Basic Equations and Conversion Factors

CYLINDER VOLUME

$$\text{Volume, cubic feet} = \frac{\pi \text{ (Cylinder Diameter) x (Cylinder Diameter) x (Cylinder Depth)}}{4}$$

Cylinder Diameter and Cylinder Depth are both expressed in inches.

EXTRACT "G" FORCE

Extract G-Force is a way of comparing washers with different cylinder sizes and extract speeds. Always ignore RPM's and compare G-Forces. To calculate G-Force, use this formula:

$$\text{G-Force, G's} = \frac{\text{(RPM) x (RPM) x (Cylinder Diameter)}}{70{,}500}$$

RPM is cylinder rotation speed in revolutions per minute. Cylinder diameter is in inches.

MOISTURE CONTENT AFTER EXTRACTION

Moisture content is a way of expressing how much water remains in a load after extraction. This is water that must be removed by turning into steam in a Tumble Dryer or ironer.

To calculate moisture content, use this formula:

$$\% \text{ Moisture Content} = \frac{(LWE) - (LWD)}{(LWD)} \times 100\%$$

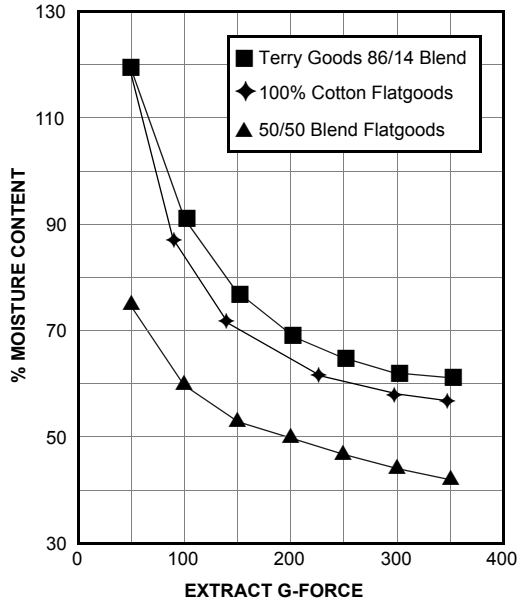
LWE = weight of load after extraction, pounds.
LWD = weight of load before extraction (dry), pounds.

Example: *A load weighs 60 lbs. before processing. After washing and extracting, the load weighs 119 lbs. The % moisture content would then be:*

$$\% \text{ Moisture Content} = \frac{(119 - 60)}{(60)} \times 100\% = 98.3\%$$

The chart below will provide an estimate of moisture content at a given G-Force for the indicated materials. Actual results will vary depending on material age and content, load size and extraction time.

MOISTURE CONTENT VERSUS EXTRACT G-FORCE



You can also estimate the water that would remain after extraction at a given G-Force. Simply rewrite the equation to solve for (LWE - LWD). So

$$\text{Weight of water to be evaporated} = (LWE) - (LWD) = \frac{\% \text{ Moisture Content}}{100\%} \times (LWD)$$

This expression shows the differences in extraction forces in “real world” terms.

Example: *A 60 pound washer extracting terry goods at 100 G’s will result in:*
Weight of water to be evaporated = 97% ÷ 100% x 60 lb. = 58.2 lbs.

While a 60 pound washer extracting the same load at 300 G’s will result in:
Weight of water to be evaporated = 57% ÷ 100% x 60 lb. = 34.2 lbs.

So there will be (58.2 - 34.8) = 23.4 lbs. less water to be removed in the Tumble dryer or ironer!

ELECTRICITY

1 kW/hr = 3413 BTU = 0.03413 Therm
1 Therm = 29.31 kW/hr
Kilowatt/hours, kW/hr = (Horsepower, H.P.) x 0.7457

WATER HARDNESS

When washing in hard water, soap consumption will be higher than when using soft water. A water softener is recommended if water hardness exceeds 3 grains.

Water hardness definitions:

Grains per gallon	Parts per million	Description
Less than 1	Less than 17.1	Soft
1 to 3.5	17.1 to 60	Slightly hard
3.5 to 7.0	60 to 120	Moderately hard
7.0 to 10.5	120 to 180	Hard
10.5 and over	180 and over	Very hard

GAS

1 BTU (British Thermal Unit) is defined as the amount of heat energy required to raise the temperature of 1 pound of water by 1 degree Fahrenheit (F).

1 therm of energy (TH) is equal to 100,000 BTU.

1 cubic foot of Natural Gas is approximately equal to 1000 BTU
[1000 cu. ft. (1 MCF) equals 10 therms]

1 cubic foot of Butane Gas is approximately equal to 3200 BTU.

1 gallon of No. 2 (Diesel) fuel oil is equal to 138,000 BTU.

1 gallon of No. 6 fuel oil is equal to 142,000 BTU.

1 gallon of Propane (LP gas) is equal to 92,000 BTU or 0.92 therms.

Gas cost: The cost of gas is usually stated as “Price per cubic meter.” In computing costs, the total charges billed in (1) period should be divided by the total number of therms used during that same period. This gives the average cost per therm, including any incentive rates used by local gas suppliers, such as “straight line rates”, “block rates”, etc. Average costs should be calculated showing the effects of usage-based rates. Additional changes such as “demand charge”, “commodity charge” or “service charge” may also be part of the gas cost and should be included in all calculations.

WATER

1 gallon of water weighs 8.33 lbs

1 cubic foot is equal to 7.48 gallons

1 cubic foot of water weighs 62.4 lbs.

BOILER HORSEPOWER

1 Boiler Horsepower (B.H.P.) is defined as the work of converting 34.5 pounds of water at 212°F per hour into steam at 0 psi gauge pressure.

1 B.H.P. = 33,500 BTU per hour

1 B.H.P. = 9.803 Kilowatts (kW)

1 B.H.P. = 34.5 lbs. of steam

To determine the boiler horsepower consumed by a laundry facility using steam-heated equipment, first determine all of the machinery that will require steam. Next, list steam consumption of each machine in B.H.P. Multiply each consumption factor by the quantity of that machine in the laundry facility. The sum of these will be the total steam consumed per hour of laundry facility operation under ideal conditions. To allow for losses and inefficiencies, multiply this by 1.1 (to add 10% safety factor) and divide by 0.7 (efficiency factor). The result is the minimum boiler size for the laundry facility.

METRIC EQUIVALENTS AND COMMON CONVERSION FACTORS

1 U.S. gallon = 3.785 liters

1 liter = 0.264 U.S. gallons

1 cubic foot = 0.028 cubic meters = 28.317 liters

1 liter = 0.035 cubic feet

1 inch = 25.4 mm = 0.0254 meters

1 foot = 0.3048 meters

1 meter = 39.37 inches = 3.28 ft. = 3 ft. 3-3/8 in.

1 square foot = 929.03 square centimeters = 0.0929 square meters

1 square meter = 10.76 square feet

1 pound = 0.4536 kilograms

1 kilogram = 2.20 pounds

1 pound per square inch (psi) = 0.069 bar

1 bar = 14.5 psi

1 BTU = 0.251996 kcal

1 C.F.M. = 0.46895 liter/sec. = 0.0283 cubic meters/min.

Labor Requirements

Use the following guidelines to estimate the number of full-time equivalent (FTE) employees that a laundry facility would need:

For a laundry facility with less than 125 total pounds (56.7 kg) of washer capacity, provide (1) FTE for every 60 pounds (27.2 kg) of washer capacity.

For a laundry facility with more than 125 total pounds (56.7 kg) of washer capacity, provide (1) FTE for every 75 pounds (34.0 kg) of washer capacity.

Examples:	*A laundry facility with (2) UWN060 washers (120 pounds [54.4 kg] total capacity) would need 2 FTE's (120 pounds [54.4 kg] washer capacity divided by 60 pounds [27.2 kg] per FTE).*
	A laundry facility with (2) UWN125 washers and (1) UWN060 washer (310 pounds [140.6 kg] total capacity) would need 4 FTE's (310 pounds [140.6 kg] divided by 75 pounds [34.0 kg] per FTE).

These guidelines are for estimation purposes only. Laundry facility operations have shown productivity levels both above and below this. Automation, management practices, use of flatwork finishing equipment, etc. can have significant effects on laundry facility labor requirements. Good judgment should be used in all cases.

Laundry Cart Capacities and Quantities

A. Select the proper cart size(s) to match the washer size(s) to be used. Use cart(s) with soiled linen capacity(s) that match, as closely as possible, the dry weight capacity of the washer(s). This makes it easy to get a full washer load of soiled linen ready without requiring a scale. Use the Laundry Cart Capacity Chart to find cart sizes.

1. Provide enough cart capacity to hold at least 1 day's volume of soiled linen.

LAUNDRY CART CAPACITY CHART					
Cart Size, bushels (liters)	Cart Dimensions		Cart capacity, pounds (kg) of linen in noted condition		
	L x W x D in.	L x W x D mm	Dry Soiled	Wet	Folded
1 (35)			6 (2.7)	12 (5.4)	14 (6.4)
2 (70)	22 x 14 x 14	559 x 356 x 356	12 (5.4)	25 (11.3)	30 (13.6)
4 (141)	30 x 18 x 16	762 x 457 x 406	20 (9.1)	40 (18.1)	48 (21.8)
6 (211)	30 x 20 x 20.5	762 x 508 x 521	37 (16.8)	74 (33.6)	89 (40.4)
8 (282)	34 x 22 x 23	864 x 559 x 584	49 (22.2)	99 (44.9)	119 (54.0)
10 (352)	36 x 24 x 25	914 x 610 x 635	62 (28.1)	124 (56.2)	149 (67.6)
12 (423)	36 x 26 x 27.5	914 x 660 x 699	74 (33.6)	149 (67.6)	179 (81.2)
14 (493)	40 x 28 x 27.5	1016 x 711 x 699	87 (39.5)	174 (78.9)	209 (94.8)
16 (564)	40 x 28 x 30	1016 x 711 x 762	99 (44.9)	199 (90.3)	239 (108.4)
18 (634)	42 x 30 x 30	1068 x 762 x 762	112 (50.8)	224 (101.6)	268 (121.6)
20 (705)	44 x 32 x 33	1118 x 813 x 838	124 (56.2)	249 (112.9)	298 (135.2)

Water Heaters

A. Determine hot water consumption. First, estimate the average hot water consumption for all washers in the laundry facility. A good rule-of-thumb is to allow 2 gallons per hour per pound of washer capacity. This will cover 95% of all laundry projects.

2. Determine the temperature of the incoming water. Subtract this from the desired heated temperature to determine the required temperature rise.
3. The minimum heat input required to heat to temperature can be calculated from:

$$BTU/hour = \frac{(Gallons/hour) \times (Temperature\ rise,\ °F)}{(0.75\ overall\ efficiency\ factor)}$$

   The formula above gives the exact size of a gas-fired heater in BTU's per hour. To determine the kW rating of an electric heater, divide this figure by 3413.
4. Storage capacity should be equivalent to 2/3 - 1 hour demand.

NOTE: Hotels and motels may be able to use the existing water heating system if a booster heater is added.

Example:	*A hotel laundry facility with (2) UWN100 washers and (1) UWN060 washer needs a new hot water system. Incoming water temperature is 50°F. Desired water temperature is 140°F.*
	Estimated hourly hot water consumption is: *(2 x 100 pounds + 60 pounds) = 260 pounds x 2 gal/hr/lb = 520 gal/hr*
	Desired temperature rise is: *140°F - 50°F = 90°F*
	Required BTU input would then be: *(520 gal/hour) x (90°F) / 0.75 = 62,400 BTU/hour*
	Use 62,000 BTU/hour for simplicity. Storage tank size would be at least 2/3 of 520 gal/hour, so use no less than a 347 gallon tank.

Recommendations for Sizing Water Supply Plumbing

If an installation uses different sizes of washers or uses auxiliary equipment that has water requirements, use the following procedure to size the plumbing:

Flow rate requirements depend directly on the size and quantity of water inlet valves found on the washers that are to use the water lines.

To find the required flow rate in gallons per minute:

- List the number of each size valve in the laundry.
- Multiply the number of each size valve by the appropriate flow in gallons per minute. Do this for each valve size.
- Total the figures obtained in the previous step. If there are any other machines (e.g., dishwasher, etc.) that will be supplied by this plumbing system, add in their applicable flow rates. This sum is the total required flow rate and should be used to size the main water line coming into the laundry.

Use 1/2 of the total flow rate to size the hot and cold water lines. (If other machines use only hot or cold water, adjust the flow rates accordingly.)

Estimated Flow Rate in Pipe or Hose Connections		
Pipe Diameter or Valve Size Inches (mm)	**Flow rate in gallons (liters) per minute**	
	Flow in valves	**Flow in pipe or tube**
1/2 (13)	7 (26)	10 (38)
3/4 (19)	12.5 (47)	17 (64)
1 (25)	25 (94)	25 (94)
1-1/4 (32)	37 (140)	42 (159)
1-1/2 (38)		55 (208)
2 (50)		100 (379)
2-1/2 (64)		300 (1136)

NOTE: Estimated flow rate at 40 to 60 pounds per square inch (2.8 to 4.1 bar) line pressure.

Use the “Estimated Flow Rate in Pipe or Hose Connections” chart to size the plumbing by finding the pipe size with an estimated flow no less than the required flow rate. If the flow rate from a pipe is just under the flow rate required, use the next larger size.

Example: *Find the required water flow rates for a laundry facility with one (1) UCN020 washer and two (2) UWN125 washers.*

Hose connection count: *3/4 inch valves - 6 (2 on each UWN020, 2 on UCN020)*
1 inch valves - 4 (2 on each UWN125)

Total flow through 3/4 inch valves = 6 x 12.5 gal./min. = 75 gpm

Total flow through 1 inch valves = 4 x 2.5 gal./min. = 100 gpm

Total flow required = 75 gpm + 100 gpm = 175 gpm

Hot water flow rate = 1/2 x 175 gpm = 87.5 gpm

Cold water flow rate = 1/2 x 175 gpm = 87.5 gpm

Using these figures, find the pipe sizes that can flow 175 and 87.5 gallons per minute in the “Estimated Flow Rate in Pipe or Hose Connections” chart. A 2 inch pipe can flow 100 gpm and a 2-1/2 inch pipe can flow 300 gpm. Use a main water line of 2-1/2 inches and hot/cold branch lines of 2 inches.

Plumbing or mechanical contractors can size water piping based on flow requirements. Contact either for more assistance.

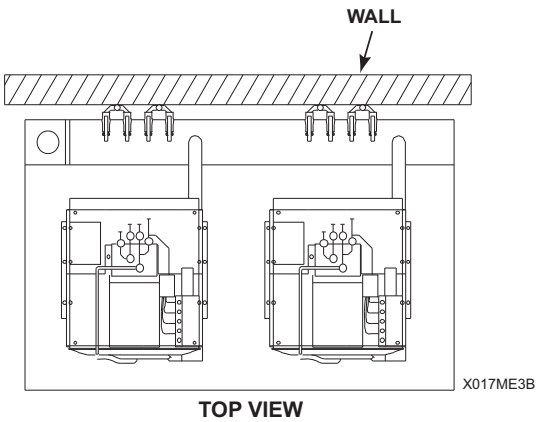
Hose Connection Configurations

Model	1/2" (13 mm)	3/4" (19 mm)	1" (25 mm)	1-1/4" (32 mm)	1-1/2" (40 mm)
UCN020		2			
UCN030		2			
UCN040		2			
UCN060		2			
UCN080		2			
UCN125		2			
UWN035K		2			
UWN035T		4			
UWN060K		2			
UWN060T		4			
UWN080K		2			
UWN080T		4			
UWN100K		2			
UWN100T		4			
UWN125K			2		
UWN125T		2	2		
UWN150T		2	2		
UX18		3			
UX25		3			
UX33		3			
UX35		3			

Hose Connection Configurations

Model	1/2" (13 mm)	3/4" (19 mm)	1" (25 mm)	1-1/4" (32 mm)	1-1/2" (40 mm)
UX40		3			
UX55		3			
UX75		3			
UX100		4			
UX135		4			
UX165		4			
UX200		4	4		

NOTE: Washers supplied by smaller plumbing lines will have longer fill times.



TOP VIEW OF WASHERS

Recommended Plumbing Sizes Diameters of main and hot/cold lines for single and multiple washer installations								
Model	Number of machines to be supplied by water lines							
	1		2		3		4	
	Main	Hot/Cold	Main	Hot/Cold	Main	Hot/Cold	Main	Hot/Cold
UCN020	3/4" (19 mm)	1/2" (13 mm)	1" (25 mm)	3/4" (19 mm)	1-1/4" (32 mm)	1" (25 mm)	1-1/2" (38 mm)	1" (25 mm)
UCN030	3/4" (19 mm)	1/2" (13 mm)	1" (25 mm)	3/4" (19 mm)	1-1/4" (32 mm)	1" (25 mm)	1-1/2" (38 mm)	1" (25 mm)
UCN040	3/4" (19 mm)	1/2" (13 mm)	1" (25 mm)	3/4" (19 mm)	1-1/4" (32 mm)	1" (25 mm)	1-1/2" (38 mm)	1" (25 mm)
UCN060	3/4" (19 mm)	1/2" (13 mm)	1" (25 mm)	3/4" (19 mm)	1-1/4" (32 mm)	1" (25 mm)	1-1/2" (38 mm)	1" (25 mm)
UCN080	1" (25 mm)	3/4" (19 mm)	1-1/2" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/4" (32 mm)	2" (50 mm)	1-1/2" (38 mm)
UCN125	1-1/2" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/2" (38 mm)	2" (50 mm)	2" (50 mm)	2-1/2" (64 mm)	2" (50 mm)
UWN035	1" (25 mm)	3/4" (19 mm)	1-1/2" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/4" (32 mm)	2" (50 mm)	1-1/2" (38 mm)
UWN060	1-1/4" (32 mm)	1" (25 mm)	2" (50 mm)	1-1/4" (32 mm)	2" (50 mm)	1-1/2" (38 mm)	2-1/2" (64 mm)	2" (50 mm)
UWN080	1-1/4" (32 mm)	1" (25 mm)	2" (50 mm)	1-1/4" (32 mm)	2" (50 mm)	1-1/2" (38 mm)	2-1/2" (64 mm)	2" (50 mm)
UWN100	1-1/4" (32 mm)	1" (25 mm)	2" (50 mm)	1-1/2" (32 mm)	2" (50 mm)	1-1/2" (38 mm)	2-1/2" (64 mm)	2" (50 mm)
UWN125	1-1/4" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/2" (38 mm)	2" (50 mm)	1-1/2" (38 mm)	2-1/2" (64 mm)	2" (50 mm)
UWN150	1-1/4" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/2" (38 mm)	2" (50 mm)	1-1/2" (38 mm)	2-1/2" (64 mm)	2" (50 mm)
UX18	3/4" (19 mm)	1/2" (13 mm)	1" (25 mm)	3/4" (19 mm)	1-1/4" (32 mm)	1" (25 mm)	1-1/2" (38 mm)	1" (25 mm)
UX25	3/4" (19 mm)	1/2" (13 mm)	1" (25 mm)	3/4" (19 mm)	1-1/4" (32 mm)	1" (25 mm)	1-1/2" (38 mm)	1" (25 mm)
UX33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UX35	1" (25 mm)	3/4" (19 mm)	1-1/2" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/4" (32 mm)	2" (50 mm)	1-1/2" (38 mm)
UX40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UX55	1" (25 mm)	3/4" (19 mm)	1-1/2" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/4" (32 mm)	2" (50 mm)	1-1/2" (38 mm)
UX75	1-1/2" (38 mm)	1" (25 mm)	2" (50 mm)	1-1/2" (38 mm)	2-1/2" (64 mm)	2" (50 mm)	2-1/2" (64 mm)	2" (50 mm)
UX100	1-1/2" (38 mm)	1-1/2" (38 mm)	2" (50 mm)	1-1/2" (38 mm)	3" (76 mm)	2" (50 mm)	3" (76 mm)	2-1/2" (64 mm)
UX135	1-1/2" (38 mm)	1-1/2" (38 mm)	2" (50 mm)	1-1/2" (38 mm)	3" (76 mm)	2" (50 mm)	3" (76 mm)	2-1/2" (64 mm)
UX165	1-1/2" (38 mm)	1-1/2" (38 mm)	2" (50 mm)	1-1/2" (38 mm)	3" (76 mm)	2" (50 mm)	3" (76 mm)	2-1/2" (64 mm)
UX200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

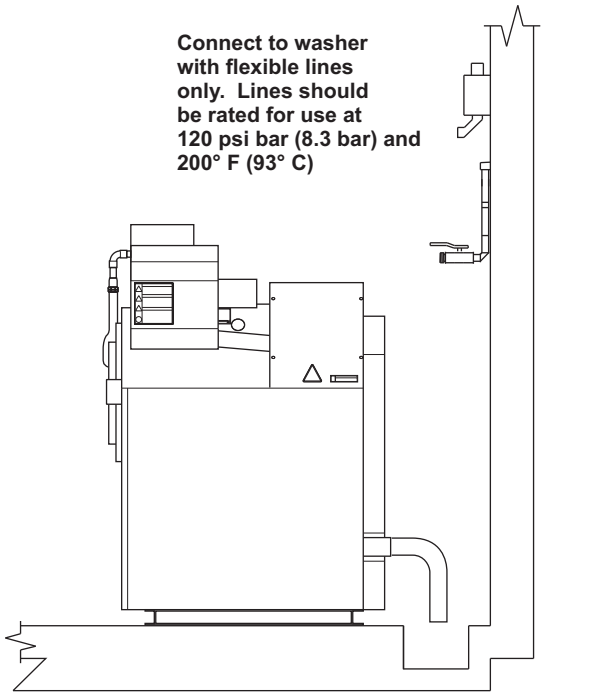
All plumbing must be done in accordance with applicable local, state & national codes.

PLUMBING LAYOUTS

Recommended

Max. Operating Pressure 85 PSI (5.8 Bar)

Min. Operating Pressure 30 PSI (2 Bar)



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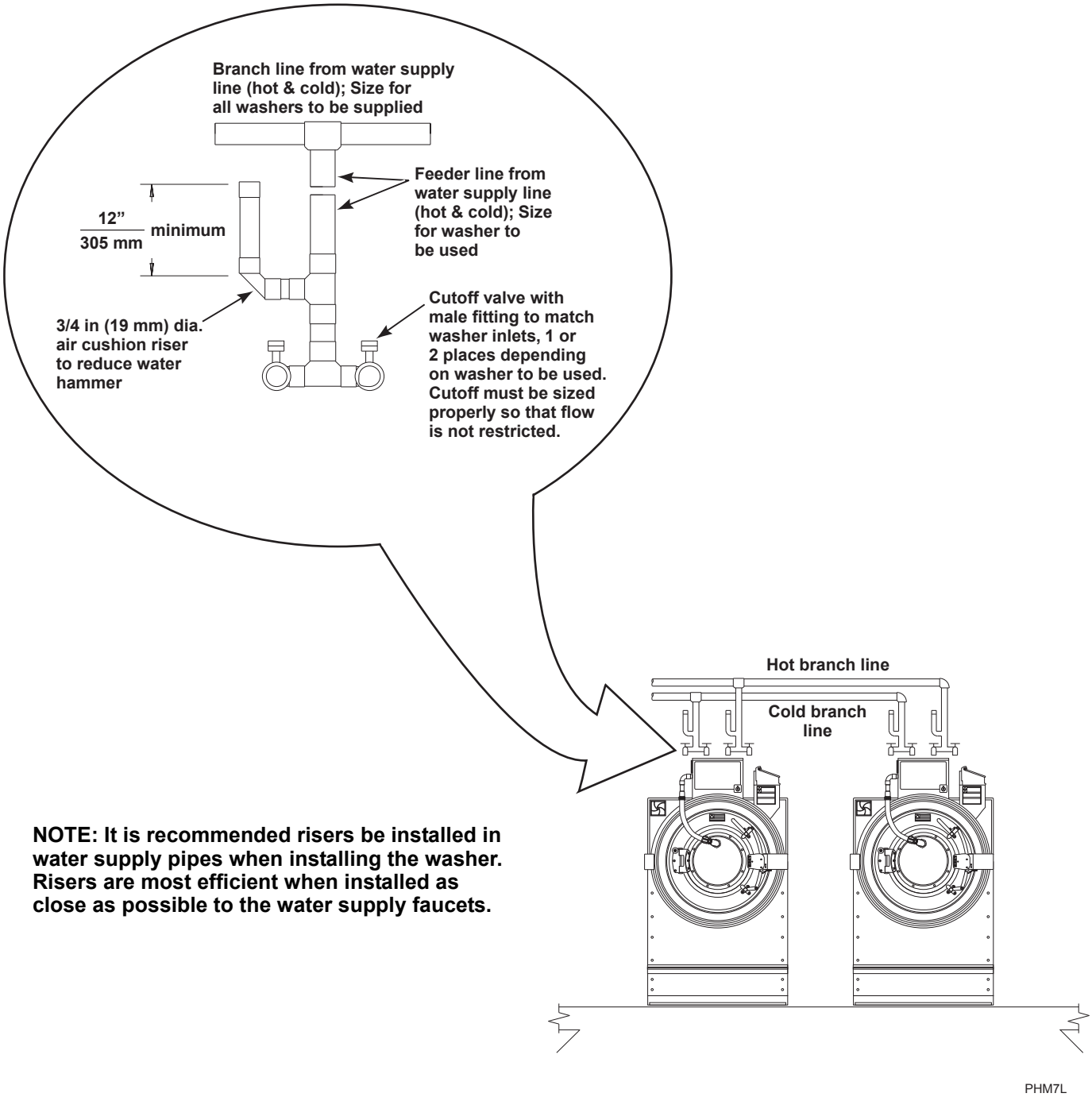
PLUMBING LAYOUTS



NOTE: It is recommended risers be installed in water supply pipes when installing the washer. Risers are most efficient when installed as close as possible to the water supply faucets.

All plumbing must be done in accordance with applicable local, state & national codes.

Recommendations for Sizing Drain Lines and Drain Trenches

A. Determine the total number of gallons that will be dumped at one time by all present and future washers. Use fill volumes at high level to get this total. (If only 1 washer will use the trench, use level at overflow.)

NOTE: Always assume worst case, i.e. all washers will drain at the same time from the highest attainable level.

5. Divide the total gallons to drain by 7.48 gallons per cubic foot. The result is the minimum volume of the drain trench in cubic feet.
6. Size the length, width and depth of the trench to meet the above minimum volume and any other parameters, such as washer foundation width, available floor space, etc.

Example: *Size a trench for two (2) UWN060 washers and one (1) UWN100 washer.*

Fill levels: *UWN060 = 24 gallons*
UWN100 = 50 gallons at high level

Total to drain, gallons = 98 gallons = 2 x 24 gallons + 50 gallons

Drain trench volume, cubic feet = 14.0 cu. ft. 98 gallons ÷ 7.48 gallons/cu. ft.

Foundation width will be 13 feet 6 inches:
(12 inches + 36-5/8 inches + 12 inches + 36-5/8 inches
+ 12 inches + 41-1/2 inches + 12 inches = 162.75 inches/12 inches = 13.56 feet
≅ 13 feet 6 inches)

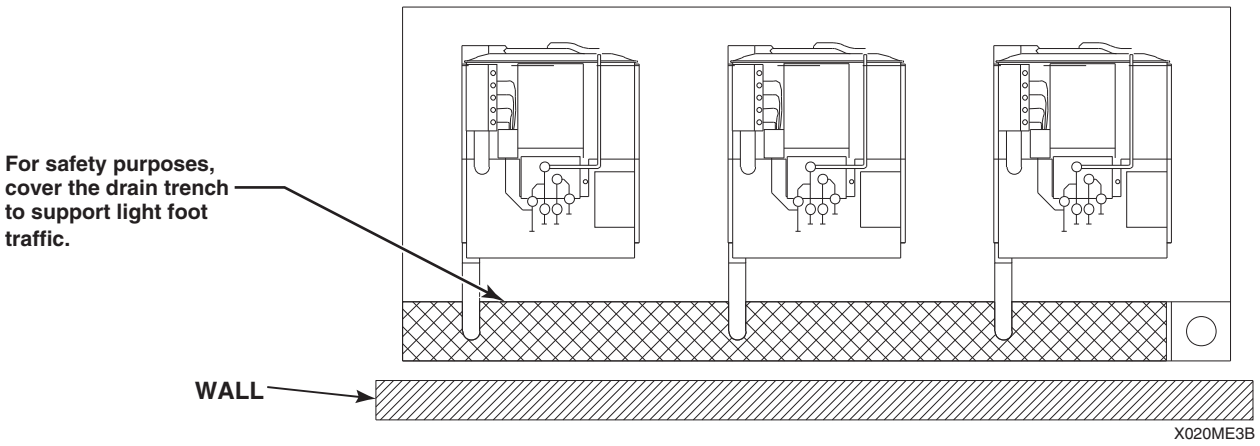
$$\text{Required trench cross section, square feet} = \frac{1.04 \text{ sq. ft.}}{} = \frac{(14.0 \text{ cu. feet})}{(13 \text{ feet } 6 \text{ inches})}$$

A drain trench with a width of 12 inches and a depth 13 inches will provide 1.04 square feet of cross section.

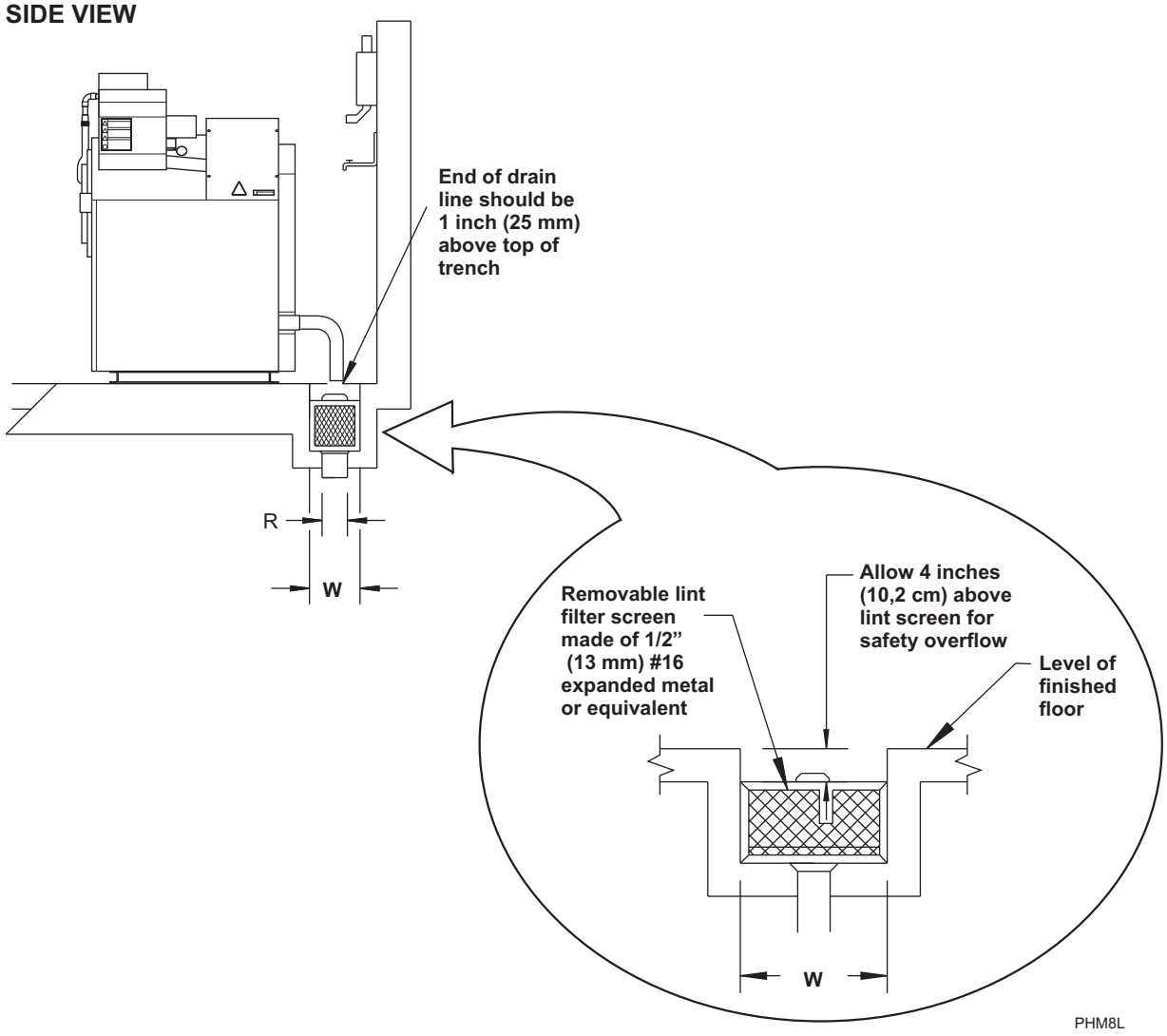
The drain trench should be 12 inches wide, 13 inches deep and 13 feet 6 inches long. The bottom of the trench should be sloped 1/8 to 1/4 inch per foot of length, toward the outlet. For safety purposes, the trench should be covered to support light foot traffic.

DRAIN TRENCHES

TOP VIEW

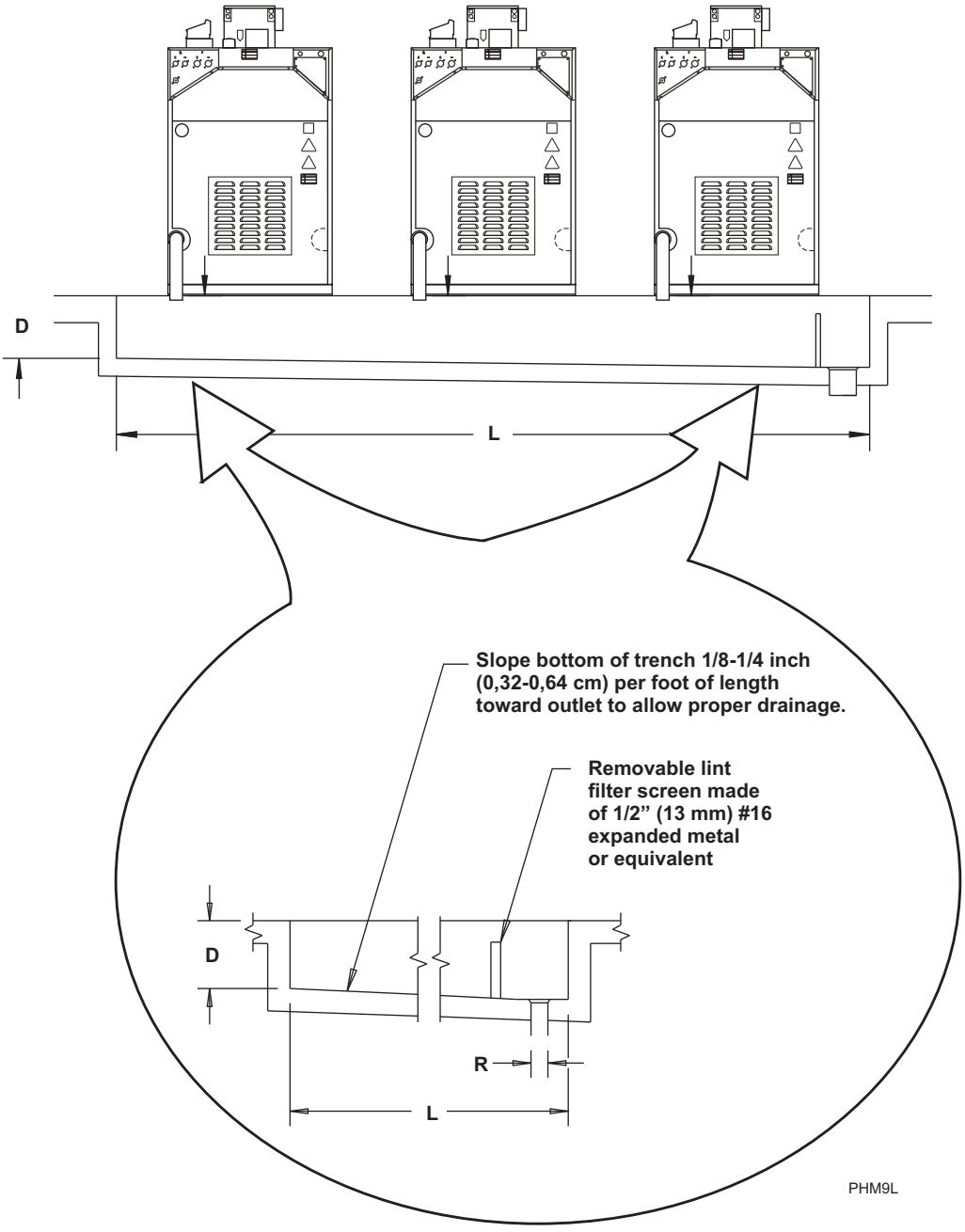


SIDE VIEW



DRAIN TRENCHES

REAR VIEW

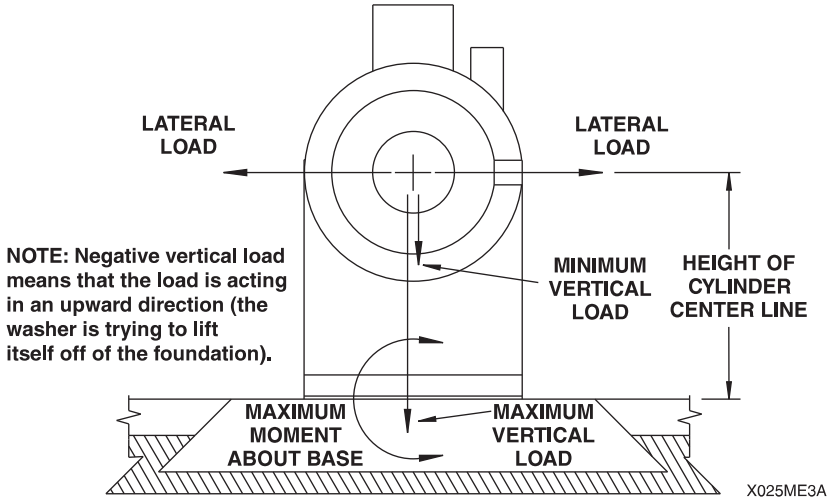


Recommended Trench Dimensions and Sewer Outlet Line Size												
Model	Width "W" inches (cm)	Depth "D" inches (cm)	Total Number of Machines to use Trench or Drain Outlet									
			1		2		3		4		5	
			Length "L" ft-in (m)	Outlet "R" in. (cm)	Length "L" ft-in (m)	Outlet "R" in. (cm)	Length "L" ft-in (m)	Outlet "R" in. (cm)	Length "L" ft-in (m)	Outlet "R" in. (cm)	Length "L" ft-in (m)	Outlet "R" in. (cm)
UX18 UX25 UCN020 UCN030	12" (30.5)	8" (20.3)	2' 6" (0.76)	2" (5.08)	5' 0" (1.52)	3" (7.62)	7' 6" (2.29)	3" (7.62)	10' 0" (3.05)	4" (10.2)	12' 6" (3.81)	4" (10.2)
UWN035 UX35 UCN040	12" (30.5)	12" (30.5)	4' 6⅛," (1.37)	3" (7.62)	8' 6¼" (2.60)	3" (7.62)	12' 6⅜" (3.82)	3½" (8.89)	16' 6½" (5.04)	4" (10.2)	20' 6⅝" (6.26)	4" (10.2)
UCN060 UX55 UWN060	12" (30.5)	12" (30.5)	5' 0" (1.52)	3" (7.62)	9' 6" (2.89)	4" (10.2)	14' 0" (4.27)	6" (15.2)	18' 6" (5.64)	6" (15.2)	23' 0" (7.01)	6" (15.2)
UX75	18" (45.7)	12" (30.5)	5' 5½" (1.66)	4" (10.2)	10' 5" (3.18)	6" (15.2)	15' 4½" (4.69)	6" (15.2)	20' 4" (6.20)	8" (20.3)	25' 3½" (7.71)	8" (20.3)
UCN080 UWN080 UCN125	18" (45.7)	12" (30.5)	6' 0" (1.66)	4" (10.2)	11' 6" (3.51)	6" (15.2)	17' 0" (4.69)	6" (15.2)	22' 5" (6.86)	8" (20.3)	28' 0" (8.53)	8" (20.3)
UWN100 UX100	18" (45.7)	12" (30.5)	6' 0" (1.66)	4" (10.2)	11' 6" (3.51)	6" (15.2)	17' 0" (4.69)	6" (15.2)	22' 5" (6.86)	8" (20.3)	28' (8.53)	8" (20.3)
UWN125 UX135	18" (45.7)	18" (45.7)	6' 0" (1.66)	4" (10.2)	11' 6" (3.51)	6" (15.2)	17' 0" (4.69)	6" (15.2)	22' 5" (6.86)	8" (20.3)	28' 0" (8.53)	8" (20.3)
UWN150	20" (50.8)	18" (45.7)	6' 2" (1.89)	4" (10.2)	11' 10½" (3.62)	6" (15.2)	17' 7" (5.35)	6" (15.2)	23' 3" (7.09)	8" (20.3)	28' 11" (8.82)	8" (20.3)
UX165	20" (50.8)	18" (45.7)	6' 6" (2)	4" (10.2)	13' (4)	6" (15.2)	19' 6" (5.9)	6" (15.2)	25' (7.6)	8" (20.3)	31' (9.4)	8" (20.3)

Ⓐ – Trench length based on 12" (305 mm) space between machine and pad edge and 18" (457 mm) space between adjacent machines.

Ⓑ – Diameter has equivalent flow area greater than the total flow areas of all machine drain outlets.

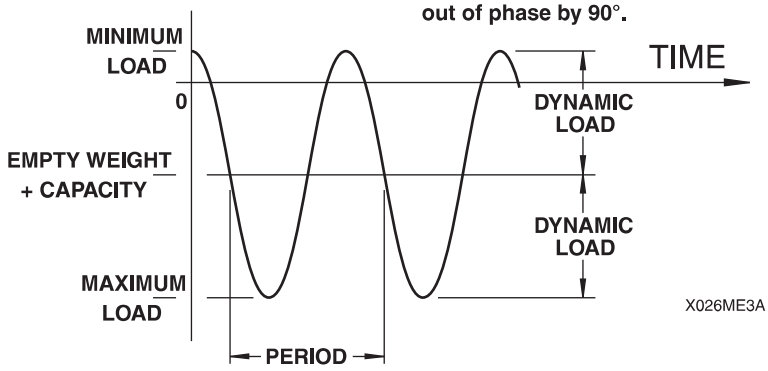
Dynamic Load Information



The moment about the base reciprocates and would cause a "rocking" motion if any of the following conditions exist:
- **The foundation is not of sufficient size**
- **The foundation is not secured to the existing floor**
- **There is loose soil, gravel, etc. under the foundation.**

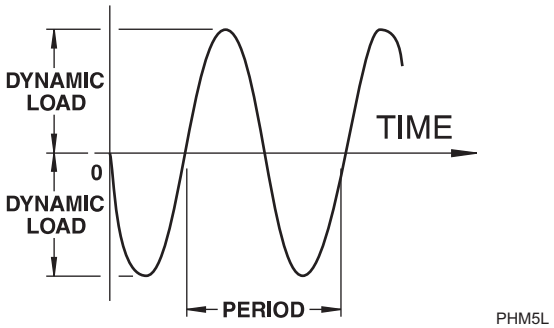
VERTICAL DYNAMIC LOADS, KILOGRAMS

NOTE: Vertical and lateral loads are out of phase by 90°.



$$\text{FREQUENCY} = \frac{1}{\text{PERIOD}}$$ PHM4L

LATERAL DYNAMIC LOADS, KILOGRAMS



1	2	3	4	5	6	7	8	9	10	11	12	13
Model	**Dry Weight Capacity, lbs. (kgs)**	**Extract Speed, RPM**	**Extract G-Force**	**Empty Weight, lbs. (kgs)**	**Weight of Water, lbs (kgs)**	**Maximum Static Load, lbs (kN)**	**Area of Frame Base, sq ft (sq m)**	**Static Load Pressure, lbs-sq ft (kN-sq m)**	**Total Dynamic Load, lbs (kN)**	**Dynamic Load Pressure, lbs-sq ft (kN-sq m)**	**Dynamic Load Fre-quency, Hz.**	**Maximum Moment About Washer Base, lbs-ft (kN-m)**
UCN020GN2 UCN020HN2 UNC020KN2	20 (8.9)	524	82	387 (176)	87.46 (39.67)	499 (1.99)	4.63 (0.43)	97.8 (4.68)	374 (1.66)	165.3 (7.91)	8.8	759 (1.03)
UCN030GN2 UCN030HN2 UCN030KN2	30 (13.6)	490	82	499 (222)	94.96 (43.07)	622 (2.76)	6.14 (0.57)	101 (4.84)	495 (2.2)	169 (8.09)	7.77	989 (1.34)
UCN030HNF	30 (13.6)	542	100	498 (226)	94.96 (43.07)	624 (2.78)	6.14 (0.57)	102 (4.87)	767 (3.41)	214 (10.22)	10.7	1535 (2.08)
UCN040GN2 UCN040HN2 UCN040KN2	40 (18.1)	490	89	692 (314)	139.11 (63.09)	903 (4.0)	7.66 (0.71)	118 (5.65)	898 (3.99)	216 (10.3)	8.2	1926 (2.61)
UCN040KNV	40 (18.1)	568	120	706 (321)	139.11 (63.09)	903 (4.11)	7.66 (0.71)	121 (5.78)	1049 (4.67)	238 (11.37)	10.2	2252 (3.05)
UCN040HNF UCN040KNF	40 (18.1)	518	100	706 (321)	139.11 (63.09)	923 (4.11)	7.66 (0.71)	121 (5.78)	1049 (4.67)	238 (11.37)	10.2	2252 (3.05)
UCN060GN2 UCN060HN2 UCN060KN2	60 (22.7)	464	92	812 (368)	209.08 (94.84)	1099 (4.9)	8.87 (0.82)	120 (5.75)	1404 (6.3)	253 (12.11)	7.8	3086 (4.2)
UCN060KNV	60 (22.7)	531	120	773 (350)	209.08 (94.84)	1061 (4.22)	8.87 (0.82)	116 (5.54)	1514 (6.73)	261 (12.47)	9.6	3328 (4.51)
UCN060HNF UCN060KNF	60 (22.7)	485	100	773 (350)	209.08 (94.84)	1061 (4.22)	8.87 (0.82)	116 (5.54)	1514 (6.73)	261 (12.47)	9.6	3328 (4.51)
UCN080KNV	80 (36.3)	485	120	1374 (623)	310.71 (140.94)	1738 (7.73)	13.69 (1.27)	126.9 (6.07)	3310 (14.72)	350.5 (16.78)	8.95	8482 (11.5)
UCN080HNF UCN080GNF	80 (36.3)	442	100	1374 (623)	310.71 (140.94)	1738 (7.73)	13.69 (1.27)	126.9 (6.07)	3310 (14.72)	350.5 (16.78)	8.95	8482 (11.5)
UCN125KNV	125 (56.7)	449	120	2301 (1044)	N/A	2839 (12.6)	16.00(1.49)	177.5 (8.05)	4364 (19.4)	431.5 (20.6)	8.1	14547 (19.7)
UWN035K12	35 (15.9)	492	90	750 (341)	147.02 (66.68)	1272 (5.66)	7.53 (0.70)	169 (8.09)	473 (2.10)	233 (11.16)	8.2	1224 (1.66)
UWN035K1L UWN035T3L	35 (15.9)	518	100	N/A	147.02 (66.68)	1272 (5.66)	7.53 (0.70)	169 (8.09)	525 (2.34)	240 (11.49)	8.63	1356 (1.84)
UWN035K1M UWN035T3M	35 (15.9)	695	80	N/A	147.02 (66.68)	1272 (5.66)	7.53 (0.70)	169 (8.09)	944 (4.02)	295 (14.12)	11.58	2442 (3.31)
UWN035T3V	35 (15.9)	803	240	1030 (468)	147.02 (66.68)	1272 (5.66)	7.53 (0.70)	169 (8.09)	1576 (7.01)	380 (18.19)	15.0	4076 (5.53)
UWN060K12	60 (22.7)	482	106	1136 (515)	170.26 (77.23)	1442 (6.41)	8.91 (0.83)	162 (7.76)	950 (4.23)	269 (12.88)	8.0	2985 (4.05)
UWN060K1L UWN060T3L	60 (22.7)	469	100	N/A	170.26 (77.23)	1442 (6.41)	8.91 (0.83)	162 (7.76)	900 (4.00)	263 (12.59)	7.82	2826 (3.83)
UWN060K1M UWN060T3M	60 (22.7)	630	180	N/A	170.26 (77.23)	1442 (6.41)	8.91 (0.83)	162 (7.76)	1624 (7.22)	344 (16.47)	10.5	5099 (6.91)
UWN060T3V	60 (22.7)	727	240	1300 (590)	170.26 (77.23)	1442 (6.41)	8.91 (0.83)	162 (7.76)	2704 (12.03)	466 (22.31)	13.6	8492 (11.51)
UWN080K1M	80 (36.3)	594	181	N/A	228.24 (103.53)	2292 (10.20)	12.49 (1.16)	184 (8.81)	2167 (9.64)	357 (17.09)	9.9	7029 (9.53)
UWN080T3V	80 (36.3)	686	241	1730 (785)	228.24 (103.53)	2292 (10.20)	12.49 (1.16)	184 (8.81)	3603 (16.03)	472 (22.06)	12.8	11688 (15.85)
UWN100K1M	100 (45.4)	594	181	N/A	291.63 (132.28)	2490 (11.08)	12.49 (1.16)	199 (9.53)	2708 (12.05)	416 (19.92)	9.9	8786 (11.91)
UWN100T3V	100 (45.4)	686	241	1770 (805)	291.63 (132.28)	2490 (11.08)	12.49 (1.16)	199 (9.53)	4504 (20.03)	439 (21.02)	12.8	14611 (19.81)
UWN125K1M	125 (56.7)	550	180	N/A	382.01 (173.28)	3283 (14.60)	16.00 (1.49)	205 (9.82)	3380 (15.03)	416 (19.92)	9.2	11268 (15.28)
UWN125T3V	125 (56.7)	565	190	2420 (1100)	382.01 (173.28)	3283 (14.60)	16.00 (1.49)	205 (9.82)	3746 (16.66)	439 (21.02)	9.7	12488 (16.93)
UWN150T3V	150 (68.0)	627	240	2970 (1347)	541.52 (245.67)	3936 (17.51)	19.44 (1.81)	202 (9.67)	4501 (20.02)	433 (20.73)	11.7	17231 (23.36)

(continued

1	2	3	4	5	6	7	8	9	10	11	12	13
Model	Dry Weight Capacity, lbs. (kgs)	Extract Speed, RPM	Extract G-Force	Empty Weight, lbs. (kgs)	Weight of Water, lbs (kgs)	Maximum Static Load, lbs (kN)	Area of Frame Base, sq ft (sq m)	Static Load Pressure, lbs-sq ft (kN-sq m)	Total Dynamic Load, lbs (kN)	Dynamic Load Pressure, lbs-sq ft (kN-sq m)	Dynamic Load Fre-quency, Hz.	Maximum Moment About Washer Base, lbs-ft (kN-m)
UX18PV	18 (8.2)	1000	293	465 (211)	N/A	N/A	4.76 (0.44)	N/A	N/A	N/A	N/A	N/A
UX25PV	25 (11.3)	1000	296	520 (236)	N/A	N/A	5.47 (0.51)	N/A	N/A	N/A	N/A	N/A
UX33PV	33 (15.0)	1000	377	811.3 (386)	N/A	N/A	6.15 (0.57)	N/A	N/A	N/A	N/A	N/A
UX35PV	35 (15.9)	1000	363	789 (358)	N/A	N/A	7.03 (0.65)	N/A	N/A	N/A	N/A	N/A
UX40PV	40 (18.1)	1000	377	862.01 (391)	N/A	N/A	6.99 (0.65)	N/A	N/A	N/A	N/A	N/A
UX55PV	55 (24.9)	1000	418	1247 (570)	N/A	N/A	8.99 (0.83)	N/A	N/A	N/A	N/A	N/A
UX75PV	75 (34.0)	1000	475	1907 (865)	N/A	N/A	12.32 (1.14)	N/A	N/A	N/A	N/A	N/A
UX100PV	100 (45.4)	800	350	3351 (1520)	N/A	N/A	14.08 (1.31)	N/A	N/A	N/A	N/A	N/A
UX135PV	135 (61.2)	800	350	3626 (1645)	N/A	N/A	16.40 (1.52)	N/A	N/A	N/A	N/A	N/A
UX165PV	165 (74.8)	750	344	4630 (2100)	N/A	N/A	17.51 (1.63)	N/A	N/A	N/A	N/A	N/A
UX200PV	200 (90.7)	750	342	6393.41 (2900)	N/A	N/A	18.19 (1.69)	N/A	N/A	N/A	N/A	N/A

EXPLANATION OF COLUMN HEADINGS 1-13

1. Machine Model.
2. Machine dry-weight capacity, in kilograms.
3. Maximum extract speed, RPM (Revolutions Per Minute).
4. G-Force, or the force applied to the load at the periphery of the cylinder during extraction.
5. Weight of the washer, empty.
6. Weight of the water in the washer when loaded.
7. Total static load, the combined weight of washer, water and load.
8. Frame area, the floor space covered by the base of the washer.
9. Static load pressure, total static load divided by the frame area.
10. Total dynamic load. G-Force times dry weight capacity times 20% out-of-balance.
11. Dynamic load pressure. Dynamic load divided by frame area.
12. Dynamic load frequency. Load cycles per second (extract speed divided by 60).
13. Maximum moment about washer base. The “torque” caused by the lateral load (maximum lateral load times the height of the cylinder center line).