Flow

SHAPE TECHNOLOGIES GROUP®

AHB TOOLING & MACHINERY

COMPLETE METALWORKING SOLUTIONS

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Pre-Installation Manual

Mach 100 | **Mach** 200 | **Mach** 300 | **Mach** 500

We’re pleased to welcome you to the Flow Waterjet Family.

This manual will guide you as you prepare for the arrival and installation of your new waterjet. Please be sure to read each section thoroughly. Should any questions about your pre-installation procedures or requirements arise, your personally assigned Project Manager will be the best resource to assist you.

On behalf of the Flow team, we are genuinely excited to partner with you.
Let the preparations begin!

Table of Contents

Here's what's included in your Pre-Installation Manual:

Facility Requirements for Your Waterjet

Setting up your facility properly before the installation of your waterjet is essential to a smooth installation.

After you've completed the set up listed here, we recommend referencing your Pre-Installation Checklist to make sure everything is ready.

In this section we'll address:

Clearances

When you determine the perfect place for your new waterjet, it's important to consider the required clearances around the machine.

Local codes and regulations will determine the actual distances required for clearances. It can be easy to overlook everyday obstructions. Be sure to watch out for lights, sprinkler heads, HVAC, or other things that may be blocking the way.

Cross reference your machine type and model with the list to determine how much clearance you'll need. Also, please review the pre-installation drawings shared with you.

Remember: you only need to account for your specific waterjet.

Mach 100

1313 models

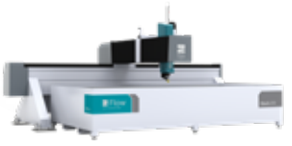
Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 4000 mm (157.5 in.)

3020 or 4020 models

Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 4270 mm (168 in.)



Mach 200

1313 models

Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 3033 mm (119 in.)

3020, 4020, or 7320 models

Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 4286 mm (169 in.)

Mach 300

All models

Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 3810 mm (150 in.)

Mach 500

All models with a 305 mm vertical axis

Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 3810 mm (150 in.)

All models with a 610 mm vertical axis

Recommended clearance each side . . . . . 1000 mm (39 in.)

Minimum vertical clearance, unobstructed . . . . . 4110 mm (162 in.)

Electrical

Setting up your electrical prior to your system arrival is important.

Here's a summary of what is required:

- Have a qualified electrician install electrical power for your system in accordance with National Electric Code (NEC) standards or local regulations, whichever takes precedence.
- Provide all of the materials for your connections including electrical wires, conduits, and clamps.
- Identify and suppress all sources of unusually high electrical noise. Noise sources could include welders, dielectric heaters, large current switching devices, and RF transmitters.
- For Mach 100 systems, A true, uninterruptable earth-ground must be provided to prevent extraneous electrical noise that could adversely affect the operation of the motion control system.
- Drive a copper or copper-clad ground rod into the ground at least 2.5 m (8 ft).
- Connect this ground rod to the ground lug in the main control enclosure with #8 or larger copper strap or wire. This strap should be as short as possible.
- Attach the strap at each connection with good mechanical bonds. & sealed to retard chemical oxidation.

Amperage/Voltage Reference Guide

AMPERAGE/VOLTAGE

Mach 100 models

SYSTEM COMPONENT	FULL LOAD AMPS (FLA)	RECOMMENDED BREAKER SIZE	VOLTAGE
Mach 100	14 amp	20 amp	440V-480V
30 hp pump	37 amp	50 amp	440V-480V
50 hp pump	64 amp	80 amp	440V-480V

Requires 1 power drop to the pump & 1 power drop to the Mach 100. (2 power drops total)

Voltages outside of this range will require a transformer.

AMPERAGE/VOLTAGE

Mach 200, Mach 300, & Mach 500 models

SYSTEM COMPONENT	FULL LOAD AMPS (FLA)	RECOMMENDED BREAKER SIZE	VOLTAGE
30 hp pump	57 amp	80 amp	440V-480V
50 hp pump	84 amp	125 amp	440V-480V
100 hp	140 amp	200 amp	440V-480V

Requires 1 power drop to the pump. Mach 200, 300, and 500 get their power from the pump.

Voltages outside of this range will require a transformer.

IMPORTANT:
Will you need a transformer?
You might! If your If your site does not have 440–480V power, a transformer is required.

The transformer size shown below is for your system only. Ancillary items—such as a chiller may require a larger size transformer.

Cross reference the pump hp (horsepower) with the applicable transformer power rating.

30 hp Pump ..... 75 KVA

50 hp Pump ..... 112.5 KVA

100 hp Pump ..... 150 KVA

Foundation

Everything starts with a great foundation and your waterjet is no exception! If you don't have an adequate foundation, the accuracy of your machine will be affected.

Your foundation must be:

- Level across the span of the machine per spec shown:

Mach 100	13 mm (½ in.)
Mach 200	13 mm (½ in.)
Mach 300	20 mm (¾ in.)
Mach 500	20 mm (¾ in.)

- Able to support the weight of the machine when the catcher tank is filled with dirty water.
- Free of expansion joints in the area that you plan to put your machine. (The purpose of expansion joints is to concentrate foundation movement and imperfections to these specific areas.)
- Structurally reinforced and undivided to ensure even settling, should any settling occur.

In abnormal cases where a poor foundation or unusual soil conditions are present, your machine could require an isolated monolithic foundation of adequate mass to resist both static and dynamic loads imposed by the machine. Consult a local structural engineer to obtain design input based upon your particular soil bearing and floor conditions.

Machine Anchoring

Certain machine types require that we anchor the machine to the floor.

Mach 100 (3020/4020 models only)	Yes, with ¾ x 10 in. anchor bolts
Mach 200	Yes, with ⅝ x 5 in. anchor bolts
Mach 300	No
Mach 500	Yes, with ⅝ x 5 in. anchor bolts

If we have to attach your machine to the foundation with anchor bolts, we might have to drill through rebar reinforcements in your foundation. If you mark where the rebar is prior to installation, we'll do our best to locate the machine around those marked areas.

If there are conditions—such as a radiant heat floor—that could prevent the Flow technician from drilling into the foundation. Please be sure to contact your Project Manager and let them know in advance.

Special for HyPlex® Prime Owners:
The HyPlex Prime must sit on the provided anti-vibration mat. It's essential for pump stability and reducing vibration. Please ensure that the mat is under the pump prior to the arrival of your Flow technician.

Foundation

Mach 100

MODEL	CATCHER TANK + CLEAN WATER	CATCHER TANK + DIRTY WATER
1313	5346 kg (11,785 lb)	11,426 kg (25,190 lb)
3020	8205 kg (18,090 lb)	21,598 kg (47,615 lb)
4020	10,500 kg (22,950 lb)	27,422 kg (60,455 lb)

Mach 200

MODEL	CATCHER TANK + CLEAN WATER	CATCHER TANK + DIRTY WATER
1313	4903 kg (10,810 lb)	11,104 kg (24,480 lb)
3020	9330 kg (20,569 lb)	25,856 kg (57,024 lb)
4020	11,398 kg (25,129 lb)	32,996 kg (72,745 lb)
7320	18,536 kg (40,866 lb)	57,028 kg (125,726 lb)

Mach 300

MODEL	CATCHER TANK + CLEAN WATER	CATCHER TANK + DIRTY WATER
2015	7990 kg (17,616 lb)	19,331 kg (42,617 lb)
3015	9841 kg (21,696 lb)	26,472 kg (58,362 lb)

Machine Weight Calculations

All weights given are approximate and assume a single bridge machine whose catcher tank is filled with water.

Foundation

Mach 500

MODEL	CATCHER TANK + CLEAN WATER	CATCHER TANK + DIRTY WATER
2020	12,091 kg (26,655 lb)	30,258 kg (66,707 lb)
2030	15,982 kg (35,235 lb)	42,245 kg (93,134 lb)
2040	19,221 kg (42,374 lb)	52,436 kg (115,602 lb)
2060	26,333 kg (58,055 lb)	75,377 kg (166,177 lb)
2080	33,351 kg (73,526 lb)	96,663 kg (213,105 lb)
3020	15,272 kg (33,669 lb)	41,116 kg (90,645 lb)
3030	20,489 kg (45,170 lb)	58,030 kg (127,935 lb)
3040	24,417 kg (53,830 lb)	71,967 kg (158,660 lb)
3060	33,544 kg (73,952 lb)	104,008 kg (229,299 lb)
3080	42,576 kg (93,864 lb)	133,538 kg (294,402 lb)
4020	18,324 kg (40,397 lb)	51,065 kg (112,579 lb)
4030	24,368 kg (53,721 lb)	71,980 kg (158,690 lb)
4040	29,390 kg (64,793 lb)	89,715 kg (197,789 lb)
4060	40,438 kg (89,151 lb)	129,907 kg (286,397 lb)
4080	51,392 kg (113,300 lb)	166,886 kg (367,922 lb)

Machine Weight Calculations

All weights given are approximate and assume a single bridge machine whose catcher tank is filled with water.

Plumbing

Setting up the correct plumbing is extremely important when it comes to waterjet. With water as our primary medium, everything must be well equipped to support your new system.

Plumbing requirements differ per waterjet and pump types. Be sure to follow the requirements that match your specific system configuration.

Waterjet Plumbing Requirements

Regardless of your waterjet, you (as the customer) are responsible for the following:

- Stubbing out the air, water, and drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Connecting inlet air at the recommended specifications.
- Connecting a drain line directly to an outlet drain at the recommended specifications.
- Connecting water at the recommended specifications.

Mach 100 Air & Drain Specifications:

Air

Air Supply . . . . . Dry and filtered to 10 microns

Capacity . . . . . 0.42 cubic meters @ 6.2 bar (15 scfm @ 90 psi)

Drain

Capacity . . . . . 8 L/min @ 0 bar (2 gpm @ 0 psi) minimum per cutting head

Interface Type . . . . . 3/4 NPTF

Mach 200, **Mach** 300, or **Mach** 500 Air & Drain Specifications:

Air

Air Supply . . . . . Dry and filtered to 10 microns

Capacity . . . . . 538 L/min @ 6.2 -8.3 bar (19scfm @ 90-120psi) per cutting head*

Drain

Capacity . . . . . 8 L/min @ 0 bar (2 gpm at 0 psi) minimum per cutting head

Interface Type . . . . . 1 in. NPTF

** If machine has UltraPierce Vacuum Assist, an additional 538 L/min @ 6.2–8.3 bar (19 scfm @ 90–120 psi) per cutting head is required.*

Pump Plumbing Requirements (See following pages for additional pumps)

7X Pump Water & Drain Specifications:

For a 7X pump, here's what you, the customer, are responsible for:

- Stubbing out the water and drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Installing manual shut-off valves on the inlet/cooling water line(s). Locate valves as close as possible to the pump interface connection to make them easier to service.
- Connecting two inlet water lines at the recommended specifications.
- Connecting three drain lines at the recommended specifications.

Bleed Down Water

Capacity . . . . . 3.8 L/min (1 gpm) minimum
Interface Type . . . . . ½ in. NPTF

Oil Water Leakage*

Capacity . . . . . 1.9 L/min (0.5 gpm) intermittent
Interface Type . . . . . ½ in. NPTF

Cooling Water Out

Capacity . . . . . 15.2 L/min (4 gpm)
Interface Type . . . . . ½ in. NPTF

Cooling Water In

Capacity . . . . . 15.2 L/min @ 16°C (4 gpm @ 60°F)
Interface Type . . . . . ½ in. NPTF

Filtered Water In

Capacity . . . . . 8 L/min @ ≥ 2 bar, 21°C (2 gpm @ ≥ 60 psi, 70°F)
Interface Type . . . . . ½ in. NPTF

3 Total Drains **2** Total Water Connections

** Collect oily water in a designated bucket or other collection device. Dispose of oily water per local regulations – **do not** put oily water down a regular drain.*

30SA Pump Water & Drain Specifications:

For a 30SA pump, here's what you, the customer, are responsible for:

- Stubbing out the water and drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Installing manual shut-off valves on the inlet/cooling water line(s). Locate valves as close as possible to the pump interface connection to make them easier to service.
- Connecting two inlet water lines at the recommended specifications.
- Connecting three drain lines at the recommended specifications.

Bleed Down Water

Capacity . . . . . 3.8 L/min (1 gpm) minimum
Interface Type . . . . . ½ in. NPTF

Oil Water Leakage*

Capacity . . . . . 1.9 L/min (½ gpm) minimum
Interface Type . . . . . ½ in. NPTF

Cooling Water Out

Capacity . . . . . 3.8 L/min (1 gpm) minimum
Interface Type . . . . . ½ in. NPTF

Cooling Water In

Capacity . . . . . 3.8 L/min (1 gpm) minimum
Interface Type . . . . . ½ in. NPTF

Filtered Water In

Capacity . . . . . 5.7 L/min @ ≥ 4 bar, 21°C
(1.5 gpm @ ≥ 60 psi, 70°F)
Interface Type . . . . . ½ in. NPTF

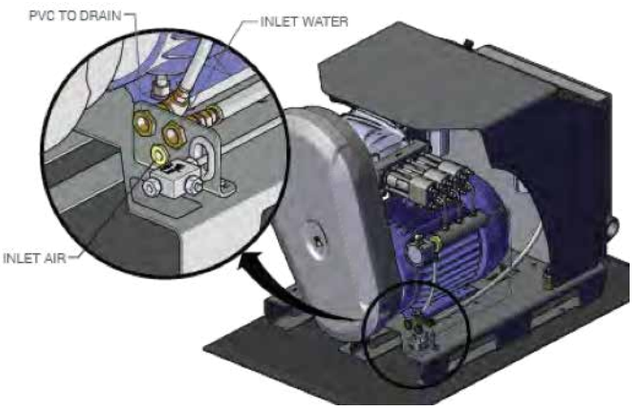
3 Total Drains **2** Total Water Connections

** Collect oily water in a designated bucket or other collection device. Dispose of oily water per local regulations – **do not** put oily water down a regular drain.*

HyPlex® Prime Pump Air, Water, & Drain Specifications:

For a HyPlex Prime pump, here's what you, the customer, are responsible for:

- Stubbing out the air, water, and drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Installing manual shut-off valves on the inlet/cooling water line(s). Locate valves as close as possible to the pump interface connection to make them easier to service.
- Making the following connections, all at recommended specifications: inlet air, inlet water line, and a drain line directly to an outlet drain.



Air Requirements

Air Supply	Dry and filtered to 10 microns
Capacity	57 L/min @ 6.2–8.3 bar (2 scfm @ 90–120 psi)
Interface Type	¼ in. NPTF

Drain Requirements

Capacity for 30 hp	3.4 L/min @ 100°C (0.9 gpm @ 212°F)
Capacity for 50 hp	5.7 L/min @ 100°C (1.5 gpm @ 212°F)
Interface Type	½ in. NPT

Water Requirements

Capacity for 30 hp	7.6 L/min @ 4 bar (2 gpm @ 60 psi)
Capacity for 50 hp	11.4 L/min @ 4 bar (3 gpm @ 60 psi)
Temperature	13°–18°C (55°–65°F)
Interface Type	½ in. NPTF

1 Drain **1** Air Connection **1** Water Connection

UltraJet™ Pump Water & Drain Specifications:

For an UltraJet 60i-S or 60i-D pump, here's what you, the customer, are responsible for:

- Stubbing out the water and drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Installing manual shut-off valves on the inlet/cooling water line(s). Locate valves as close as possible to the pump interface connection to make them easier to service.
- Connecting two inlet water lines at the recommended specifications.
- Connecting three drain lines at the recommended specifications.

Bleed Down Water

Capacity . . . . . 3.8 L/min (1 gpm) intermittent
Interface Type . . . . . ½ in. NPTF

Oil Water Leakage*

Capacity . . . . . 1.9 L/min (½ gpm) intermittent
Interface Type . . . . . ½ in. NPTF

Cooling Water Out

Capacity for 50 hp . . . . . 15 L/min (4 gpm)
Capacity for 100 hp . . . . . 30 L/min (8 gpm)
Interface Type . . . . . ½ in. NPT

Cooling Water In

Capacity for 50 hp . . . . . 15 L/min @ ≥ 4 bar, 15°C
(4 gpm @ ≥ 60 psi, 60°F)
Capacity for 100 hp . . . . . 30 L/min @ ≥ 4 bar, 15°C
(8 gpm @ ≥ 60 psi, 60°F)
Interface Type . . . . . ½ in. NPT

3 Total Drains

Filtered Water In

Capacity for 50 hp . . . . . 8 L/min @ ≥ 4 bar, 21°C
(2 gpm @ ≥ 60 psi, 70°F)
Capacity for 100 hp . . . . . 15 L/min @ ≥ 4 bar, 21°C
(4 gpm @ ≥ 60 psi, 70°F)
Interface Type . . . . . ½ in. NPT

2 Water Connections

** Collect oily water in a designated bucket or other collection device. Dispose of oily water per local regulations – **do not** put oily water down a regular drain.*

HyperJet® Pump Water & Drain Specifications:

For a HyperJet 94i-s or 94i-D pump, here's what you, the customer, are responsible for:

- Stubbing out the water and drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Installing manual shut-off valves on the inlet/cooling water line(s). Locate valves as close as possible to the pump interface connection to make them easier to service.
- Connecting two inlet water lines at the recommended specifications.
- Connecting three drain lines at the recommended specifications.

Bleed Down Water

Capacity . . . . . 3.8 L/min (1 gpm) intermittent

Interface Type . . . . . ½ in. NPTF

Oil Water Leakage*

Capacity . . . . . 1.9 L/min (½ gpm) intermittent

Interface Type . . . . . ½ in. NPTF

Cooling Water Out

Capacity for 50 hp . . . . . 15 L/min (4 gpm)

Capacity for 100 hp . . . . . 30 L/min (8 gpm)

Interface Type . . . . . ½ in. NPTF

Cooling Water In

Capacity for 50 hp . . . . . 15 L/min @ ≥ 4 bar, 15°C
(4 gpm @ ≥ 60 psi, 60°F)

Capacity for 100 hp . . . . . 30 L/min @ ≥ 4 bar, 15°C
(8 gpm @ ≥ 60 psi, 60°F)

Interface Type . . . . . ½ in. NPTF

Filtered Water In

Capacity for 50 hp . . . . . 8 L/min @ ≥ 4 bar, 21°C
(2 gpm @ ≥ 60 psi, 70°F)

Capacity for 100 hp . . . . . 15 L/min @ ≥ 4 bar, 21°C
(4 gpm @ ≥ 60 psi, 70°F)

Interface Type . . . . . ½ in. NPTF

3 Total Drains **2** Total Water Connections

Ancillary Plumbing, Air Requirements

Regardless of your ancillary system or systems, you (as the customer) are responsible for the following:

- Stubbing out the air lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Connecting inlet air at recommended specifications.

Abrasive Transfer System (ATS) Plumbing, Air Specifications:

Air Supply . . . . . Dry and filtered to 10 microns
Capacity . . . . . 441 L/min @ 4.1 bar (15.6 scfm @ 60 psi)
Interface Type . . . . . ⅜ in. NPT quick disconnect female socket

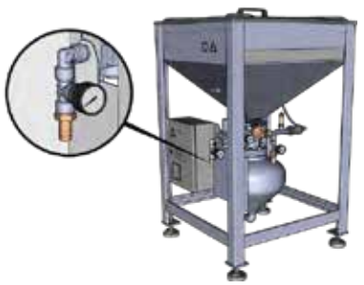
100 lb. Hopper Plumbing, Air Specifications:

Air Supply . . . . . Dry and filtered to 10 microns
Capacity . . . . . 56.6 L/min @ 6.2 bar (2 scfm @ 90 psi)
283.2 L/min @ 6.2 bar (10 scfm @ 90 psi) initial fill
Interface Type . . . . . ⅜ in. NPTF

2200 lb. Hopper Plumbing, Air Specifications:

Air Supply . . . . . Dry and filtered to 10 microns
Capacity . . . . . 56.6 L/min @ 6.2 bar (2 scfm @ 90 psi)
283.2 L/min @ 6.2 bar (10 scfm @ 90 psi) initial fill
Interface Type . . . . . ¾ in. NPTF

Add 500# ABT



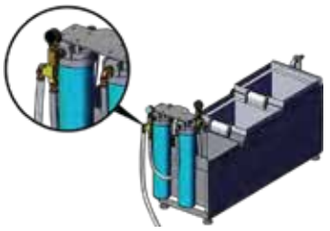
Paser® CF-900 Hopper Plumbing, Air Specifications:

Air Supply	Dry and filtered to 10 microns
Capacity	56.6 L/min @ 5.5 bar (20 scfm @ 80 psi)
Interface Type	¾ in. NPTF

Final Filter Plumbing, Drain Requirements:

For a Final Filter here's what you, the customer, are responsible for:

- Stubbing out the drain lines prior to the arrival of your Flow technician.
- Providing all pipes, hoses, fittings, and clamps for your plumbing connections.
- Connecting a drain line directly to an outlet drain at recommended specification.
- Providing an electrical outlet (110/120V - 15A) for the sump pump



Capacity	38 L/min (10 gpm)
Interface Type	½ in. JIC
Electrical Requirement	110/120V Single Phase, 15A outlet

Internet/Ethernet

A stable internet connection will be required for access to the customer portal and Waterjet Connect.

- It will be necessary to provide a CAT 5 or CAT 6 cable to connect to the machine console. The length is dependent upon where the access point to the router is located.
- The maximum cable length for Ethernet connection is 76 m (250 ft).
- If a longer length of cable is required, you must install a switch near the interface enclosure to amplify the signal. Otherwise, it may not be possible to connect the machine to your network, which will limit our ability to support the machine remotely, or for you to be able to access and utilize our customer portal and Waterjet Connect features.

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Guidelines for Removing System Crating

In this section we'll go over what to do when your shipment arrives, how to inspect it for damage, and how to properly remove the crating your system is shipped in.

When your system arrives, inspect it for damage!

Report any shipping damage to Flow and to the carrier immediately. Record all shipping damage on the carrier's Bill of Lading so you are eligible for a carrier claim. We recommend you take pictures of all equipment damage for your records. If possible, please send those pictures to us.

Crates for the bridge, base, and roll-around console have two ShockWatch® indicators on them. Red indicates rough handling. If it's red, make a note on the Bill of Lading, and then inspect the product.

Guidelines for Uncrating & Unpacking Your New System

Before we arrive for installation, we ask that you remove the packaging and crating from items listed and put them in position per the layout drawing (included in the back pocket of this guide). We recommend that you uncrate your equipment indoors as equipment exposed to outdoor elements may get damaged. Remove the crate panels with pry bars, hammers, and a drill. Dispose of all crating and packaging in accordance with local regulations.

Safety Precautions

- Put equipment in position with a properly rated forklift in accordance with local regulations. We recommend that you have flaggers and spotters present while you put the equipment in position.
- There may be sharp objects inside the catcher tank. Exercise caution while removing packaging and positioning tank.

Workflow

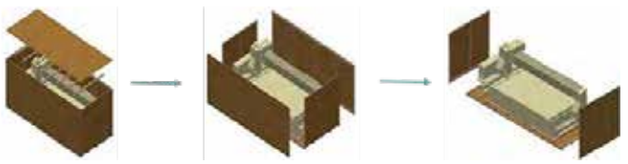
1. Uncrate the pump, remove all packaging, and then put the pump in the position shown on the layout drawing.
2. Uncrate the hopper, remove all packaging, and then put the hopper in the position shown on the layout drawing.
3. If you have ancillary items that will be located to the rear of the machine, uncrate these items and put them in position.
4. For the roll-around console: Remove the crate's top and side panels.

   !!! *Please do not remove any more panels or packaging from this crate until asked to do so by your Flow technician during installation.*
5. For Mach 100 machines, also do this:
   - Locate leveling feet (shipped inside the catcher tank)
   - Carefully remove items from any steel packaging. Flow does not reuse steel packaging, so remove as you prefer – just be cautious to avoid damage to your equipment.
   - Insert leveling feet. Your Flow technician will level your waterjet during installation.
   - Place a leveling foot at each of the four corners of machine, and one in the middle of each long side of base (6 total – 3020 & 4020 models only).

   !!! *Please do not block anchor holes with leveling feet.*

   !!! *Please do not put the catcher tank in position until asked to do so by your Flow technician during installation.*
6. For Mach 200 machines, also do this:
   - For the catcher tank: Remove crating and packaging only.
   - For the bridge/base: Remove crate's top and side panels.

     !!! *Please do not remove any more panels or packaging from this crate until asked to do so by your Flow technician during installation.*

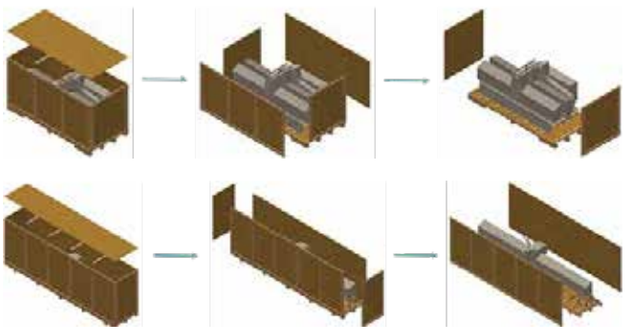


(Fig. 1)

7. For Mach 300 machines, also remove the machine crate's top and side panels. (Fig. 1)
   - Take the Mach 300 machine off of the pallet and set it in the position shown on the layout drawing.
8. For Mach 500 machines, also do this:
   - Put the rear catcher tank in the position shown on the layout drawing.

     !!! *Do not put the other catcher tank sections in position until instructed to do so by your Flow technician during installation.*
   - For both the base and bridge crates, remove the top and side panels. (Fig. 2)

     !!! *Please do not remove any more panels or packaging from this crate until asked to do so by your Flow technician during installation.*



(Fig. 2)

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Scheduling Your Installation

Schedule your installation at least four weeks?? before your desired installation date.

Make sure the date you select coincides with the completion of your pre-installation tasks. We recommend that you allow at least one week from the date of your final equipment delivery to complete all tasks.

When you schedule your installation, please let us know if any of the following apply:

- Is a security background check required prior to entering the site?
- Is a safety briefing or training required prior to entering the site?
- Are electronic devices allowed at the site? Electronic devices include items such as laptops, mobile phones, tablets, and USB flash drives.
- Is this a union shop that requires coordination of trades?
- Any other protocols or requirements that we must be aware of prior to our arrival.
- Days and hours of operation
- Is weekend work possible and if so, will operators and maintenance personnel be available for training on weekends if necessary? (Please confirm on the Pre-Installation Readiness checklist)

Site Readiness Preparation

What You'll Need to Prepare Before Your Waterjet is Delivered

You'll need to supply certain things in preparation of the delivery of your waterjet system.

Here's a quick overview of the parts you need. We'll follow this section up with more details.

During installation, please provide the following items:

- Clean, 5-gallon bucket (used when your Flow technician bleeds down abrasive lines)
- Forklift (see requirements to follow)
- Ladder [2 m (7 ft)]
- Hoses, fittings, and clamps for your plumbing connections
- Hydraulic oil for pump (see requirements to follow)
- WD-40® multi-use product (12 oz)
- Clean, lint-free rags
- Waste container(s) for crating & packaging materials
- Authorized personnel to assist with the system installation

Forklift Requirements

You will need to supply a forklift for installation of your equipment.

Please take special care to make sure your forklift is rated for the specifications listed to the right.

Table & catcher tank

Capacity . . . . . 5900 kg (13,000 lb)
Fork length . . . . . 2000 mm (84 in.)
Fork spacing . . . . . 1100 mm (44 in.)
Fork pocket (H × W) . . . . . 220 × 73 mm (9 × 3 in.)

High-pressure pump

Capacity . . . . . 2500 kg (5000 lb)
Fork length . . . . . 1800 mm (72 in.)

Ebbco equipment

Capacity . . . . . 1500 kg (3000 lb)
Fork length . . . . . 1500 mm (60 in.)

Garnet

Capacity . . . . . 1500 kg (3000 lb)
Fork length . . . . . 1800 mm (72 in.)

Oil Requirements

You will need to supply oil for your waterjet pump.

Use the quick reference guide below to understand how much you'll need and what type, based on your specific pump model.

HyPlex Prime

Oil type . . . . . Shell Morlina® S3 100 or equivalent ISO 100 oil
Hydraulic system capacity . . . . . 4 L (4.2 qt)

30SA

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Hydraulic system capacity . . . . . 114 L (30 gal)

7X

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Hydraulic system capacity . . . . . 133 L (35 gal)

20X

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Reservoir capacity . . . . . 133 L (35 gal)

25X

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Hydraulic system capacity . . . . . 171 L (45 gal)

30XQ

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Reservoir capacity . . . . . 315 L (83 gal)

UltraJet 60i-S or 60i-D

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Hydraulic system capacity for 60i-S pump . . . . . 133 L (35 gal)
Hydraulic system capacity for 60i-D pump . . . . . 152 L (40 gal)

HyperJet 94i-S or 94i-D

Oil type . . . . . Shell Tellus® S2 MX 46 or equivalent ISO VG 46 oil
Hydraulic system capacity for 94i-S pump . . . . . 133 L (35 gal)
Hydraulic system capacity for 94i-D pump . . . . . 152 L (40 gal)

Inlet Water Quality Recommendations

Water quality plays a crucial role in determining how well an ultrahigh-pressure waterjet system operates.

Maintain inlet water quality and temperature within the recommended parameters to ensure optimum performance of ultrahigh-pressure pumps and components.

In this section we'll address:

Recommended Plumbing Materials:

We recommend that you use pipes and fittings made with copper or Schedule 80 PVC. Do not use pipes and fittings made with iron or aluminum. Use only quality hoses such as Push-Lok® or stainless steel.

Water Flow Rates:

Required primary water flow rate is determined by pump and orifice size. Recommended cooling water flow rate is 15 L/min (4 gpm) per 50 hp (motor) at 15.5°C (60°F) inlet water temperature. This flow rate will increase as inlet water temperature increases.

Primary Water Source & Treatments

Primary Water Source

Use a municipal tap water supply source (or equivalent) for the primary water to the pump. Process water, boiler condensate, or untreated water sources are generally not acceptable. Do not use water treated by the deionization (DI) process.

Reverse osmosis (RO) process is acceptable under certain circumstances. RO can cause damage unless a proper bypass feature is put in place.

Primary Water Treatments

As impurities are removed from the water, it becomes more aggressive, seeking to replace the removed impurities with whatever it contacts. Excessive water treatment can be detrimental to components in the high-pressure water system.

Chillers

If the temperature of the inlet water to the pump does not fall within the range specified, a chiller may be required to achieve the expected pump maintenance cycles. The capacity of a chiller is determined by horsepower, application, and site-specific conditions.

Water Softeners

Use a sodium ion exchange water softener system to treat water hardness. We recommend a dual sodium ion exchange system to allow for regular regeneration of the system and to provide a continuous supply of treated water.

The water softener system must have the capacity to handle 1.5 times the maximum flow rate of the pump. Both the exiting flow rate [liters (gallons) per minute] and the flow rate of liters (gallons) per duty cycle should be considered.

Most water utilities change the source of the water supply seasonally. This causes water hardness to change significantly. Select a softener that handles the highest expected hardness levels.

Water with unusually high iron levels may require additional water softening treatment from your local water treatment supplier.

Suspended Particulate Filtration

Filter the primary water supply for suspended particulate matter. Our pumps include filters for this purpose. Replace filter cartridges as specified in the manual and only use filters with absolute ratings.

We recommend you install a quality 1- or 2-stage 5-micron absolute pre-filter in the primary water source.

Cooling water for intensifier pumps does not have to be filtered.

WATER QUALITY

4150 bar (60k) Intensifier Pumps

General Properties

Temperature	≤ 15°C (≤ 60°F)
Clarity	clear
Color	colorless
Odor	none present
Electrical conductivity	100–550 µS/cm
pH	7–8.5
Total Dissolved Solids (TDS)	70–380 mg/l

Anions

Chloride | Cl	0–150 mg/l
Silica | SiO_2	0–15 mg/l
Sulfate | SO_4	0–50 mg/l

Carbonate

m-Alkalinity | $CaCO_3$	0–320 mg/l
Hardness | $CaCO_3$	0–40 mg/l
	0–2.3°dh

Cations

Calcium | Ca	0–30 mg/l
Iron | Fe	0–0.2 mg/l
Magnesium | Mg	0–5 mg/l
Magnesium | Mn	0–0.1 mg/l
Sodium	0–150 mg/l

Dissolved Gases

Carbon Dioxide | CO2	0–20 mg/l
Free Chlorine | Cl_2	0–0.2 mg/l
Oxygen | O_2	0–2 mg/l

6500 bar (94k) Intensifier Pumps

General Properties

Temperature	≤ 15°C (≤ 60°F)
Clarity	clear
Color	colorless
Odor	none present
Electrical conductivity	100–550 µS/cm
pH	7–8.5
Total Dissolved Solids (TDS)	70–280 mg/l

Anions

Chloride | Cl	0–100 mg/l
Silica | SiO_2	0–8 mg/l
Sulfate | SO_4	0–25 mg/l

Carbonate

m-Alkalinity | $CaCO_3$	0–320 mg/l
Hardness | $CaCO_3$	0–30 mg/l 0–1.7°dh

Cations

Calcium | Ca	0–25 mg/l
Iron | Fe	0–0.1 mg/l
Magnesium | Mg	0–1 mg/l
Magnesium | Mn	0–0.05 mg/l
Sodium	0–110 mg/l

Dissolved Gases

Carbon Dioxide | CO2	0–10 mg/l
Free Chlorine | Cl_2	0–0.1 mg/l
Oxygen | O_2	0–1 mg/l

Direct Drive Pumps

General Properties

Temperature	5°–21°C (41°–70°F)
Clarity	clear
Color	colorless
Odor	none present
Electrical conductivity	100–400 µS/cm
pH	7–8.5
Total Dissolved Solids (TDS)	70–280 mg/l

Anions

Chloride | Cl	0–100 mg/l
Silica | SiO_2	0–8 mg/l
Sulfate | SO_4	0–25 mg/l

Carbonate

m-Alkalinity | $CaCO_3$	0–320 mg/l
Hardness | $CaCO_3$	0–30 mg/l 0–1.7°dh

Cations

Calcium | Ca	0–25 mg/l
Iron | Fe	0–0.1 mg/l
Magnesium | Mg	0–1 mg/l
Magnesium | Mn	0–0.05 mg/l
Sodium	0–110 mg/l

Dissolved Gases

Carbon Dioxide | CO2	0–10 mg/l
Free Chlorine | Cl_2	0–0.1 mg/l
Oxygen | O_2	0–1 mg/l

WATER QUALITY

Water Properties Guide

Additional reference for the water properties shown in the water quality recommendations.

General Properties

Clarity

Turbidity indicates the existence of very fine particles. Small particles can destroy orifices. Primary water should be clear.

Color

Color can derive from dissolved iron or from organic compounds. Primary water should be colorless.

Odor

Chlorine, organic solvent, and sulfur compounds can generate noticeable smell. Primary water should be odorless.

pH

With increasing pH, the formation of solids increases. Water hardness should be stabilized. With decreasing pH, cavitation damage can occur through off-gassing carbon dioxide.

Total Dissolved Solids (TDS)

Measure of the total amount of dissolved matter in water.

Anions

Chloride | Cl

Adds to solid content and increases the corrosiveness of water; in relative percentage presence with oxygen induces stress corrosion cracking.

Silica | SiO_2

With higher amounts of silicate and untreated water, the silicate has the tendency to crystallise under high pressure. This effect increases significantly as pressure increases. Crystals reduce the life of orifices, check valves, and pressure control valves.

Sulfate | SO_4

Adds to solid content; combines with calcium to form calcium sulfate scale.

Carbonate

m-Alkalinity | $CaCO_3$

Acid neutralizing capacity of water. Foaming and carryover of solids, causes embrittlement of steel, can produce CO_2, a source of corrosion. ** Bicarbonate (HCO_3), Carbonate (CO_3), and Hydrate (OH) expressed as $CaCO_3$.*

Hardness | $CaCO_3$

Sum of all hardness constituents in water. Typically expressed as their equivalent concentration of calcium carbonate primarily due to calcium and magnesium in solution, but may include small amounts of metal. Non-carbonate hardness is due to sulfates and chlorides.

Cations

Calcium | Ca

When dissolved makes water hard; contributes to the formation of scale.

Iron | Fe

Discolors water or precipitation; source of scale and erosion.

Magnesium | Mg

When dissolved makes water hard; contributes to the formation of scale.

Manganese | Mn

Discolors water or precipitation; source of scale and erosion.

Sodium

Found naturally; introduced to water in the ion exchange water softening process.

Dissolved Gases

Free Chlorine | Cl_2

Oxidizing agent; can attack elastomeric seals and damage reverse osmosis (RO) membranes.

Environmental Factors

The environment your waterjet lives in is important to its overall health and performance. Volatile swings in temperatures can affect your cut performance.

For example, the tolerances of parts cut in extreme heat will differ from those cut in extreme cold because of variances produced in both the machine's structure and expansion of the actual part.

Recommended Climate:

Ambient temperature	15.5°–38°C (60°–100°F)
Recommended temperature	20°±3°C (68°± 5°F)
Relative humidity	up to 90% @ 38°C (100°F) non-condensing
Airborne dust/contaminants	minimal
Radio frequency interference	minimal
Lighting	adequate to operate and service the machine

Waterjet Training & Support

Learning how to properly operate your Flow waterjet is essential to your success.

You are welcome to attend training before your system is installed – many customers have had success with this approach.

Customers who come to our training center are given the opportunity to work on dedicated training equipment while learning to solve real-life application scenarios. Hands-on training with our application experts means you get the focused attention you deserve. When you leave our facility, you will have a strong understanding of your software and cutting applications.

Training FAQs

Are there any prerequisites for training?

Software and applications training requires attendees to have a working knowledge of personal computers and Windows® operating systems.

How many people can attend training?

Every order is different. In most cases, two seats of training are included with your machine purchase.

Where is the training held?

Our flagship training center is located in Kent, WA. For airport and hotel information, visit http://www.flowwaterjet.com/Service-Support/Training/Customer-Technology-Center. All travel related expenses are your responsibility.

How do I sign up for training?

Please contact your Project Manager to find out how to sign up for training in your region.

Will I get any training during my installation?

Yes. Towards the end of installation, your Flow technician will provide approximately four hours of familiarization training to operators and maintenance personnel.

Your Flow Service & Support Team

We've committed ourselves to the success of our customers for over 40 years.

As a result, **nearly 1 out of every 3 systems** built is delivered to repeat customers. We are proud to provide the largest and most highly trained support team, with the experience to ensure your success.

Important Contact Information:

CUSTOMER & TECHNICAL SERVICE	FLOW TRAINING
1.800.526.4810	812.590.4922

Flow Parts & Consumables

Your one-stop shop for all things Flow waterjet – parts, consumables, abrasives, and more.

We're committed to helping you get the most out of your machine. We built your waterjet, and we know it better than anyone else. When you order from FlowParts.com, you're guaranteed to get parts specifically engineered for your system.

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Flow

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Everything we do stems from our desire to serve our customers – from innovating the next waterjet advancement, to solving customer challenges – we are committed to always delivering best-in-class service.

When you partner with Flow, you get more than a waterjet.
You get the full support of our company.

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