates: 20130927 / 20130927 / 20130927 Lang: ENG01 Applic: 42044SP2 42044SP3

3.1. Site Accommodation and Installation: 42044SP2

This document describes physical characteristics of the machine that the site needs to accommodate, and the installation tasks needed to prepare the machine for use.

Notice 5: Owner/user responsible for safety—Most regulatory authorities (including OSHA in the USA) hold the owner/user ultimately responsible to maintain a safe working environment. Accordingly, the owner/user must recognize all foreseeable safety hazards, furnish safety instructions and guidance to all personnel who may come in contact with the installation, and provide all necessary additional safety guards, fences, restraints, devices, etc., not furnished by the equipment manufacturer or vendor.

CAUTION 6: Risk of damage and excessive vibration—The floor and/or other support components must have sufficient strength (and rigidity with due consideration for the natural or resonant frequency thereof) to withstand the fully loaded weight of the machine, including the goods, the water, and any repeated sinusoidal (rotating) forces generated during its operation.

- Write the Milnor factory for additional machine data for use by a competent soil and/or structural engineer.
- Refer also to Milnor document BIWUUI02 "About the Forces Transmitted by Washer-extractors"

CAUTION 7: Risk of costly rework—All dimensions shown in the figures are approximate and subject to normal manufacturing tolerances, and to occasional changes without notice, through redesign and/or relocation of components, etc.

- Do not pre-install anchor bolts. Instead, use the machine itself as a template.
- Do not pre-pipe closer than five feet (1.5 meters) from the machine.
- Do not base any facility construction on this information unless it is certified by Milnor.
- Consult the Milnor factory if the machine is to be moved through narrow or low corridors or openings.

Supplement 1

About the Figures

What the Figures Show—The figures depict views of the machine. Components identified in the views are described in the figure legend. **Dimensions** shown in these views are in **inches and [millimeters]**, unless stated otherwise. Threaded **pipe sizes** listed in the legends are NPT (USA National Pipe Thread) **inch** sizes, unless stated otherwise.

How to Identify a View—Each view has a label that is an abbreviation of the English word, such as "F" for "Front View." These abbreviations, which are not shown in the figure legend, are:

B—Back (rear) view. In the case of a divided cylinder Staph Guard® washer-extractor, this is the clean (unload) side.

F—Front view. In the case of a divided cylinder Staph Guard® washer-extractor, this is the soil (loading) side.

L—Left side view

R—Right side view

T—Top view

FP—Foundation plan view

ID—Installation detail on foundation plan

SP1—Detail of recommended barrier wall by others at side of machine

SP2—Detail of recommended barrier wall by others at top of machine

Understanding the "X," "Y," and "Z" Lines—Milnor uses three standard reference lines as a means of locating machines in the laundry facility. These reference lines, which are not shown in the figure legend, are:

Centerline X—Centerline of the machine frame. Most left/right dimensions are taken from this line.

Reference line Y—Front face of frame. Most front/rear dimensions are taken from this line. Reference line Y can be thought of as a vertical plane that the front of the machine frame touches.

Reference line Z—Base of machine. Most vertical dimensions are taken from this line. Reference line Z can be thought of as a horizontal plane that the underside of the machine foot pads, and the top of grout, touch (see Section 3.1.2.1 “Locating”).

Tip: When pre-piping, you may find it convenient to first establish the "X," "Y," and "Z" reference lines, and locate the connection points relative to these. But do not pre-pipe closer than five feet (1.5 meters) from where the connection point on the machine will be located.

3.1.1. Provide Adequate Clearances

The machine location must provide suitable clearance for:

- the standard machine envelope, which includes machine motion and door swings,
- any optional components,
- accommodating operation and maintenance, **as determined by the owner/user.**

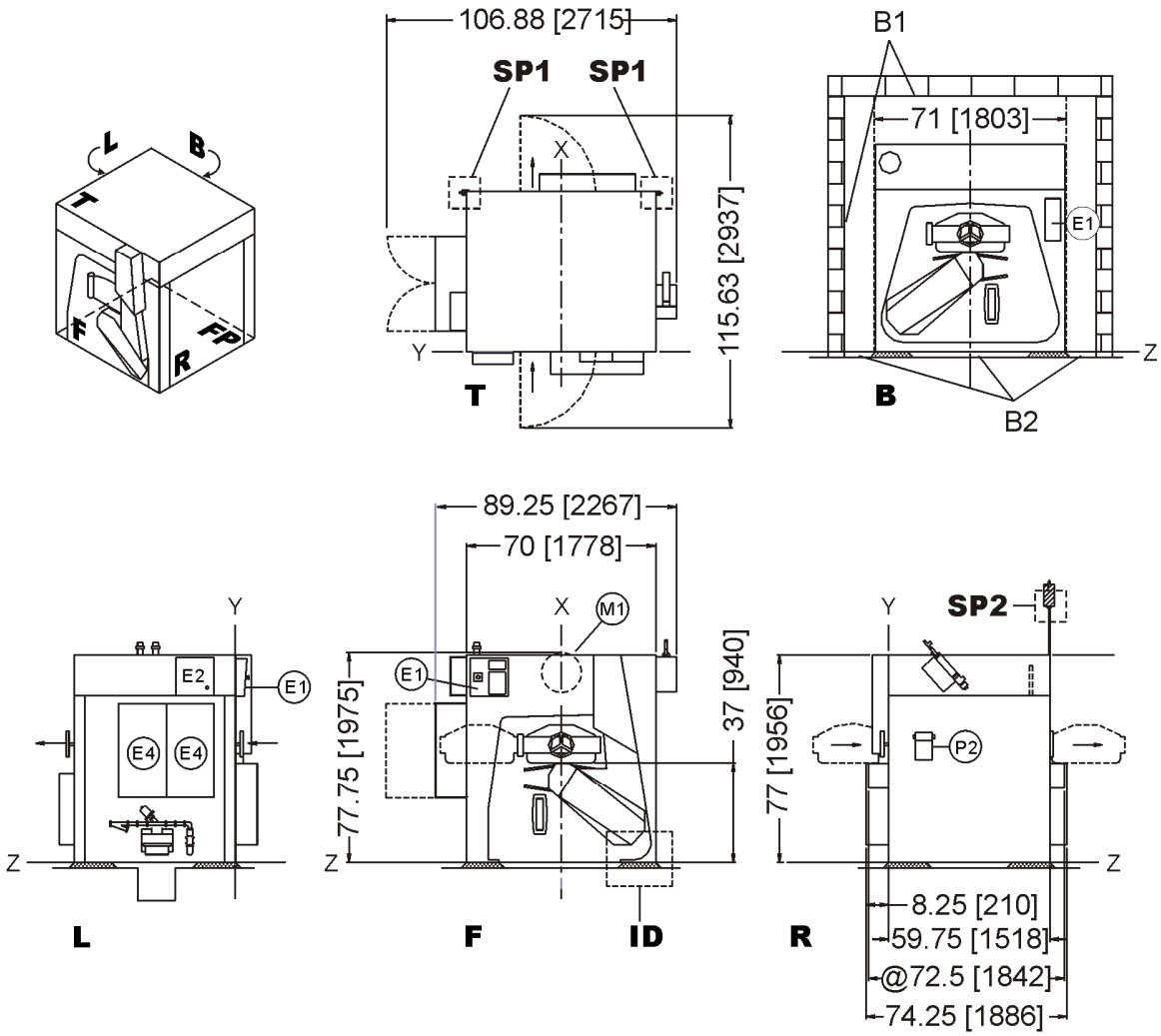
3.1.1.1. Dimensions and Components—Standard—These are shown in Figure 6, and include:

- Overall dimensions for the standard machine. Certain options will extend the overall space occupied by the machine (see Section 3.1.1.2).
- Clearance dimensions required for movement (e.g., tilting, door swings), but not any other clearances (see Section 3.1.1.3).

- Other dimensions that may be helpful, such as the frame size. Most components protruding from the frame can be temporarily removed, if necessary, to pass the machine through a narrow door or corridor.
- Identification of components mounted to the outside of the frame, that affect overall dimensions or that require clearance consideration.

Figure 6: 42044SP2 Dimensions and Components—Standard

Machine Views as Indicated

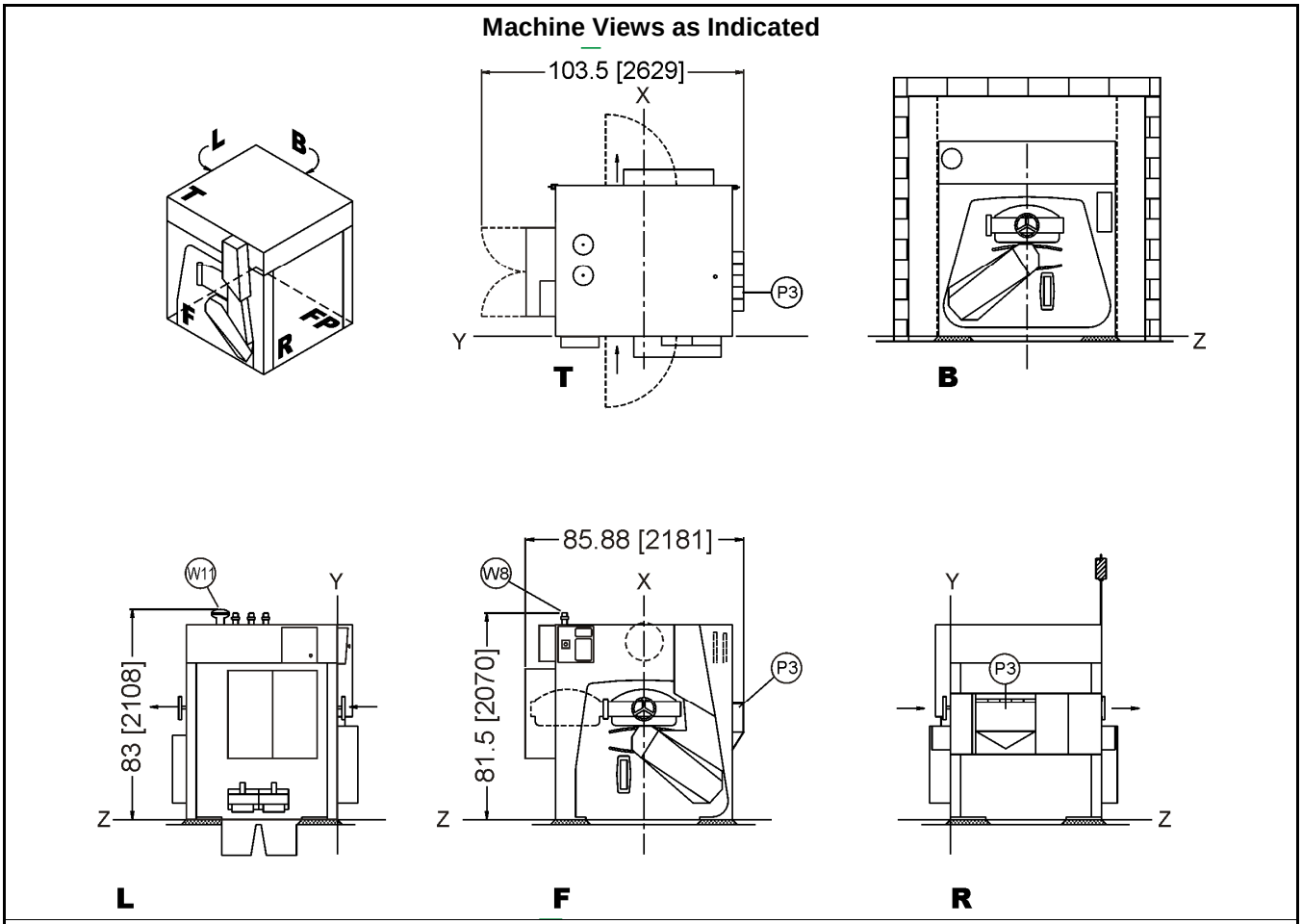


Legend

B1. Opening in permanent wall—96" [2438] x 96" [2438]. This provides approximately 18" [457] all around for machine installation and maintenance.
B2. Seal along bottom of machine frame and curtain wall frame with grout.
E1. Operator controls
E2. Microprocessor box—contains electronic circuitry such as printed circuit boards
E4. Main electric box—contains electrical circuitry and components such as output relays
M1. Drive motor (single motor, inverter-controlled).
P2. Soap chute
@. Dimension with belt guards removed.
FP. See Figure 8
ID. See Figure 8
SP1. See Figure 9
SP2. See Figure 9

3.1.1.2. Dimensions and Components—Options—Optional components that extend the space occupied by the machine or impose additional clearance considerations are shown in Figure 7.

Figure 7: 42044SP2 Dimensions and Components—Options



Legend

P3. Five-compartment supply injector
W11. Siphon breaker
W8. See Figure 11 "42044SP2 Utility Connections - Options".

3.1.1.3. About Functional Clearances—Milnor does not specify how much clearance should be provided around the machine for operation and maintenance. This is a matter of customer preference, except where codes govern. For example, the owner/user may decide not to provide clearance at the rear of an open pocket washer-extractor for bearing replacement, but only for routine maintenance, because the floor space has more value than the cost to temporarily move the machine forward, if this repair procedure becomes necessary.

Referring to Figure 6, the following are clearances required by code and types of activities with notable clearance requirements:

NEC electric box clearance—the minimum clearance required by the National Electric Code (NEC) in the USA, between an electric box and any object. This primarily applies to the main electric box on the left side (view L). As of this writing, this requirement is:
36" (914) if the object is an ungrounded (insulated) wall,

42" (1067) if the object is a grounded wall (i.e. bare concrete, brick, etc.),
48" (1219) if the object is any live (electrified) part.
In the absence of more stringent codes, Milnor recommends that installations outside the USA abide by the NEC requirements.

Drive motor replacement—a rare repair procedure performed on top of the machine (view T). The more overhead clearance, the wider the choice of lifting equipment, and the easier and quicker the task of dis-mounting and handling the drive motor (item M1).

Routine maintenance—normal preventive maintenance and minor corrective procedures, such as greasing, belt tension adjustment, and replacement of wear items such as belts and hoses. The least amount of clearance needed for these activities is that for one person with hand tools to access all sides and the top of the machine (views F, B, L, R, and T). However, the owner/user should consider the benefits of easy maintenance. A difficult to access grease fitting is easily forgotten until a bearing burns out.

Loading and operating (soil side)—normal soil side (view F) operator activities such as loading by the chosen method (e.g., cart, sling) and using the soil side controls.

Unloading at rear (clean side)—normal clean side (view B) operator activities such as unloading (normally by cart) and using the clean side controls.

Filling and cleaning the optional supply injector—operator procedures which include adding chemicals to the supply injector on the right side (view R) one or more times per cycle, and occasional hosing with water.

3.1.2. Set the Machine

The machine is designed for installation on a concrete foundation/floor containing a floor drain trough (or a split trough), as typically found in large laundries. Typically, two or more adjacent machines of similar size and type will straddle the trough, which must be sized to accommodate the outflow from all machines (see Section 3.1.3.2.1 “Accommodating Draining”).

3.1.2.1. Locating—Refer to any official architectural drawings of this installation and these figures, and proceed as follows:

1. Establish the "X," "Y," and "Z," reference lines, as shown in Figure 6.
   - If you are installing adjacent, similar machines, establish centerline "X" for each machine, and reference lines "Y," and "Z" for the entire group of machines.
   - Locate the horizontal "Z" plane a minimum of 1" (25) above any part of the floor that runs beneath the machine or group of machines, for grout integrity. On divided-cylinder models, this also helps ensure that the lower brake assembly will not hit the floor during operation.

Tip: Most cementious grout should be no thinner than 1" (25). Consult the grout manufacturer for more information.

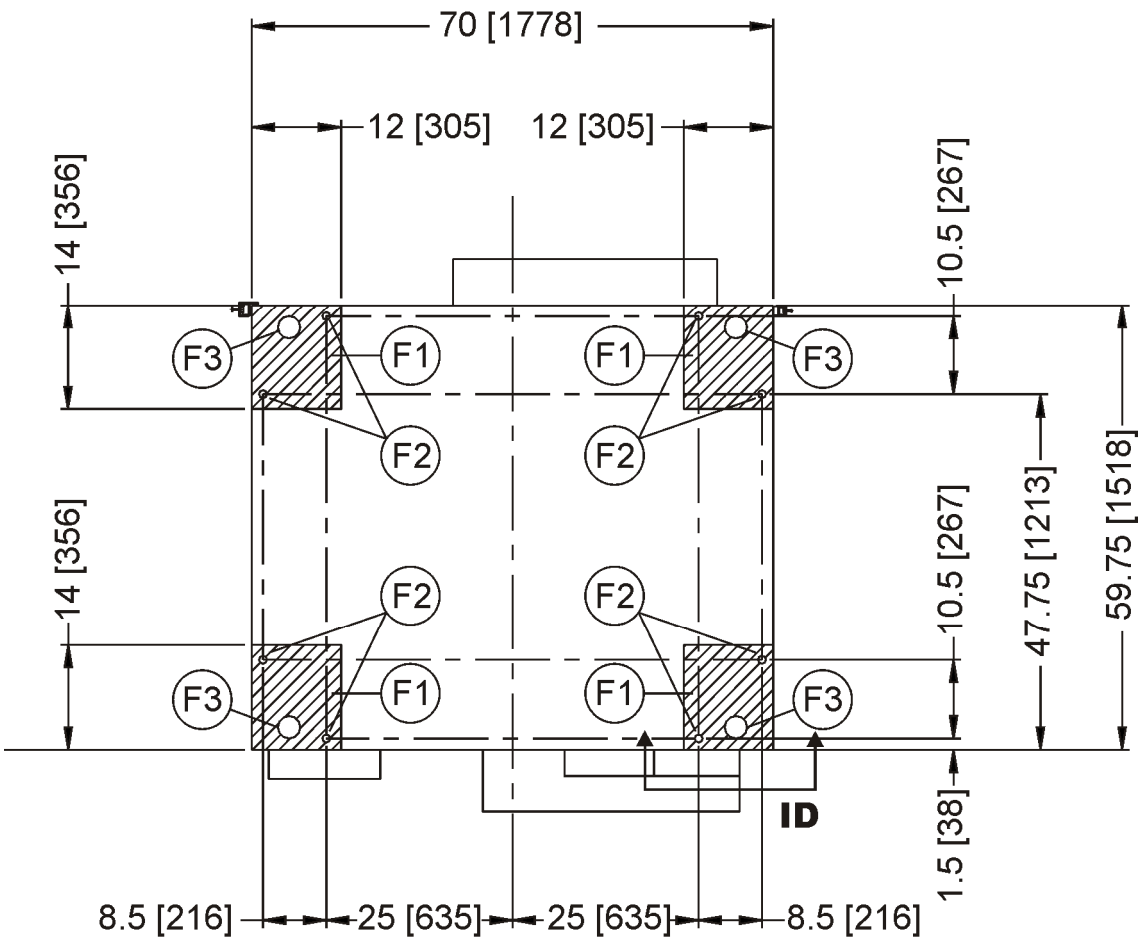
2. Determine the machine front-to-back position that is the best compromise between:
   - alignment with the "Y" reference line, such that the fronts of adjacent machines align.
   - alignment with the floor drain trough(s), such that, with no additional piping, the outflow from the drain outlet(s) will fall (air drop) into the trough(s). The drain valve(s) can move a few inches (several centimeters) during operation and must not be rigidly piped.

3.1.2.2. Leveling, Aligning, Anchoring, and Un-restraining

1. Roughen the floor surface where each foot pad will rest, as shown in Figure 8, Detail ID, for better grout adhesion and to discourage any tendency of the machine to creep during operation.
2. Set the machine in position and level it by shimming until the bottom of all four base pads touch the imaginary "Z" plane (see Figure 6).
3. Locate and install the anchor bolts using the machine as a template. Use the size and quantity of anchor bolts given in Figure 8.
4. Apply machinery grout under each foot pad such that the grout completely fills the space under the foot pads (no voids exist) and fills the grout hole, as shown in Figure 8, Detail ID. On divided cylinder, Staph Guard® models, grout continuously below the clean-side lower frame member and below the lower curtain wall members, to completely seal the barrier wall.
5. When the grout has hardened completely, remove all internal restraints. These are painted or marked with red and/or tagged. Be sure to check all possible areas where restraints may be located. For example, remove the tagged wire tie from the arm of the small vibration switch usually located in the high voltage electric box.

Figure 8: 42044SP2 Anchoring

Foundation Plan (FP)



Legend

F1. Foundation base pads, 4 places. Shading indicates these areas must be continuously supported.

F2. Anchor bolt holes—1-1/16" (27) diameter, 8 places.

F3. Grout holes—3" (76) diameter—one (1) per pad.

FF. Finished floor

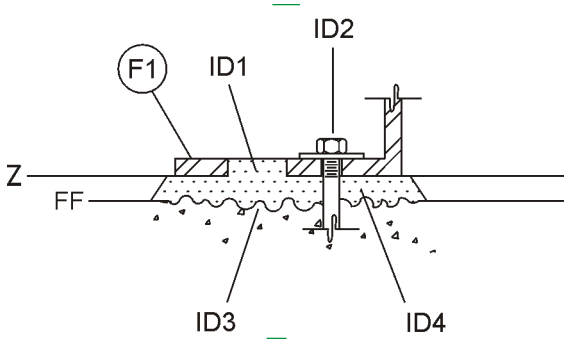
ID1. Grout must fill the grout holes

ID2. Anchor bolts— 5/8" (16) diameter x 6" (152). Use four (4) anchor bolts—one (1) bolt per pad, minimum.

ID3. Roughen the floor to discourage sideways movement of the machine

ID4. Minimum grout thickness: 1" (25).

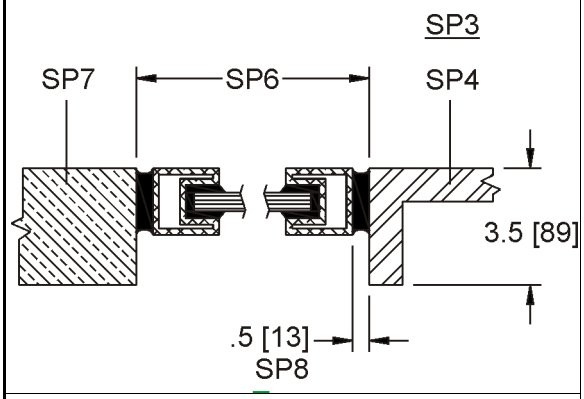
Anchoring Detail (ID)



3.1.2.3. About the Barrier Wall by Others—Milnor Staph Guard® washer extractors are intended to be located with the clean side of the machine sealed inside of a wall separating soiled goods from clean goods in the laundry. The typical sequence is to install a permanent barrier wall with openings that are substantially larger than needed for the machine, then install the machine, then fill the space between the machine and the permanent wall with a curtain wall. The curtain wall typically consists of a light metal frame with panel inserts. The recommended opening clearance in the permanent wall, for the machine, along with typical curtain wall details, are provided in Figure 9.

The Staph Guard® washer-extractor is internally sealed and specially vented to help prevent airborne contaminates from passing from the soil, to the clean side. However, the barrier wall must also be airtight. All gaps between the curtain wall and the machine, and between the curtain wall and the permanent wall must be continuously caulked. There must also be continuous grout along the machine frame at the floor.

Figure 9: Typical Barrier Wall Construction



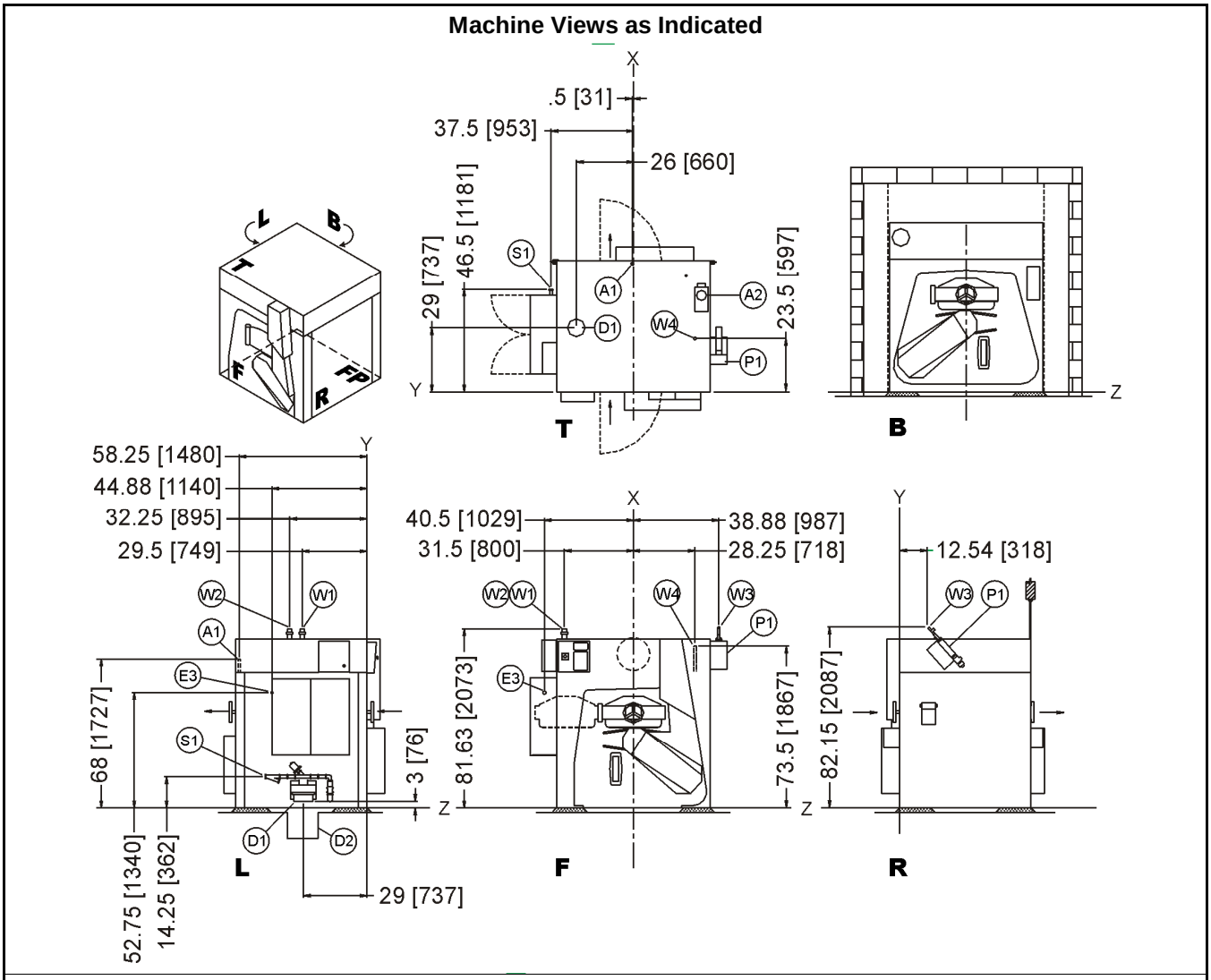
Legend

SP3. Clean side
SP4. Machine frame
SP5. Sheet metal belt guard on machine
SP6. Self-supporting curtain wall, by others. Allow about 18" [457] for installation and maintenance.
SP7. Permanent wall
SP8. Caulk

3.1.3. Connect Utilities

Standard connection locations and sizes are shown in Figure 10; those for machine options are shown in Figure 11. Connection guidelines follow the figures.

Figure 10: 42044SP2 Utility Connections - Standard



Legend

A1. Air inlet—1/4" NPT.

A2. Air vent—4" diameter sheet metal pipe. No connection required. If venting to the building exterior is desired, see Section 3.1.3.2.2 for precautions.

D1. Drain outlet—8" (203) diameter sheet metal pipe. Permit air drop to floor trough.

D2. Floor drain trough by others (see Section 3.1.3.2.1)

E3. Electric power connection

P1. Pumped liquid chemical inlet manifold containing twenty 1/2" NPT chemical inlets. Note that the number of output signals available for controlling chemicals varies with the controller type, but is typically limited to 15.

S1. Steam inlet—1-1/4" NPT

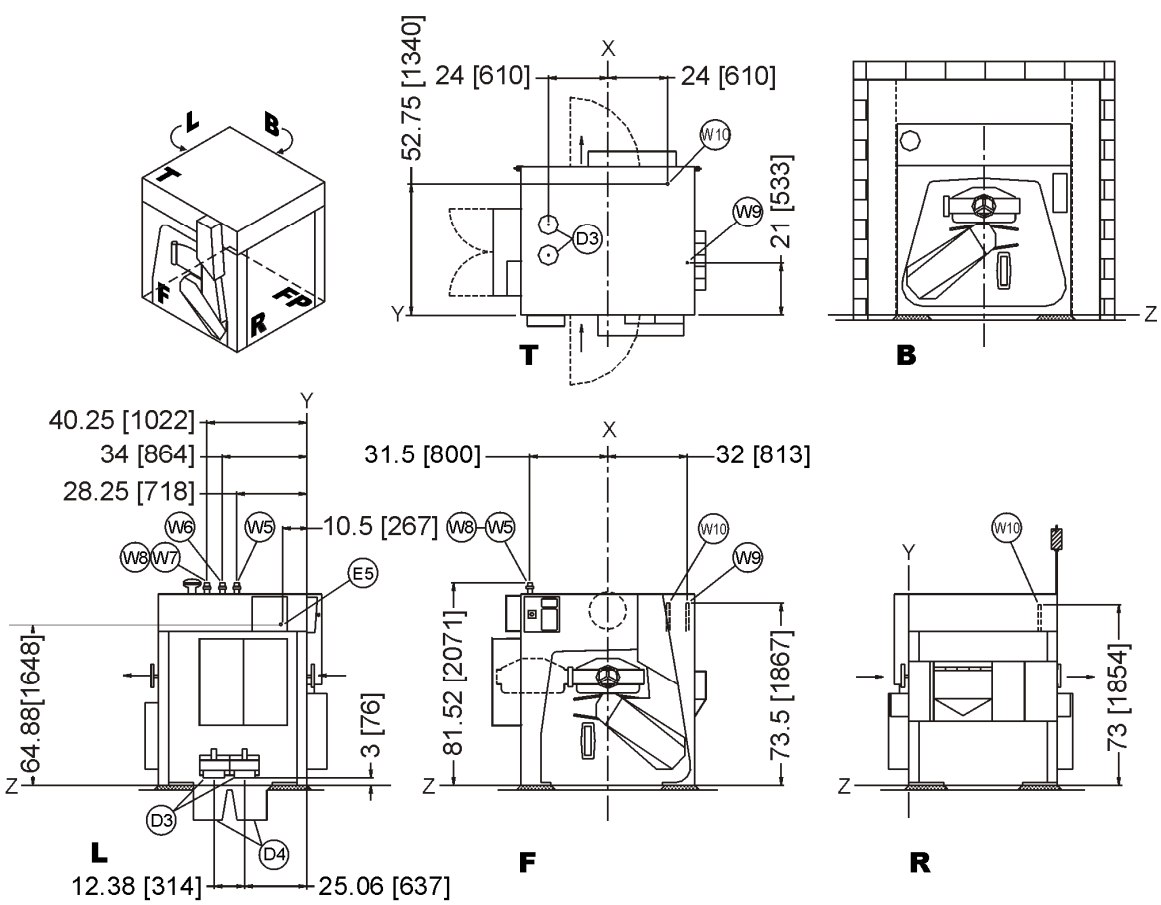
W1. Hot water inlet—1-1/2" NPT

W2. Cold water inlet—1-1/2" NPT

W3. Hot water inlet for flushing pumped chemical manifold—1/2" NPT.

W4. Cooldown water inlet—3/4" NPT

Figure 11: 42044SP2 Utility Connections - Options



Legend

D3. Dual drain outlets (sewer and reuse)—8" diameter sheet metal pipes (see Section 3.1.3.2.1).
D4. Dual floor drain troughs by others (see Section 3.1.3.2.1).
E5. Mildata network connection
W5. Hot water inlet if optional vacuum breaker—1-1/2" NPT.
W6. Cold water inlet if optional vacuum breaker—1-1/2" NPT.
W7. Third water inlet if optional vacuum breaker—1-1/2" NPT.
W8. Third water inlet if no vacuum breaker—1-1/2" NPT.
W9. Cooldown water inlet if optional vacuum breaker—3/4" NPT.
W10. Hot water inlet for flushing the optional supply injector—1/2" NPT.

3.1.3.1. **Piped Inlet Guidelines and Specifications**—The piped inlet pressure ranges required for this machine are shown on the machine nameplate and in Table 3. In the event of a discrepancy, the nameplate takes precedence.

CAUTION 8: Risks of damage, malfunction, and poor performance—Machine components such as internal valves can be damaged and can malfunction as a result of deficient plumbing or utility service.

- Abide by applicable codes regarding piping materials.
- Maintain the pressures specified on the machine nameplate and in Table 3.
- Avoid restricting upstream piping (see Supplement 2).

- Provide each piped connection with an external shutoff valve and a union for ease of maintenance.
- Thoroughly flush all water lines when making connections. Strainers on fresh water lines are recommended.
- Hold the machine side of the connection stationary with a wrench when tightening the fitting.

Supplement 2

Sizing Piping and Shutoff Valves

A good practice is to make the piping between the header and the machine one NPT pipe size larger than that of the inlet on the machine, and use a ball type shutoff valve. This will help compensate for pipe run, turns, and valve restrictions. Many valves have ports smaller, or more restrictive than the pipe size they connect to. A fully open, **full** port ball valve imposes no flow restriction at the valve location. A fully open, **standard** port ball valve has about the same effect as reducing the pipe by one pipe size at the valve location. A fully open globe valve has about the same effect as a reduction of two to three pipe sizes at the valve location.

Table 3: Pipe Inlet Pressure Ranges and Other Requirements (see also machine nameplate)

Connection Type	Permissible Pressure Range in pounds per square inch and (kilogram/square centimeter)		Other Requirements, Comments
	Minimum	Maximum	
Cold, fresh water	30 (2.11)	65 (4.57)	If water hammer occurs, compensate by installing a shock absorber, reducing pressure with a regulator, or by adjusting the needle valve on an air-operated water inlet valve to slow valve actuation.
Hot, fresh water	30 (2.11)	65 (4.57)	Hot water must be free of steam.
"Third" or reuse water	30 (2.11)	65 (4.57)	Reuse water often contains lint. Never connect reuse water to other than a reuse inlet and avoid using a globe type shutoff valve, which clogs easily.
Flushing water for optional supply injector	30 (2.11)	65 (4.57)	At startup, verify that the internal pressure regulator reads 28 PSI (1.96 kilograms per square centimeter).
Steam	30 (2.11)	115 (8.09)	Install the Y-strainer provided. Install a trap (not provided) immediately before the steam valve to help suppress steam hammer, if necessary.
Compressed air	85 (5.97)	115 (8.09)	
Pumped liquid chemicals	Refer to document BIWUUI03 "Avoiding Damage from Allied Remote Chemical Delivery Systems"		

3.1.3.2. Draining and Venting Guidelines and Specifications

3.1.3.2.1. Accommodating Draining—The machine is designed to quickly drain the bath liquor via the large, air-operated drain valve. The drain valve box is mounted to the shell weldment, which can

move a few inches (several centimeters) during operation—and particularly during extraction. The best condition is for the outflow from the drain to fall unrestricted (air drop) into the floor drain trough. It is permissible to mount a flexible extension hose onto the drain outlet provided it does not constrict the drain outlet, resist movement of the shell weldment, or restrict the flow of water through the trough.

For adequate draining, Milnor recommends that the floor drain trough (provided by others) have a minimum 1/8" per foot (1 centimeter per meter) slope and the cross-sectional dimensions shown in Figure 10 or Figure 11, as applicable. These specifications generally work regardless of the number of similarly sized machines that this trough serves.

If the machine has optional dual drain valves, the machine is circuited to open the front-most drain valve to release sewer water and the rearmost valve to release reuse water. If it is necessary to reverse this, reverse the air lines to the valve air cylinders; do not change any electrical circuitry.

3.1.3.2.2. Accommodating Venting—The machine will release a small volume of exhaust air via the shell vent when the cylinder door is closed and the machine is operating. Milnor Staph-Guard® washer-extractors are designed for mounting in a barrier wall that separates the soiled linen area from clean linen area. These machines have a vent valve that directs exhaust air to the soil-side. In most circumstances, washer-extractor vents should not be piped. Without proper engineering, external vent piping and/or powered ventilation is more likely to interfere with venting and normal machine functioning.

3.1.3.3. Electric Power Guidelines and Specifications —Refer to the machine nameplate for the incoming electric power specification.

CAUTION 9: Unsafe operation, damage and malfunction hazards—Electrical components can malfunction or fail as a result of deficient wiring or electric service.

- Power connections must be made by a competent electrician.
- Abide by the applicable codes regarding wiring materials.
- Ensure reliable electric power, free of significant voltage spikes and drops.
- Ensure that fusing and wiring meet the requirements given in the following sections.
- Provide external disconnect capability and a separate ground wire between disconnect box and the machine, as described in the following sections.
- Connect the “stinger leg,” if any, only to terminal L3.
- At startup, verify proper cylinder rotation during extract. Change the rotation direction by reversing the incoming power conductors connected to terminals L1 and L2. Never swap out the L3 connection. See the schematic manual for more information.

3.1.3.4. External Fuse/Breaker, Wiring, and Disconnect Requirements [Document BFUUUF01]—An external fuse **or** circuit breaker and a disconnect switch must be provided in the facility for (and dedicated to) the machine. These may be in the same or separate, **permanently mounted** electric boxes. Electric power and ground connections will be made between the incoming power junction box on the machine and this external box (or one of the boxes).

3.1.3.4.1. Fuse or Circuit Breaker Size—Refer to the “External Fuse and Wire Sizes...” document for your machine model. This document will be found either in the machine's installation manual or in manual MAEFUSE1AE “External Fuse and Wire Sizes for Milnor Machines.” Choose the fuse or circuit breaker from the appropriate column of the table provided, as follows:

3.1.3.4.1.1. If a fuse is used—Match the fuse listed in the “Fuse” column for your machine's voltage. The specified fuse sizes are consistent with the USA National Electric Code (NEC), section 430-52, exception No. 2, Part B, which states: “The rating of a time-delay (dual-element) fuse shall be permitted to be increased, but shall in no case exceed 225 percent of the full-load current.”

3.1.3.4.1.2. If a standard circuit breaker is used—Match the amperage rating listed in the “Breaker” column for your machine's voltage.

3.1.3.4.1.3. If an inverse time circuit breaker is used—Match the characteristics (amperage rating) of the fuse listed in the “Fuse” column for your machine's voltage. When applied to an inverse time circuit breaker, the specified fuse sizes are consistent with the USA National Electric Code (NEC), section 430-52, exception No. 2, Part C, which states: “The rating of an inverse time circuit breaker shall be permitted to be increased, but shall in no case exceed 400 percent for full-load currents of 100 amperes or less.”

3.1.3.4.2. Wire Size—Use wiring no smaller than that listed for your machine's voltage in the “Wire size...” column in the “External Fuse and Wire Sizes...” document. The table value applies to runs up to 50 feet (15 meters). Use the next larger size for runs 50 to 100 feet (15 to 30 meters). Use wire two sizes larger for runs greater than 100 feet (30 meters). If an inverse time circuit breaker is used and local codes require a larger wire size than that specified by Milnor, abide by the local code.

Notice 10: The specified wire size may appear too small for the fuse or circuit breaker shown. However, it is consistent with both the load imposed and with the USA National Electric Code.

3.1.3.4.3. Ground—The ground wire and connections must ensure a reliable earth ground (zero potential). Use wiring of at least as large a gauge as that required for incoming power. Do not rely on conduit, machine anchorage, etc. Use the ground lug provided in the incoming power junction box on the machine.

3.1.3.4.4. Disconnect Switch for Lockout/Tagout—The disconnect switch must permit personnel to disconnect and lockout/tagout electric power from the machine. In the USA, refer to OSHA standard 1910.147 “The control of hazardous energy (lockout/tagout)”. Refer to the USA National Electric Code for requirements on locating the switch. In other locales, abide by these standards if no other local codes apply.

3.1.3.5. External Fuse or Breaker and Wire Sizes for Washer-extractors 42044 CP2, CP3, NP2, NP3, SP3, WP3 42044 SP2, WP2 (Multi- and Single motor) [Document BFHD4F02]

Table 4: Specifications (Largest motor: Multimotor—7.5 HP; Single motor—25HP)

Volt Code	Voltage (VAC) See note 1	Running Amps - See note 2	Phase	Cycles (Hz)	Fuse OR circuit breaker		Wire size for 50 ft (15 m) run (AWG/mm²) See notes 4, 5
					Fuse (Amps) See notes 3, 5	Breaker (Amps) See notes 3, 5	
46	200	25	3	50	FRN60	100	08 / 10.00
52	208	24	3	60	FRN50	100	08 / 10.00
62	220	23	3	50	FRN50	90	08 / 10.00
66	220	23	3	60	FRN50	90	08 / 10.00
74	240	21	3	60	FRN45	80	08 / 10.00
81	346	14.5	3	50	FRS30	60	10 / 6.00
82	380	13	3	50	FRS30	60	10 / 6.00
83	380	13	3	60	FRS30	60	10 / 6.00
84	400	12.5	3	50	FRS30	50	10 / 6.00
85	415	12	3	50	FRS25	50	10 / 6.00
88	440	11.5	3	50	FRS25	45	10 / 6.00
94	440	11.5	3	60	FRS25	45	10 / 6.00
96	480	10.5	3	60	FRS25	40	12 / 4.00
98	600	8.5	3	60	FRS20	35	12 / 4.00

Notes:

1. Not all voltages available in all models.
2. Running amps are for the portion of the cycle with the highest, steady-state demand (after the motor is up to speed) and are approximate.
3. If fuses are used, they must be Bussmann Fusetron or similar lag type. If standard circuit breakers are used, they must match the amperage rating listed in the "Breaker" column. If inverse time circuit breakers are used, they must match the characteristics (amperage rating) listed in the "Fuse" column. An over-sized fuse or breaker poses a fire hazard (see caution below). An under-sized fuse or breaker will trip needlessly.
4. Wire size is per the USA National Electric Code. **Use wire size shown for runs up to 50 feet (15 meters). Use next larger size for runs 50 to 100 feet (15 to 30 m). Use wire two sizes larger for runs greater than 100 feet (30 m).** Under-sized wiring poses a fire hazard (see caution). This can also cause voltage drops even if the wire's current-carrying capacity exceeds that of the fuse/breaker. Voltage drops cause machine faults and reduce motor starting torque (e.g., a 5% voltage drop causes a motor to produce only 90% of rated torque). Voltage drop is greatest the instant the motor is energized, when highest torque is required.
5. See document BFUUUF01 "External Fuse...Requirements" for more information.

CAUTION 11: Fire hazard—An over-sized fuse/circuit breaker or under-sized wiring can permit the wiring to overheat and cause a fire.

- Always use the fuse/circuit breaker and wire size specified here.

3.1.4. Facilitate Safe Use

Before placing the machine in production, perform the actions explained below, to help ensure safe, productive operation. These actions should be performed by installers, maintenance

personnel, and/or dealer service personnel, as appropriate, not by operators or other third parties such as chemical suppliers.

3.1.4.1. Safety and Functional Inspection —An electrical power disconnect box, dedicated to this machine, is required, and should have been installed. This permits anyone, such as maintenance personnel, to remove electric power at the disconnect box and padlock the disconnect lever so that no one else can energizing the machine. Alternatively, the person can place a tag on the disconnect box to inform others not to energize the machine. The occupational Safety and Health Administration (OSHA) in the USA refers to this as the lockout/tagout procedure and it is essential for safety. Lockout/tagout is part of these, and many other procedures explained in the product documentation.

The safety inspection uses the manual operating procedures explained in the reference manual (provided with the machine). If you do not understand how to perform any of the following steps, refer to the manual operating procedures.

1. With the machine powered on, open the cylinder door fully. On Staph Guard® models, which have two cylinder doors, open the soil side door.
2. Shut down the machine and lockout/tagout power at the external disconnect switch.
3. Attempt to start the machine. If there is any indication that the machine is energized, this must be corrected by a competent electrician, before proceeding.
4. With power locked out/tagged out, look throughout the interior of the housing for any shipping restraints not previously removed and remove them.
5. With power locked out/tagged out, walk around the machine, looking for, and correcting any unsafe conditions, such as tools that were not removed, electric box doors that remain open or unlocked, and any objects too close to the machine for safe passage.
6. With power locked out/tagged out, replace any panels or belt guards that were removed for inspection.
7. Restore power and close the cylinder door.
8. If the machine has one or more emergency stop push buttons (red, mushroom-shaped button), test each one to verify that 1) machine operation stops, 2) the operator signal actuates, and 3, the Stop button locks in the open circuit position. Use manual functions to run the machine at wash speed, press the Stop button, then turn the knob in the direction of the arrows to unlock it (allow the circuit to close).
9. With bystanders clear of the machine, use manual functions to run the machine in extract. Verify that the cylinder turns in the correct direction, as indicated by the rotation tag(s) on the machine. If not, this must be corrected by a competent electrician, as previously explained.
10. With bystanders clear of the machine, start the machine and perform each of the manual functions explained in the reference manual. As you perform each one, have an assistant observe machine movement from a safe distance, looking, and listening for anything unusual. If any such condition occurs, this must be investigated and corrected by service personnel knowledgeable with the machine.

Tip: The white, adhesive-back paper tags and tie-on tags on the machine provide installation information and may be removed once this inspection is complete. Yellow, adhesive-back tags and all placards, which provide safety, operation, and maintenance information, must remain on the machine. If the owner/user prefers to remove the installation tags, it is better to do so now. The adhesive used on the white tags is designed to permit the tag to be pealed off, but this will become more difficult over time.

3.1.4.2. Documentation and Training—A set of product manuals and keys was provided with the machine (in a plastic bag placed inside the cylinder). Distribute these to the appropriate personnel, as shown in Table 5.

Table 5: Product Manuals, Keys, and Who Needs Them

What	User(s)	Suggested Custodian	Comments
Installation manual	Installers, management personnel	Laundry manager	May be useful for future facility planning after initial installation.
Programming key, if applicable	Chemical supplier, maintenance technicians	Laundry manager	For security, remove the Program key except when programming.
Reference manual			Programming, operating, and troubleshooting instructions
Formula set, if applicable			Descriptions of built-in wash formulas
Electric box keys	Maintenance technicians	Maintenance manager	For safety, electric boxes must remain closed and locked, except for maintenance.
Service/parts			Service procedures and mechanical parts identification
Schematic manual			Electrical parts identification
Operator Guide	Operator	Operator	
Safety Guide	all	Laundry manager	Important information for all personnel who may come in contact with the machine

The safety of personnel and productivity of the equipment depend on, in addition to proper installation, the proper configuration, maintenance, and operation of this machine. Laundry management personnel must ensure that personnel are trained in the appropriate aspects of the equipment and that these personnel have access to the appropriate product documentation.

— End of BIHD4F01 —