



Q-FOG

Q-FOG Controlled Relative Humidity (CRH) Cyclic Corrosion Tester



For Q-FOG Models:

- CRH1100-HSC
- CRH1100-HSCR
- CRH600-HSC
- CRH600-HSCR

Revision Date
27 Apr 2021

Table of Contents

1. Purpose (Mar 2021)	3
2. Specifications, Classifications, Symbols (Jun 2020)	4
3. Safety (Mar 2021)	5
4. Operating Environment	6
4.1. Suitable Environments (Jun 2020).....	6
4.2. Unsuitable Environments (Jul 2017).....	7
5. Uncrating	9
5.1. Test Chamber (Jun 2020)	9
5.2. Flat Top Crate for Container Shipping (Sep 2019).....	11
5.3. Peaked Crate for Domestic and Air Shipping (Jun 2020).....	15
5.4. Air Preconditioner (Jul 2017)	19
5.5. Accessories (Mar 2021)	21
6. Setup	22
6.1. External Dimensions and Space Requirements (Mar 2021)	22
6.2. Air Preconditioner Connection (Feb 2016).....	25
6.3. Leveling (May 2020).....	26
6.4. Electrical (Mar 2021).....	28
6.5. Compressed Air (Nov 2020).....	35
6.6. Water Supply (Nov 2020)	37
6.7. Water Drainage (Nov 2020)	41
6.8. Venting (Nov 2020)	44
6.9. Test Chamber (Mar 2021)	48
7. Warranty (Aug 2014)	50
8. Repair and Tester Support (Sep 2019)	51

1. Purpose (Mar 2021)

- This Quick Setup Guide is not an operating manual. It is intended to explain only the basics of setting up a Q-FOG® Controlled Relative Humidity (CRH) cyclic corrosion tester.
- **LF-8165-TM Q-FOG CRH Technical Manual** is necessary for a complete understanding of how to operate the Q-FOG CRH tester. A printed copy of the manual is shipped with the Q-FOG tester.
- This guide and the technical manual can also be accessed online at [Q-Portal Documents](#).



Figure 1: LF-8165-TM Q-FOG CRH Technical Manual

2. Specifications, Classifications, Symbols (Jun 2020)

Specifications, Classifications

- Replacement (Make-up) Air: 60 CFM.
- Transportation and Storage Temperature: -40 to 80 °C.
- Installation Category: Category II for transient over-voltages.
- Pollution Control: Pollution Degree 2.
- Sound Pressure Level: Sound Pressure Level does not exceed 75 dBA.
- Altitude: 2000 meters or less.
- Operation: Continuous Rating.
- Supply Connection: Permanently connected or plug/socket connection (industrial type per IEC 6309 or twist lock type in North America).
- External Disconnect: Required for all connections.

Symbols



Electrical Shock Hazard



Hot Surfaces Hazard



Attention



Finger/Hand Crushing Hazard



Local Waste & recycling regulations per the WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment

3. Safety (Mar 2021)

Q-Lab accepts no responsibility for the consequences if the user fails to comply with the instructions in this document. Q-Lab will accept responsibility for defective parts or components only if the machinery was defective at the time that the tester was shipped.

- This document does not claim to address potential safety issues, if any, associated with the use of this product.
- It is the responsibility of the user of this manual to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment safety devices may be impaired.
- The Q-FOG meets the European Low Voltage Directive 2014/35/EU and complies with the requirements of EN61010-1: 2010 (Third Edition), "Safety of Electrical Equipment for Measurement, Control and Laboratory Use".
- The Q-FOG meets the European Electromagnetic Directive 2014/30/EC and complies with the requirements of EN 55011:2007 Radiated and Conducted Emissions – class A.
- Do not use gases such as SO₂ in the Q-FOG. Do not use hazardous or petroleum based organics (solvents). Purge the chamber of airborne mist or fog before opening the chamber lid.
- Use only parts that have been supplied or recommended by Q-Lab.

Safety Devices

- Chamber Cabinet Residual Current Device
- Chamber Cabinet Electrical Power Circuit Breakers
- Chamber Over Temperature Cut-out
- Bubble Tower Over Temperature Cut-out
- Bubble Tower Low Water Level Indicator
- Bubble Tower High Water Level Indicator
- Bubble Tower O-Rings and Compression Springs
- Bubble Tower Pressure Relief Valve
- Solution Reservoir Low Level Indicator
- Solution Reservoir Empty Indicator
- Chamber Heater Over Current Switch

4. Operating Environment



The Tester Must Be Located in a Suitable Environment

- All Q-Lab test chambers are sophisticated scientific instruments.
- All tester models must be operated in a suitable controlled environment ([Section 4.1](#)).
- Operating the tester in an unsuitable environment ([Section 4.2](#)) will void the warranty.

4.1. Suitable Environments (Jun 2020)

Ambient Laboratory Temperature and Humidity

- The recommended ambient operating temperature and relative humidity (RH) for Q-FOG testers is 23 ± 5 °C and $50 \pm 25\%$ RH.
- Operating outside the recommended range (or in rare cases, even within it), certain standards or test cycle conditions may not be achievable.
- Operating outside the recommended range can result in the tester producing chamber temperature and/or humidity faults.
- Never operate a Q-FOG tester in lab temperatures >40 °C or $>80\%$ RH.
- Consult with Q-Lab for more specific information about achievable chamber temperature/humidity values based upon various ambient lab conditions.

Physical Environment

- A room that is dry, clean and free of dust, particles, gases or salt fog.
- A room with an HVAC (heating/ventilation/air-conditioning) system.
- A location away from windows or HVAC vents.
- A location that provides the necessary minimum clearances as specified in [Section 6.1](#).

4.2. Unsuitable Environments (Jul 2017)

Salt Fog or Other Airborne Contamination

- Always wait at least five (5) minutes for the purge blower to clear the chamber of mist or fog before opening the Q-FOG test chamber lid.
- Do Not install Q-FOG corrosion chambers in a room with Q-SUN xenon testers or QUV weathering testers (Figure 4.2a).
- Do Not locate Q-FOG in a room with machines or processes that generate dust, particles, vapors, gases, etc (Figure 4.2b).



Figure 4.2a: Do not install with Q-SUN or QUV testers.



Figure 4.2b: Do not locate in room with dust, particles or gases

Uncontrolled Temperature and Humidity

- Do not operate the tester in a room with uncontrolled temperature and humidity.
- Do not locate tester near sources of cold or hot air (Figure 4.2c).



Figure 4.2c: Do not locate Q-FOG near open windows.



Figure 4.2d: Keep tester away from sources of hot or cold air.

Other Unsuitable Environments

- **Outdoors:** Rain and dust will corrode or short out electrical components.
- **Metal Dust / Metal Chips:** Do not locate the tester near metal cutting machines or metal grinding machines. Conductive metal dust or metal chips in the air will damage electronic components.
- **Carbon Fibers:** Do not operate the tester where carbon fibers or carbon reinforced plastic are being cut. The conductive carbon fibers will damage electronic components.
- **Conductive Pigments:** Do not operate the tester where carbon black or other conductive pigment dust is in the air. The conductive dust will damage electronic components.
- **Other Corrosive Gases:** Do not expose the tester to acid fog, SO₂ gas, or other corrosive gases.
- **Excessive Voltage:** The electrical supply to the tester must be no more than 10% higher than the voltage listed on the nameplate.
- **Low Voltage:** Recurring “brown-outs” or voltages less than 90% of the rated voltage will damage electrical components.
- **Water Leaks from Ceiling:** Water leaking onto the tester will damage electrical components.

**For further detail on laboratory environment requirements,
please contact Q-Lab Repair and Tester Support.
See [Section 8](#) for contact information.**

5. Uncrating

5.1. Test Chamber (Jun 2020)



Carefully read these instructions before uncrating the tester. Follow all local, OSHA, EHS, and other applicable equipment operation and material handling safety requirements, recommendations, and practices.

- All Q-FOG testers are shipped in one of two types of crates (Figure 5.1a) and Figure 5.1b).
- Labels on the crate indicate the location of the instructions to be opened first (Figure 5.1c).
- Instructions for uncrating and setting up the tester are located in the envelope shown in Figure 5.1d.

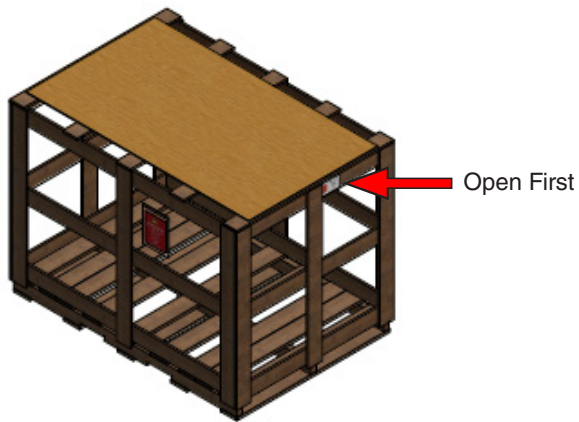


Figure 5.1a: This crate has a flat top.

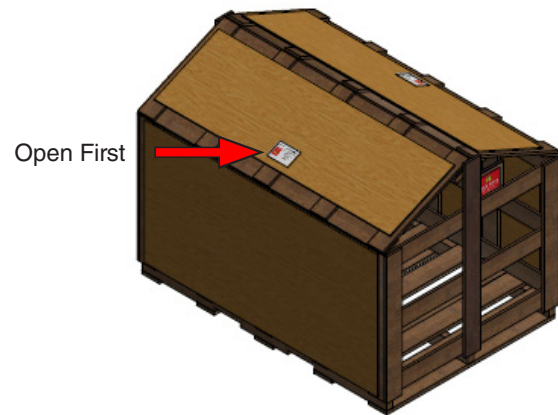


Figure 5.1b: This crate has a peaked top.



Figure 5.1c: Crate labels indicate open first envelope.



Figure 5.1d: Important - open first.

Shipping Weights (Approximate)	CRH600	CRH1100	Air Preconditioner
Q-FOG in Crate	390 kg (860 lb)	472 kg (1040 lb)	175 kg (385 lb)
Q-FOG Only	333 kg (734 lb)	378 kg (834 lb)	91 kg (200 lb)

Tools Required

Phillips Screwdriver	Ratchet
Utility Knife	15 mm (9/16") Socket
Fork Lift*	11 mm (7/16") Socket
Step Stool or Small Ladder	Pry Bar

*A fork lift or other mechanical lifting device is recommended for use in moving the crated tester to the installation location.

- For flat top crate uncrating instruction go to [Section 5.2](#).
- For peaked crate uncrating instructions go to [Section 5.3](#).



Use extreme care when uncrating to avoid damaging the Q-FOG cabinet.

Do not attempt to remove the chamber lid without special instructions. Contact Q-Lab Repair and Tester Support for detailed instructions ([Section 8](#)).

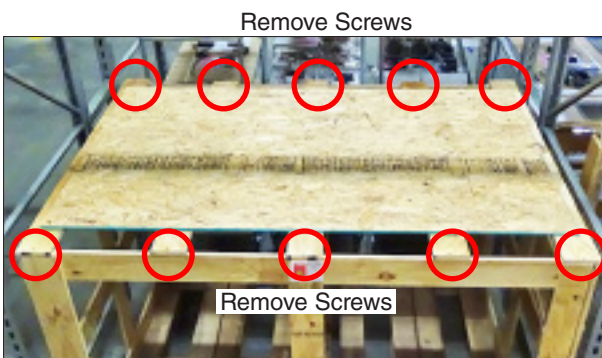
5.2. Flat Top Crate for Container Shipping (Sep 2019)



1. Uncrating instructions are located in this envelope attached to the tester. Remove and read first.



2. Uncrating instructions are located in the red envelope attached to the top of the tester. Remove the envelope and read the instructions.



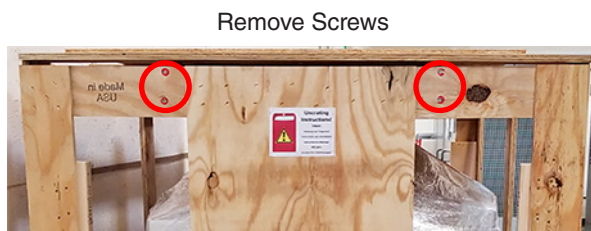
3. Remove the screws along the top front and back edges of the crate in areas shown.

Right End of Crate



4. Remove the screws at the top right end of the crate.

Left End of Crate



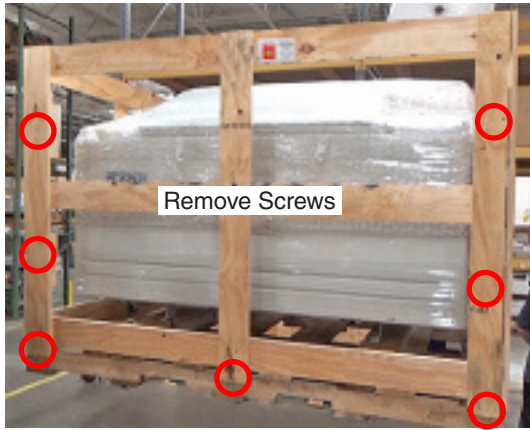
5. Remove the screws at the top left end of the crate.



6. **IMPORTANT:** Use two persons. Lift off the top of the crate. The top may be discarded.

Section 5. Uncrating

Front of Crate



7. Remove the screws in the front side of the crate in the areas shown.



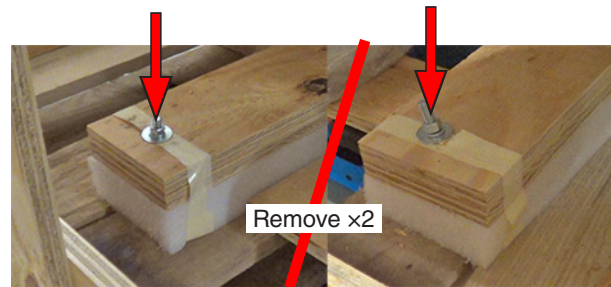
8. Remove the front side of the crate. The front side may be discarded.

Front of Q-FOG



9. Remove the two (2) 15 mm (9/16") bolts and nuts holding the front of the Q-FOG to the pallet.

Rear of Q-FOG



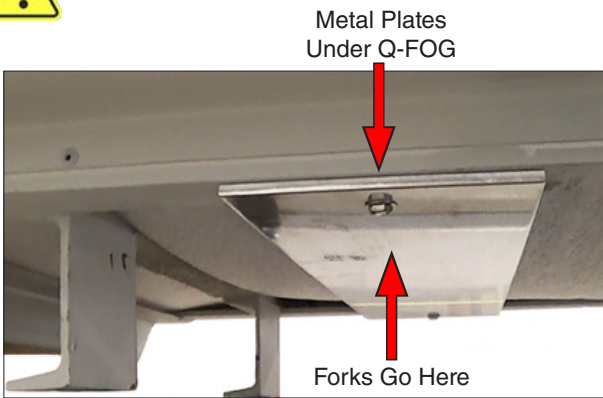
10. Remove the two (2) 15 mm (9/16") bolts and nuts holding the rear of the Q-FOG to the pallet.



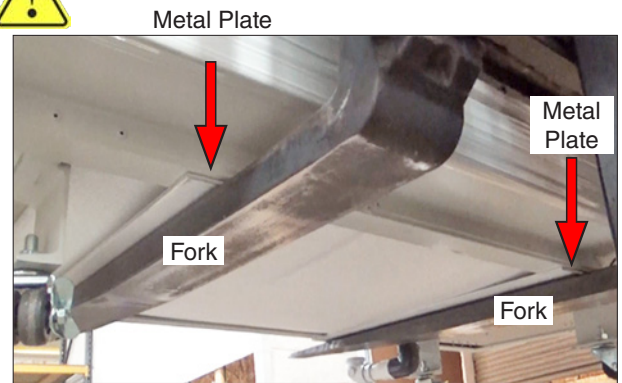
11. **IMPORTANT:** Locate the forklift labels on the front of the Q-FOG chamber.



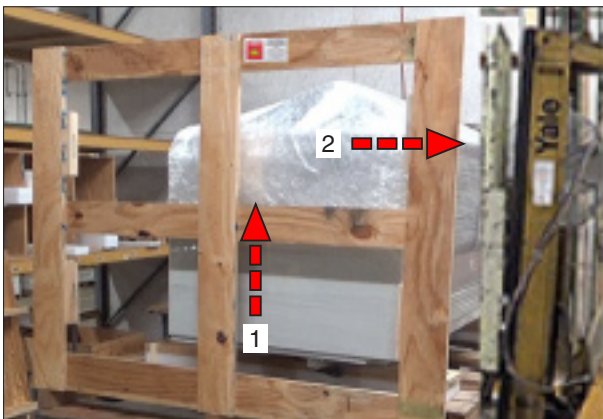
12. Location of lift plates under Q-FOG.



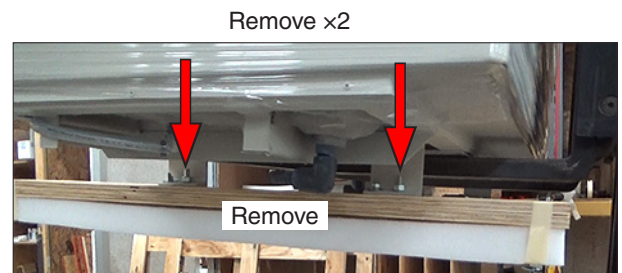
13. Make sure lift forks are under the metal plates on the bottom of the Q-FOG.



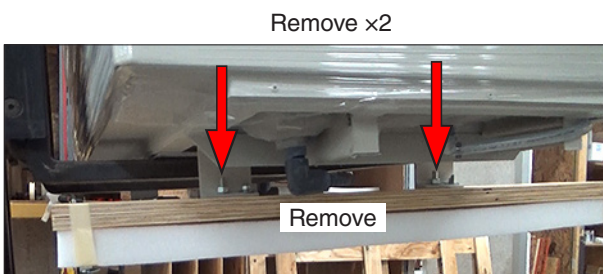
14. **USE EXTREME CAUTION:** Forks can easily damage the Q-FOG. Make sure forks are under metal plates before lifting.



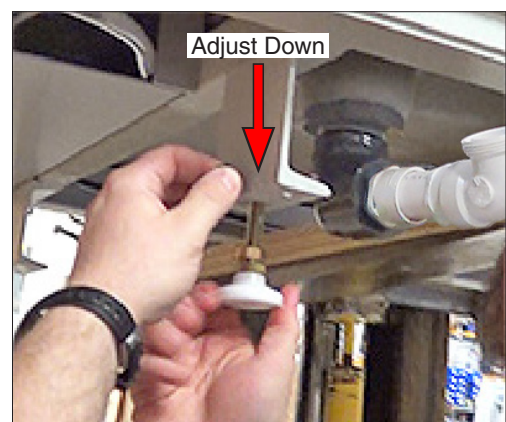
15. Use a forklift to lift Q-FOG up off the pallet. Move the Q-FOG away from the crate.



16. Use a 15 mm (9/16") wrench to remove the 2 nuts and bolts in the left angle brackets under the Q-FOG. Remove the board and foam.



17. Use a 15 mm (9/16") wrench to remove the 2 nuts and bolts in the right angle brackets under the Q-FOG. Remove the board and foam.



18. Adjust the 4 leveling pads or casters down about 38 mm (1.5"). See [Section 6.3](#) for leveling information.

Section 5. Uncrating



19. Carefully move the Q-FOG to the installation location and lower into position.



20. Use a utility knife to carefully remove the plastic wrapping. Use care to avoid scratching the Q-FOG cabinet.



21. Q-FOG cabinet uncrating is complete.



22. If any accessories are attached to the pallet, remove them and remove the plastic wrap.

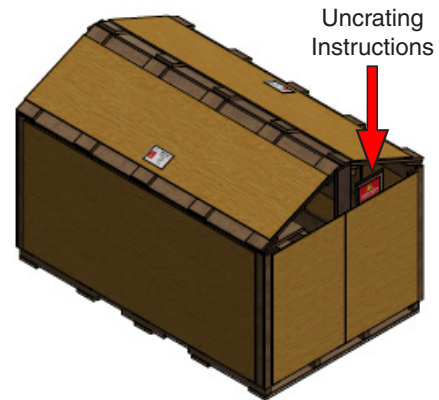


23. Go to [Section 5.4](#) for Air Preconditioner uncrating instructions.

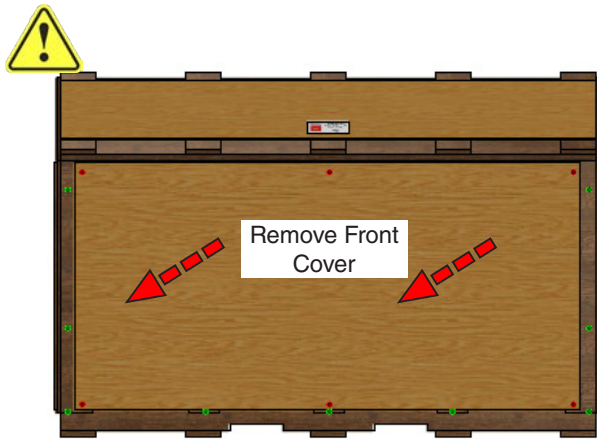
5.3. Peaked Crate for Domestic and Air Shipping (Jun 2020)



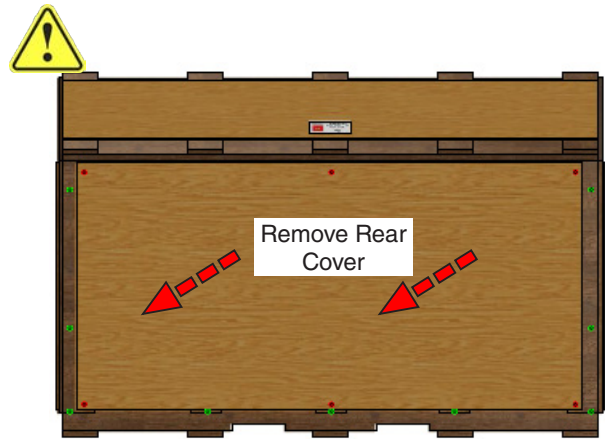
1. Uncrating instructions are in this envelope attached to the end of the tester. Remove and read first.



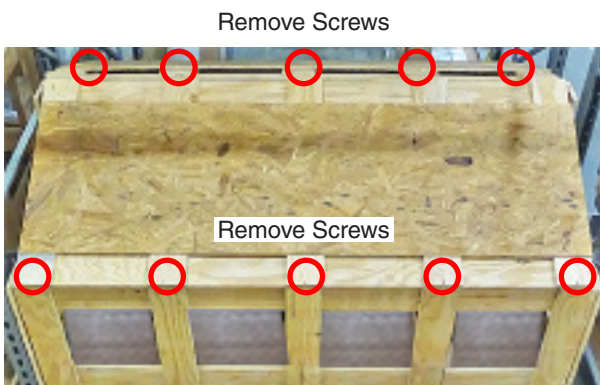
2. Uncrating instructions are located in the red envelope attached to the end of the tester. Remove the envelope and read the instructions.



3. Carefully pry the front cover off of the crate.



4. Carefully pry the rear cover off of the crate.



5. Remove the screws along the top front and back edges of the crate in areas shown.



6. Remove the screws in the vertical support at the right end of the crate.

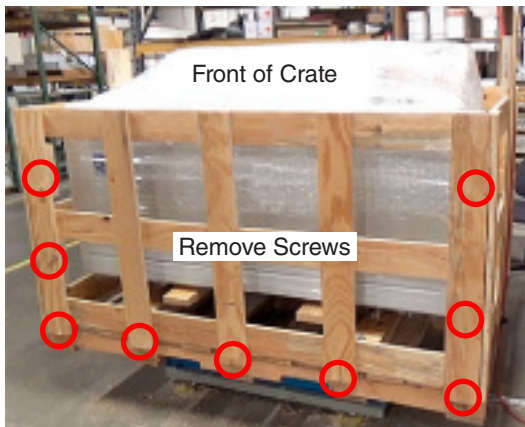
Section 5. Uncrating



7. Remove the screws in the vertical support at the left end of the crate.



8. **IMPORTANT:** Use two persons. Lift off the two sides of the top of the crate. Set aside.



9. Remove the screws in the front side of the crate in the areas shown.



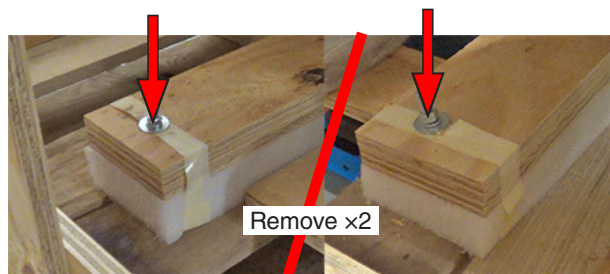
10. Remove the front side of the crate. The front side may be discarded.

Front of Q-FOG



11. Remove the two (2) 15 mm (9/16") bolts and nuts holding the front of the Q-FOG to the pallet.

Rear of Q-FOG



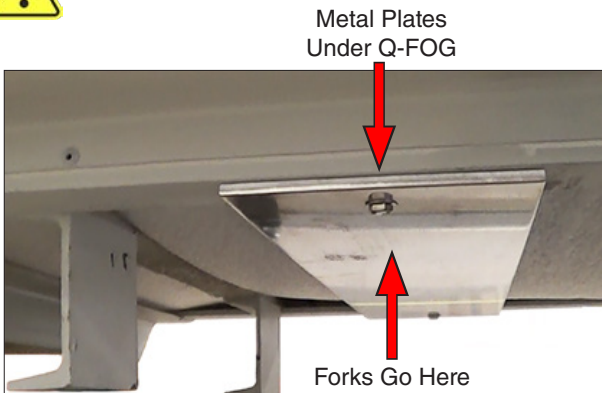
12. Remove the two (2) 15 mm (9/16") bolts and nuts holding the rear of the Q-FOG to the pallet.



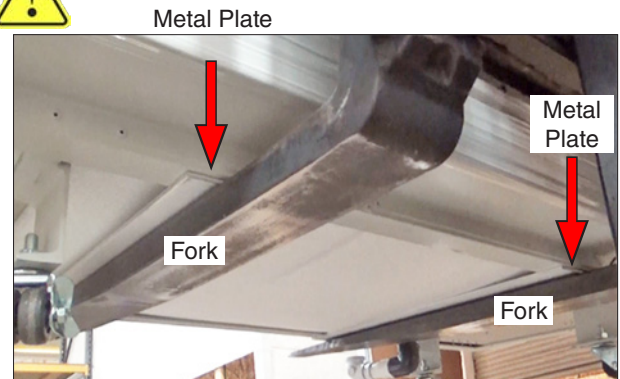
13. **IMPORTANT:** Locate the forklift labels on the front of the Q-FOG chamber.



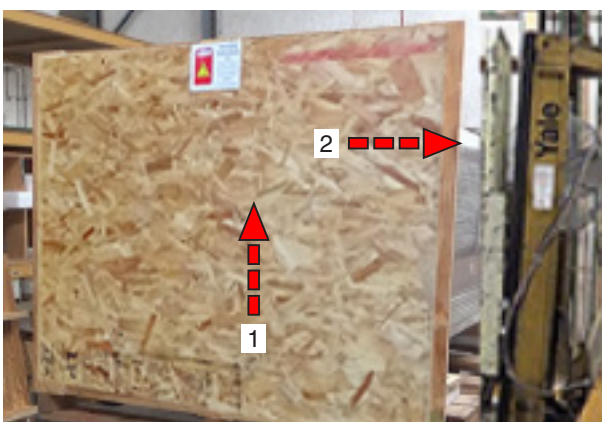
14. Location of lift plates under Q-FOG.



15. Make sure lift forks are under the metal plates on the bottom of the Q-FOG.



16. **USE EXTREME CAUTION:** Forks can easily damage the Q-FOG. Make sure forks are under metal plates before lifting.



17. Use a forklift to lift Q-FOG up off the pallet. Move the Q-FOG away from the crate.



18. Follow [Step 16](#) through [Step 22](#) in [Section 5.2](#) to complete cabinet uncrating.

Section 5. Uncrating



19. Go to [Section 5.4](#) for Air Preconditioner uncrating instructions.
-

5.4. Air Preconditioner (Jul 2017)

- The Q-FOG CRH Air Preconditioner is shipped in a separate packaging assembly.
- The Air Preconditioner can be shipped with or without a wooden crate.
- Two persons are needed to unpack the Air Preconditioner.
- Follow the steps below to uncrate the Air Preconditioner.



Use extreme care when uncrating to avoid damaging the Air Preconditioner cabinet.



1. If the Air Preconditioner is packaged in a wooden crate, remove the screws from around the bottom of all four (4) sides of the crate.



2. If the Air Preconditioner is packaged in a wooden crate, use two (2) persons to lift the crate off of the Air Preconditioner.

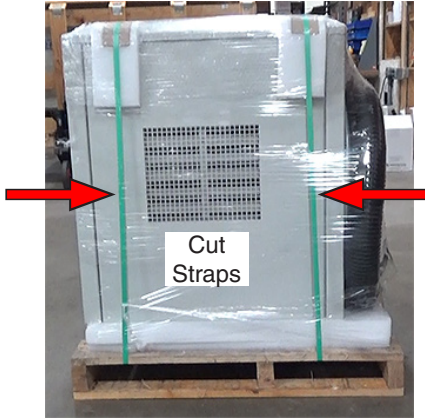


3. Cut the plastic straps securing the fiberboard carton to the pallet.



4. Lift the carton straight up and remove the carton from the pallet.

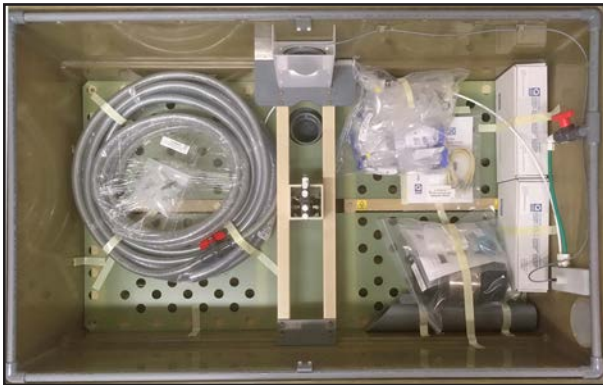
Section 5. Uncrating



5. Cut the plastic straps securing the Air Preconditioner to the pallet. Remove the plastic wrap.



6. Use two (2) persons to remove the Air Preconditioner from the pallet. See [Section 6.1](#) and [Section 6.2](#) to complete Air Preconditioner setup.



7. Go to [Section 5.5](#) for accessory unpacking.

5.5. Accessories (Mar 2021)

- Accessory parts and kits needed for Q-FOG operation and maintenance are packed in the test chamber.
- Open the Q-FOG lid to remove the accessories (Figure 5.5). Remove all tape and packaging material from the chamber.
- See Table 5.5 below for a list of accessory items and location of setup instructions.

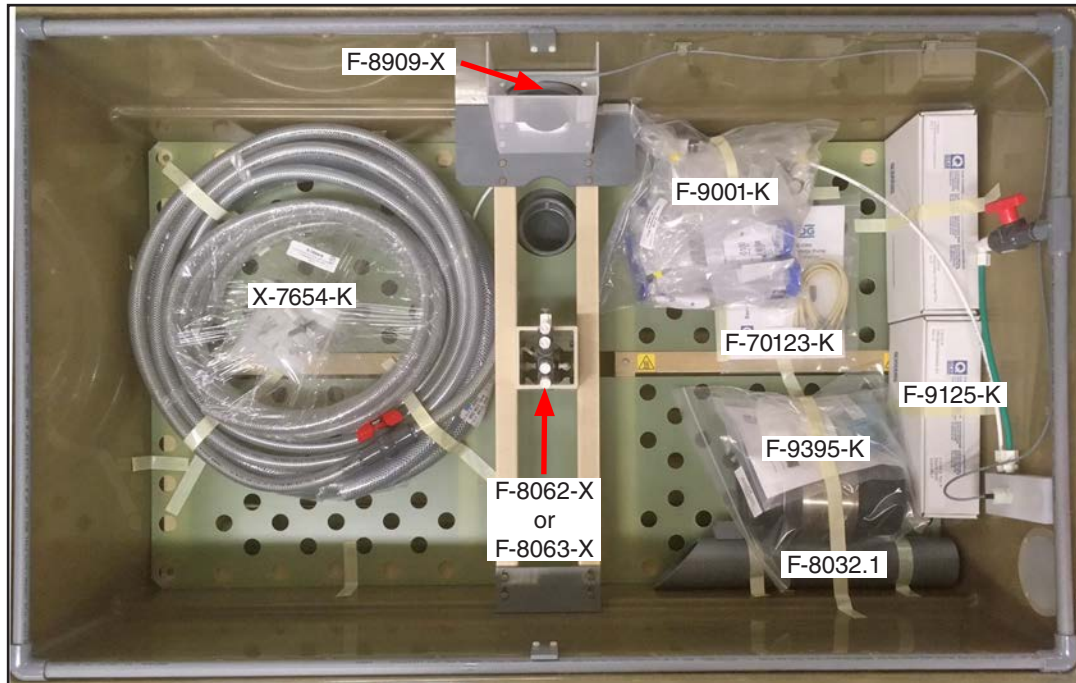


Figure 5.5: Q-FOG test chamber lid open to show accessories. **NOTE:** Optional wall wash assembly shown.

Part Number	Description	Installation / Use Instructions
X-7654-K	Drain Connection Accessories Kit	Section 6.7
F-70123-K	2.4 mm Pump Tubing Kit	See LF-8165-TM Q-FOG CRH Technical Manual
F-9125-K	Q-FOG CRH Maintenance Kit	See LF-8165-TM Q-FOG CRH Technical Manual
F-8032.1	Return Tube	Section 6.9
F-9001-K	Fog Collection Kit	See LF-8165-TM Q-FOG CRH Technical Manual
F-8909-X	Chamber Temperature Sensor Assembly	Section 6.9
F-9395-K	Q-FOG CRH Temp Sensor Calibration Kit	See LF-8165-TM Q-FOG CRH Technical Manual
F-8062-X, F-8063-X	Shower Module	See LF-8165-TM Q-FOG CRH Technical Manual

Table 5.5: Accessory parts and kits packed in the Q-FOG test chamber with setup instruction location.

6. Setup

6.1. External Dimensions and Space Requirements (Mar 2021)

- [Figure 6.1a](#) and [Figure 6.1b](#) show the external dimensions of the Q-FOG CRH main test chamber.
- [Figure 6.1c](#) shows the external dimensions of the Air Preconditioner.
- Installation location space requirements are shown in [Figure 6.1d](#).

Test Chamber

	CRH600 Models		CRH1100 Models	
A	184 cm	72.3"	220 cm	86.6"
B	188 cm	74.1"	225 cm	88.4"
C*	122 cm	48.0"	126 cm	49.8"
D	84 cm	33.0"	100 cm	39.3"
E	103 cm	40.3"	121 cm	47.3"
F	107 cm	42.0"	125 cm	49.0"
G*	175 cm	68.8"	187 cm	73.5"
H*	187 cm	73.5"	202 cm	79.5"

* Vertical dimensions are approximate and will vary based upon caster (leveling feet) adjustment.

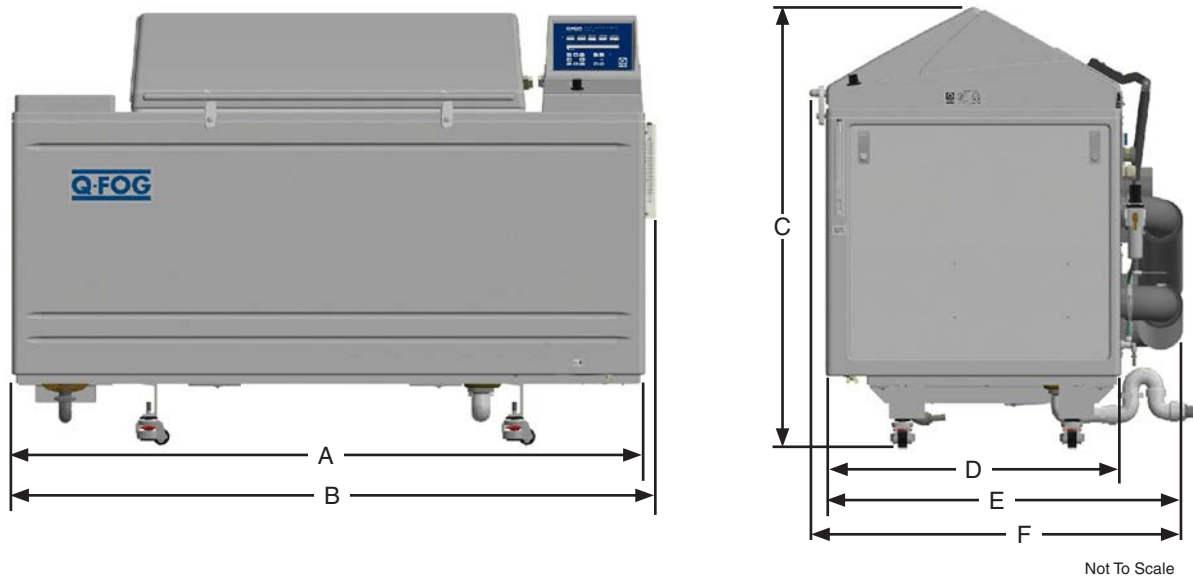
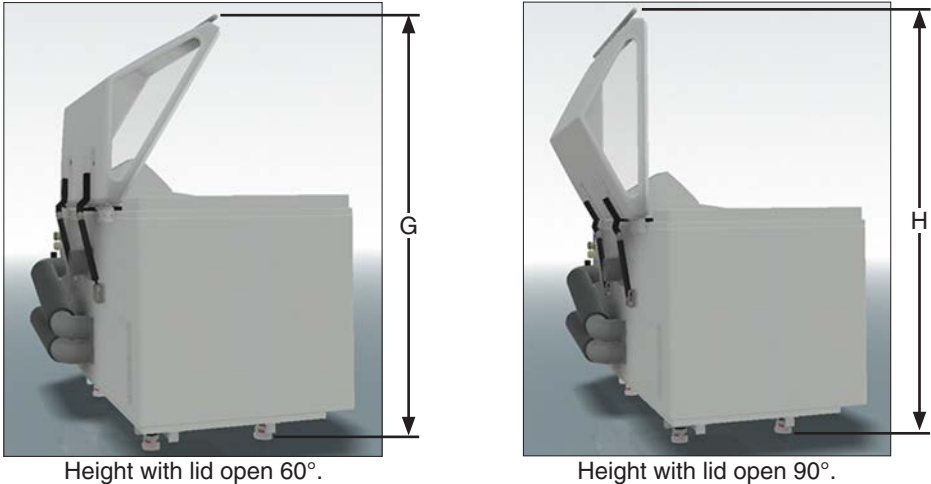


Figure 6.1a: Q-FOG CRH external dimensions.



Height with lid open 60°.

Height with lid open 90°.

Figure 6.1b: Q-FOG CRH height with lid opened.

Air Preconditioner

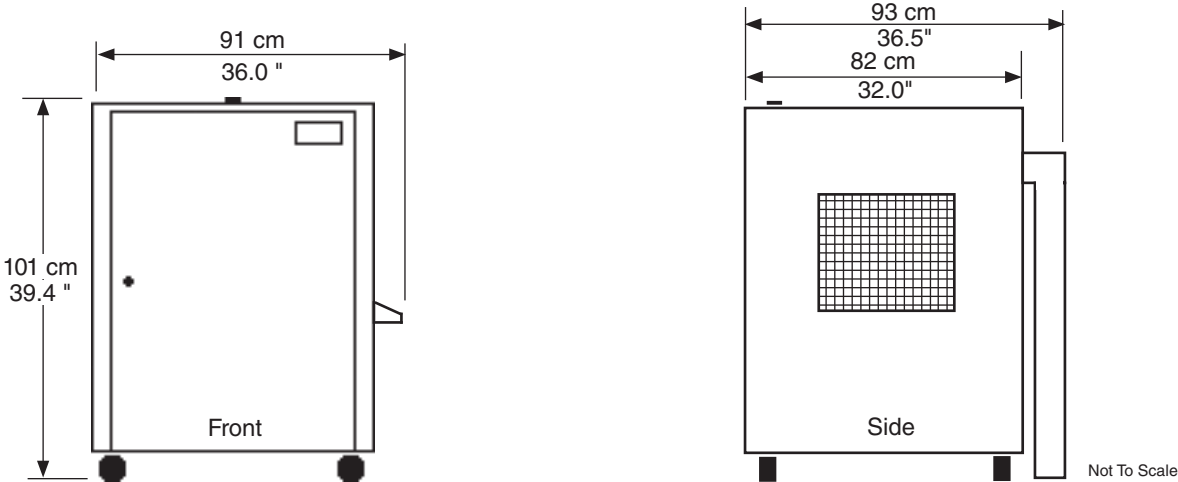


Figure 6.1c: Q-FOG Air Preconditioner external dimensions.

Space Requirements

- The Q-FOG CRH test chamber and Air Preconditioner should be positioned as shown in [Figure 6.1d](#) below to allow sufficient room to operate the unit and for proper ventilation.
- The Air Preconditioner is attached to the Q-FOG chamber by a 96" (244 cm) flexible hose.
- The Air Preconditioner is mounted on casters and may alternatively be positioned in front of or behind the Q-FOG test chamber.
- The Air Preconditioner may be moved to open the Q-FOG test chamber right side access panel.
- An Air Preconditioner hose and cable extension is kit (F-8169-K) is available to enable positioning of the air preconditioner at the left end of the Q-FOG test chamber.

	CRH600 Models		CRH1100 Models	
Minimum length of dimension A in Figure 6.1d	275 cm	108.1"	311 cm	122.4"

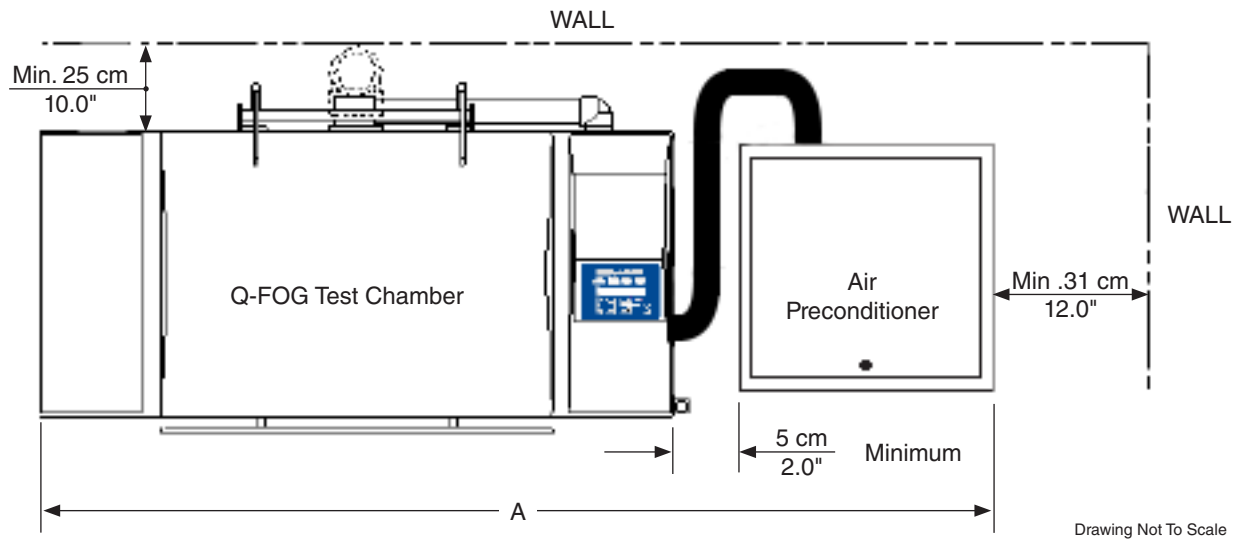


Figure 6.1d: Q-FOG CRH space requirements.

6.2. Air Preconditioner Connection (Feb 2016)



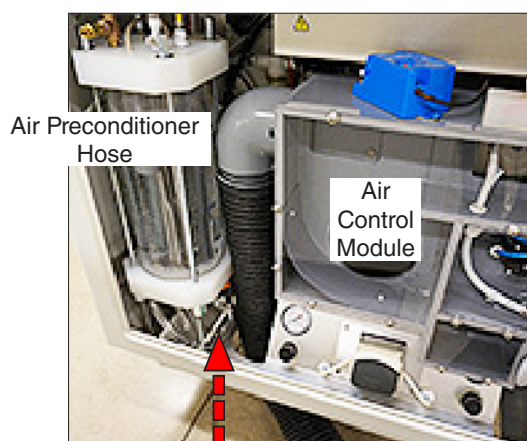
1. Press down on the bottom of the 2 latches on the Q-FOG access panel to open the latches.



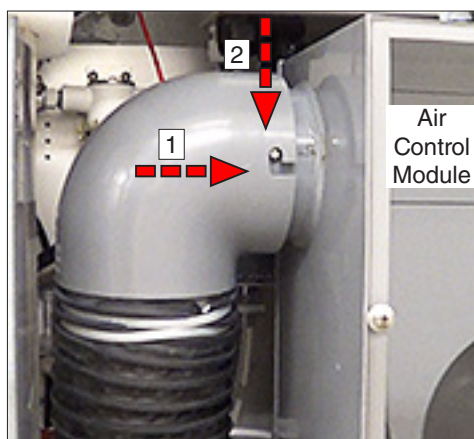
2. Remove the Q-FOG access panel.



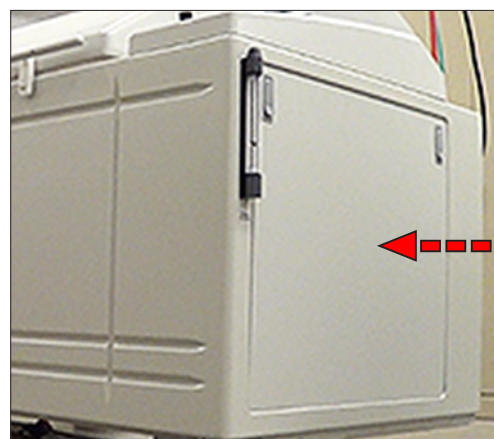
3. Cut the ties on the Air Preconditioner hose and power cable.



4. Route Air Preconditioner hose through the hole in the Q-FOG cabinet, to the air control module as shown.



5. Connect hose to the air control module.



6. Replace the access panel. Close the latches by pressing on the lever that popped out when the latches were opened.

6.3. Leveling (May 2020)

- The Q-FOG must be leveled correctly to assure a proper lid seal and prevent leakage of corrosive fog into the laboratory.
- The Q-FOG is an all-plastic chamber and, therefore, it is not perfectly rigid. Because of this, the chamber can flex a small amount.
- Flexing can cause the lid seal to leak if the Q-FOG chamber is not properly adjusted.
- The Q-FOG is equipped with leveling feet that can be adjusted to level the chamber (Figure 6.3a).
- An optional leveling caster wheel kit (Part Number F-8131-K) is available (Figure 6.3b).
- Be sure to follow the [Instructions for Leveling the Q-FOG to Prevent Leakage](#) so that the lid seals properly.

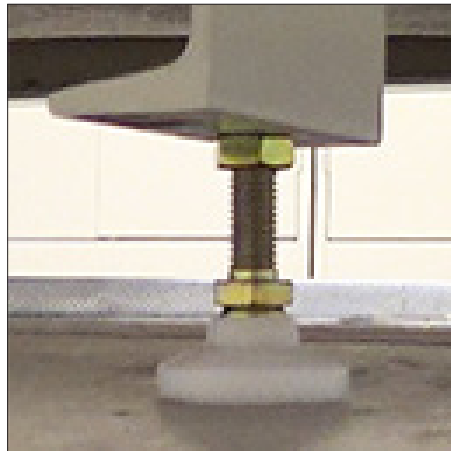
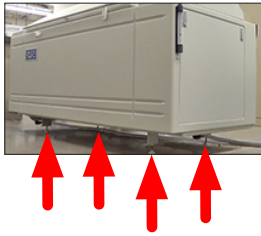


Figure 6.3a: Q-FOG test chamber with standard leveling feet.



Figure 6.3b: Optional leveling caster.



Do not use other leveling devices. Contact [Q-Lab Repair and Tester Support](#) for more information.

Instructions for Leveling the Q-FOG to Prevent Leakage

1. Position the Q-FOG in its operational location. The floor should be flat and level.
2. Close the lid and close the lid latch by rotating the latch counter-clockwise until it fully engages with the center lid handle post.
3. Adjust the support feet (or optional leveling casters) so the Q-FOG is reasonably level and all four feet touch the ground (does not rock). The support feet or leveling casters are adjusted using a wrench.
4. To check for leakage, put a light inside the chamber and look for light escaping. The Q-FOG CRH has a light built in. The power cord for an external inspection light may exit through the air exhaust pipe.
5. Make sure the lid is closed and latched. Look all along the lid seal for light escaping between the lid seal and the chamber.
6. If light is escaping from the left side of the lid, lift the left front corner of the chamber by adjusting the left front support foot or caster. If light is escaping from the right side of the lid, lift the right front corner of the chamber by adjusting the right front support foot or caster. The adjustments should be made just enough to prevent light from escaping the chamber.
7. After adjustment, the Q-FOG may rock because only three feet are touching the ground. If it rocks, extend the foot or caster that is not touching until it touches the ground. The foot or caster should be extended just enough to touch the ground. Too much extension may create another leak.

6.4. Electrical (Mar 2021)



IMPORTANT: Do not switch main power ON until the other services have been connected.

Q-FOG Test Chamber

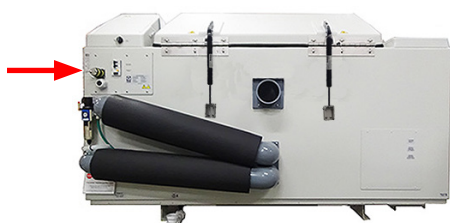
- The Q-FOG chamber power requirements are listed in [Figure 6.4a](#).
- This voltage requirement was specified by the purchaser at the time the chamber was ordered.
- The input voltage is shown on the nameplate attached to the rear of the chamber, [Figure 6.4b](#).
- It is very important that the cabinet be connected to the correct voltage.
- If the voltage is too low, the chamber will not heat up quickly enough.
- If the voltage is too high, it could cause damage to the chamber.

Power Cord Not Supplied

- The power cord connection between the facility main power supply and the Q-FOG main power circuit breaker **IS NOT** supplied with the Q-FOG (see the [Mains Power Installation](#) section).

Model	Voltage	Maximum Current	Frequency
CRH600-HSC	208 V± 10%, 1-Phase	32 A	50/60 Hz
	230 V± 10%, 1-Phase		
CRH600-HSCR	208 V± 10%, 3-Phase, 4-Wire (3P+E)	28 A	
	230 V± 10%, 3-Phase, 4-Wire (3P+E)	25 A	
	400 V± 10%, 3-Phase, 5-Wire (3P+N+E)	15 A	
CRH1100-HSC	208 V± 10%, 1-Phase	38 A	
	230 V± 10%, 1-Phase		
CRH1100-HSCR	208 V± 10%, 3-Phase, 4-Wire (3P+E)	44 A	
	230 V± 10%, 3-Phase, 4-Wire (3P+E)	39 A	
	400 V± 10%, 3-Phase, 5-Wire (3P+N+E)	24 A	

Figure 6.4a: Q-FOG power requirements.



Q-FOG Rear View

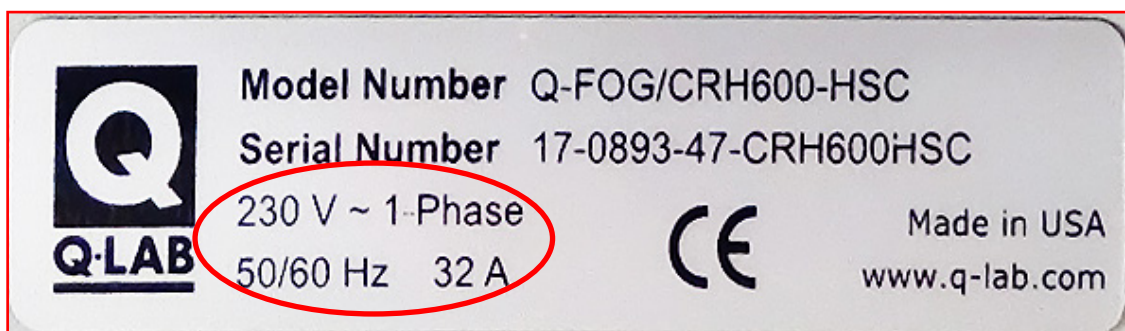


Figure 6.4b: Q-FOG nameplate showing power requirements.

Mains Power Installation

- A power cord for connecting the facility main power supply to the Q-FOG **IS NOT** supplied with the Q-FOG.
- A qualified electrician should connect the mains according to local codes using approved disconnect and over-current protection.
- On the back of the Q-FOG is a Main Power Circuit Breaker and a Residual Current Device (RCD), [Figure 6.4c](#).
- Near the breaker is a hole with strain relief for the mains power entry, [Figure 6.4c](#).
- The electrician can enlarge this hole to accept the chosen electrical conduit or power cord.
- The mains wires should be connected to the breaker, [Figure 6.4d](#) through [Figure 6.4i](#).
- Wire used for connection is required to be rated for 90 °C or higher.
- Make sure that power cord, plugs, receptacles, or connectors are rated for the specified voltage and current.
- For detailed electrical wiring information see LF-8165-SO Q-FOG CRH System Overviews.



Figure 6.4c: Mains power entry and circuit breaker locations.

208/230 V 1-Phase

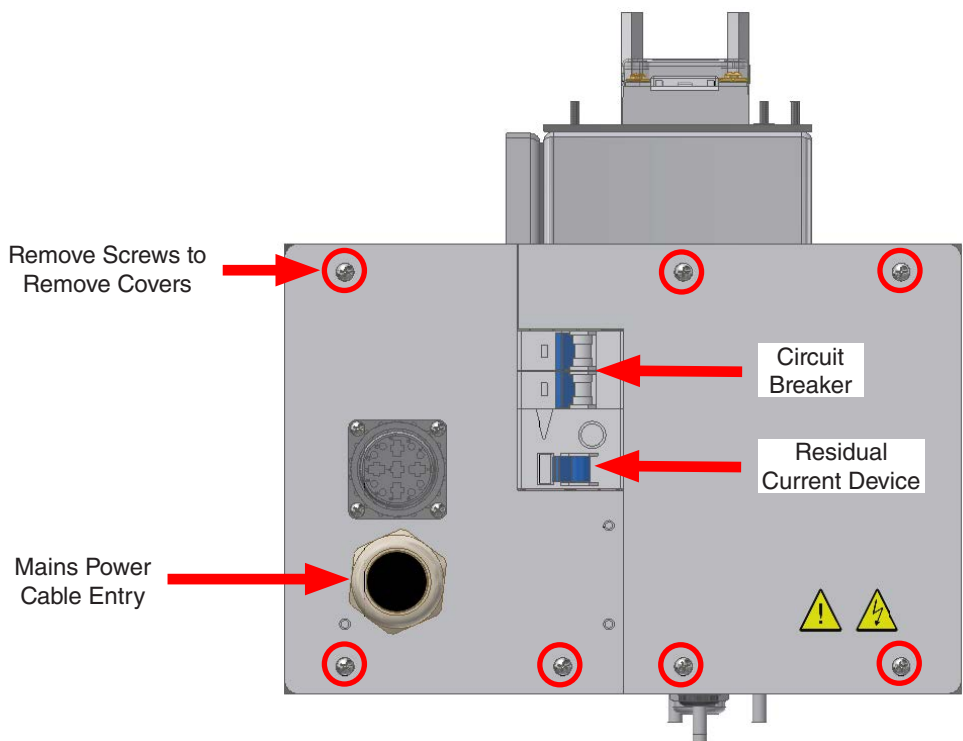


Figure 6.4d: 208/230 V 1-phase electrical power entry and circuit breakers with covers.

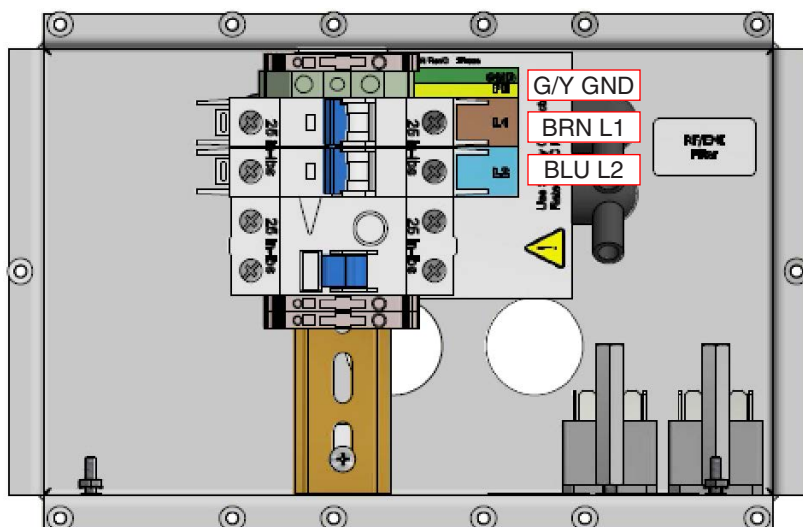


Figure 6.4e: 208/230 V 1-phase electrical power entry and circuit breakers with covers removed.

208/230 V 3-Phase

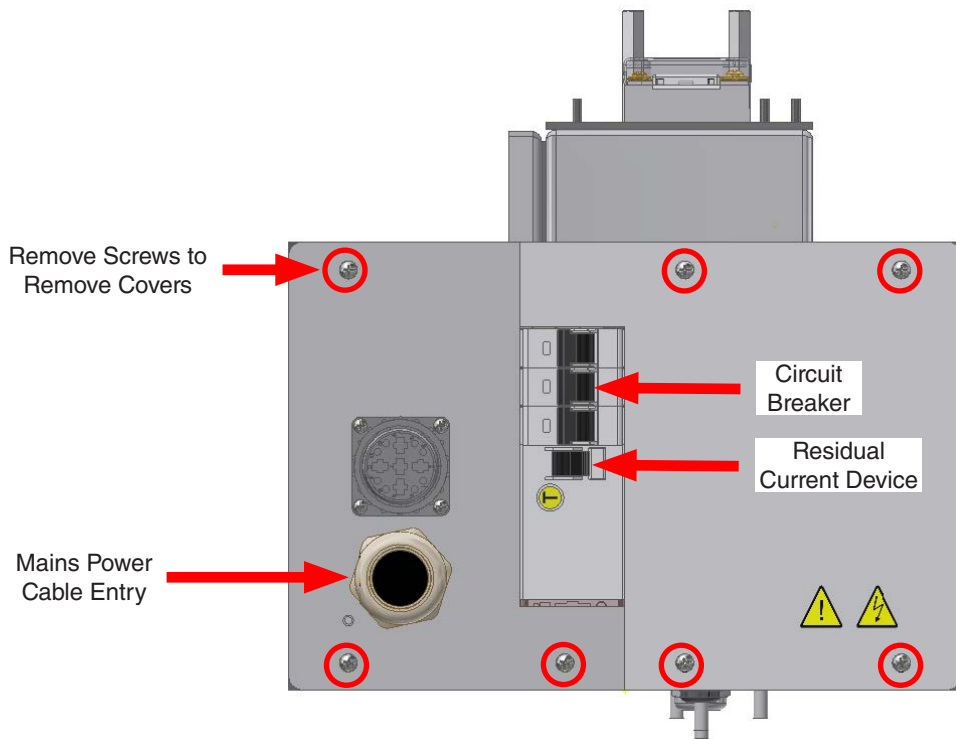


Figure 6.4f: 208/230 V 3-phase electrical power entry and circuit breakers with covers.

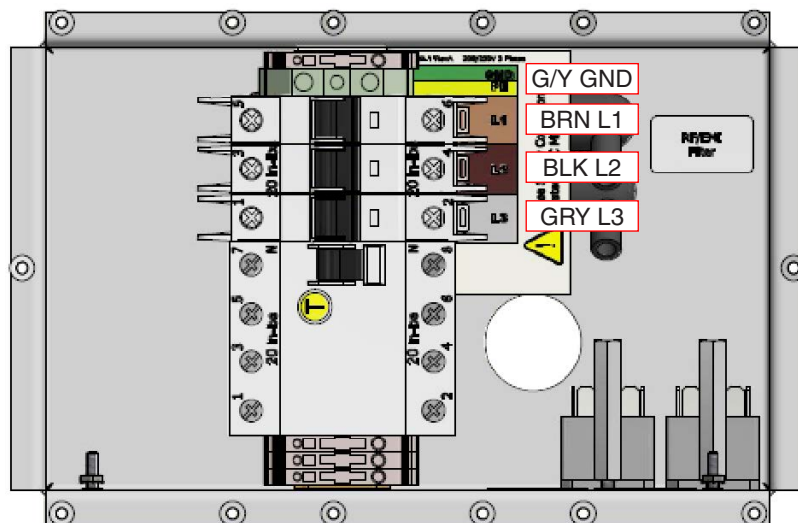


Figure 6.4g: 208/230 V 3-phase electrical power entry and circuit breakers with covers removed.

400 V 3-Phase

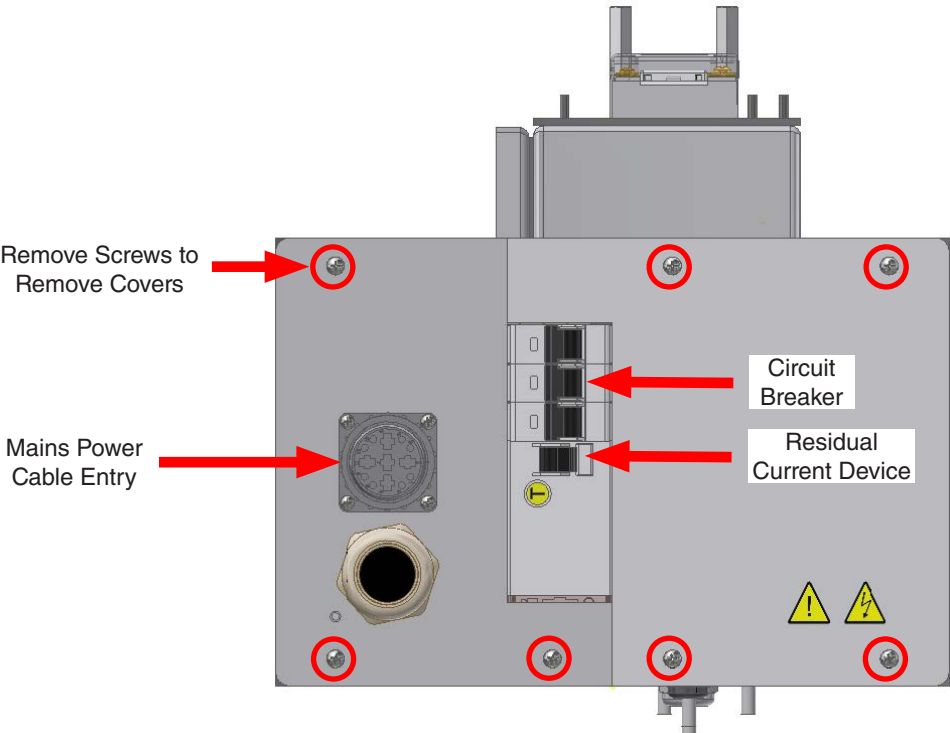


Figure 6.4h: 400 V 3-phase electrical power entry and circuit breakers with covers.

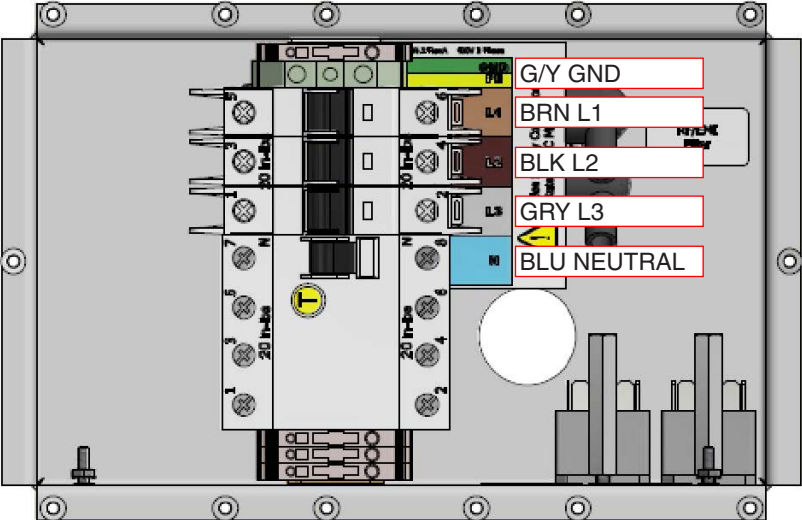


Figure 6.4i: 400 V 3-phase electrical power entry and circuit breakers with covers removed.

Air Preconditioner Power Connection

- The input voltage is shown on the nameplate attached to the rear of the Air Preconditioner (Figure 6.4j).
- The Q-FOG test chamber supplies the power to the Air Preconditioner as follows: 208 V ± 10% or 230V ± 10%, 1-Phase, 50/60 Hz, 18 A.
- An Air Preconditioner power connector is located at the rear of the Q-FOG cabinet (Figure 6.4k).
- Remove the cover from the power connector.
- Connect the Air Preconditioner power cable to the Q-FOG connector (Figure 6.4l).
- An Air Preconditioner hose and cable extension is kit (F-8169-K) is available to enable positioning of the Air Preconditioner at the left end of the Q-FOG test chamber or other positions within the length of the extensions, approximately 4.6 m (15.0’).



Figure 6.4j: Power requirements on Air Preconditioner nameplate.



Figure 6.4k: Air Preconditioner connector on Q-FOG cabinet rear.

NOTE: If the Air Preconditioner is not connected the cover should remain in place.

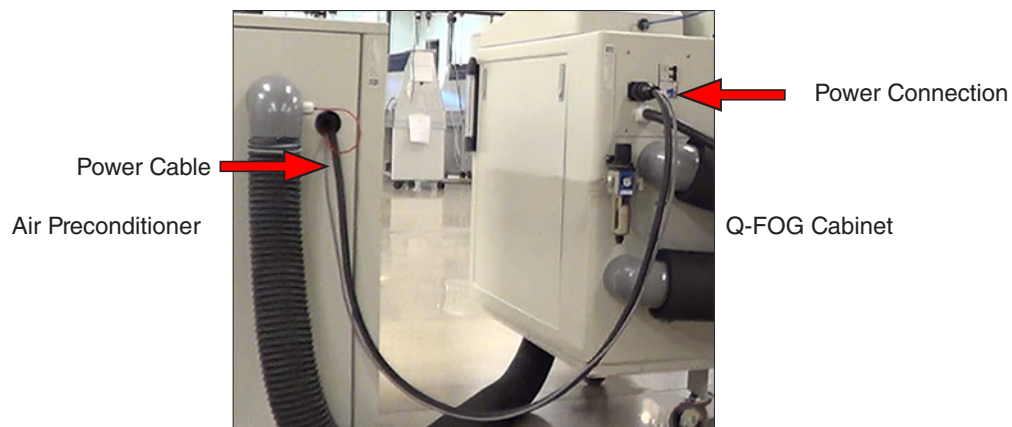


Figure 6.4l: Air Preconditioner power cable connection.

6.5. Compressed Air (Nov 2020)

Purity

- Compressed air must be supplied to the Q-FOG via an inlet at the rear of the cabinet (Figure 6.5a).
- The compressed air supply must be clean, dry, and oil-free.
- The presence of solid impurities, water, oil, or other contaminants in the compressed air may affect test results.
- Do not add a lubricator to the compressed air system.
- Oil in the air will reduce the corrosive effects of the electrolyte on the test specimens.
- Pollutants in the air may increase the corrosive effects.
- Impurities in the air supply may also clog the spray nozzle, solenoid valves or check valves and cause maintenance problems.
- The Q-FOG CRH is equipped with a moisture filter to improve the incoming compressed air quality.
- As moisture accumulates, the filter purges to a water drain.

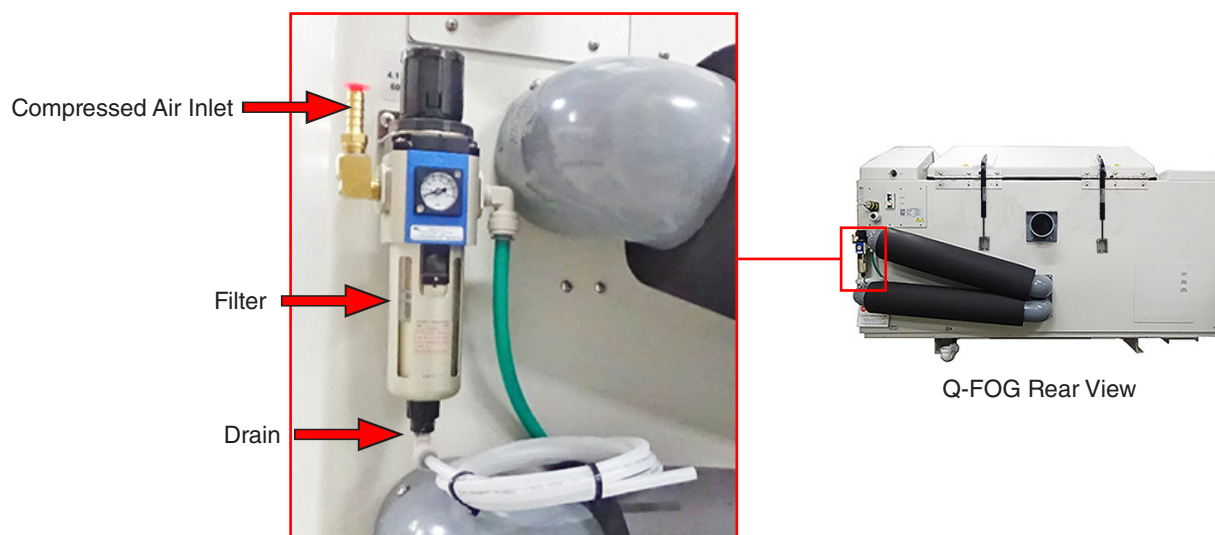


Figure 6.5a: Compressed air inlet and moisture filter.

Installation

- Pressure: 60-150 psi (4-10 bar).
- The Q-FOG CRH is equipped with a pressure regulator and gauge (Figure 6.5b).
- Set pressure regulator to 60 psi
- Volume: 3.5 CFM (1.7 LPS) maximum.
- 9 mm (3/8") inside diameter compressed air supply tubing is required to connect to the air inlet at the rear of the cabinet (Figure 6.5c).
- Optionally, for connection to 10 mm compressed air supply tubing, a metric installation kit (part number F-70099-K) is available.

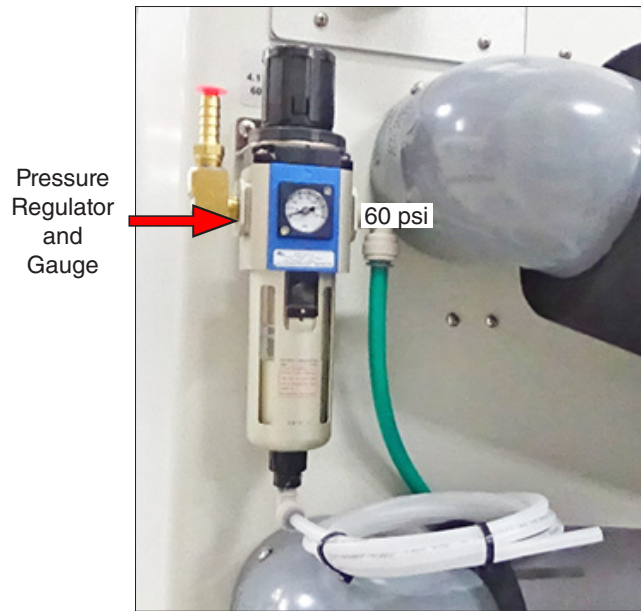


Figure 6.5b: Compressed air pressure regulator.

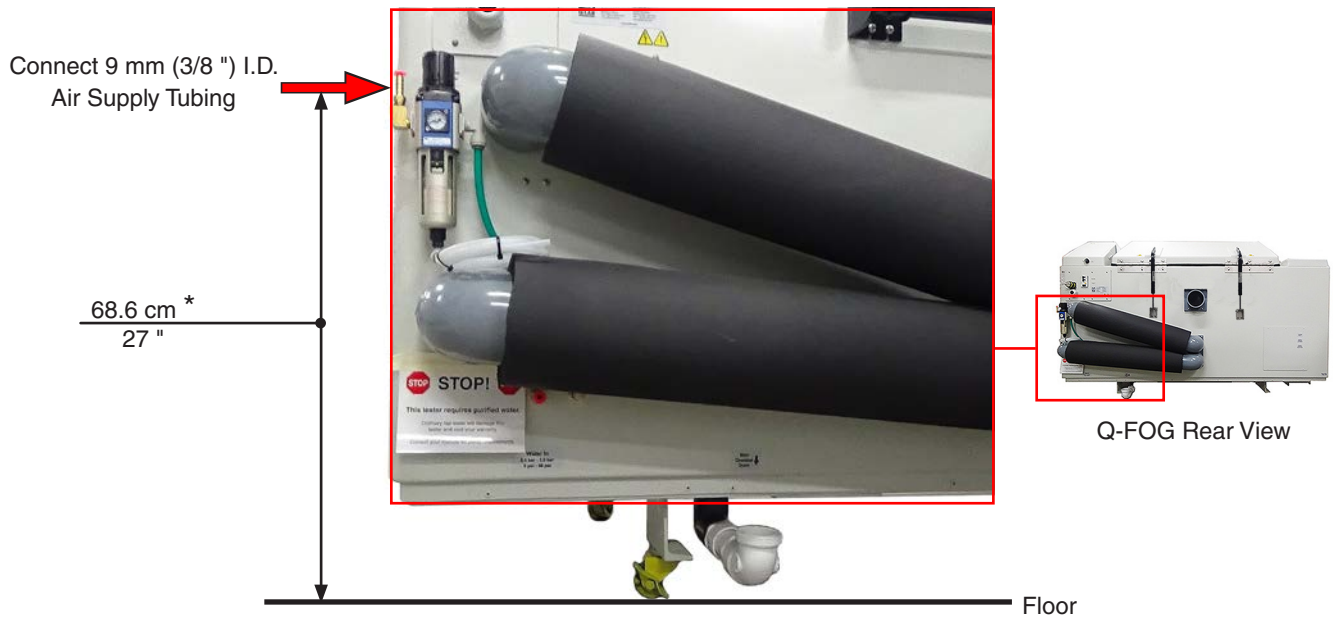


Figure 6.5c: Compressed air connection.

*Distance from floor to compressed air inlet on tester varies based upon adjustment of leveling feet or installation of optional casters. Measure tester to determine actual height.

6.6. Water Supply (Nov 2020)

Purity



Important Caution: The Q-FOG CRH tester requires purified water.

The Q-FOG tester warranty is voided if this condition is not met.
Water purity requirements are listed below.

- The Q-FOG tester requires a supply of pure water for the bubble tower.
- Pure water is used for saturating the compressed air with water vapor during the fog function.
- Q-FOG CRH tester also needs pure water for producing chamber humidity, for water line refresh (see below), and the optional wall wash system (see LF-8165-TM Q-FOG CRH Technical Manual for wall wash system information).
- The reverse osmosis / deionized (RO/DI) water system described on the next page produces water pure enough for Q-FOG CRH testers.
- **This type of RO/DI system is required for Q-FOG CRH testers:**

Pressure	Maximum Flow Rate	Maximum Volume	Resistivity	Conductivity	Silica	Total Dissolved Solids	pH
9-56 psi (0.6-3.8 bar)	0.4 liter/min.	5 liters/hour	> 5M ohm•cm	< 0.2 μ S/cm	< 0.1 ppm	< 0.1 ppm	6-8

- Remove Solid Particles: > 20 μ m.
- If line pressure is greater than 4.0 bar (56 psi), install a pressure regulator.
- Maximum consumption rates are during the RH function; typical consumption will be much lower.
- Additionally, the purified water system must be sized to accommodate maximum peak demand during short duration bubble tower refill step at 0.4 liters/minute.

Recirculation

- To avoid the build-up of organic contaminants in the water supply system, Q-Lab recommends the use of a recirculating RO/DI system.
- Contact Q-Lab Repair and Tester Support. See [Section 8](#) for contact information.

Water Line Refresh

- When the tester is turned on, and has not been operated for a minimum of 168 hours (one week), or has been running steps other than RH for more than 168 hours, water line refresh is initiated.
- Water line refresh replaces possibly stagnant or contaminated water in the water feed assembly and associated supply lines with fresh clean water for the RH generator nozzles, the shower purge water circuit, and the wet bulb water supply tube.
- Refresh runs for 600 seconds (10 minutes) delaying the start of a test cycle until the refresh is complete.
- During this time, a stream of water flows from the RH generator nozzles and water drips from the shower nozzles (if the shower module is installed).
- During the refresh process WATER LINE REFRESH and XX SECONDS REMAINING are displayed on the controller.

Reverse Osmosis / Deionization System

- The reverse osmosis / deionized (RO/DI) water system shown in [Figure 6.6a](#) and [Figure 6.6b](#) produces water pure enough for spray systems.
- RO/DI water output by Stage E is required for Q-FOG CRH testers.



Important: Use Type I, not Type II anion in the mixed bed tanks of the RO/DI system.

The Strong Base **Type I** Anion resin in the mixed bed tanks is the most important part of these systems to prevent water spotting. This is because strong base Type I anion resin is the only resin that can effectively remove suspended silica.

Suspended silica is the major cause of specimen spotting. Type I anion is much better at removing suspended silica than Type II.

Unfortunately, Type II is the most common anion. So be sure to insist that your water purification supplier installs Type I, not Type II. The cost for Type I anion is about the same as Type II. Note that Type I anion is only necessary in the mixed bed “polishing” stages of the deionization, not in the initial “rough” purification stages.

- [Figure 6.6a](#) shows an effective Reverse Osmosis / Deionized Water System with Anion Type I Resin for spray water silica removal.
- For more information on water purification systems contact the Life Science business of Merck KGaA, Darmstadt, Germany. The Life Science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the USA and Canada.

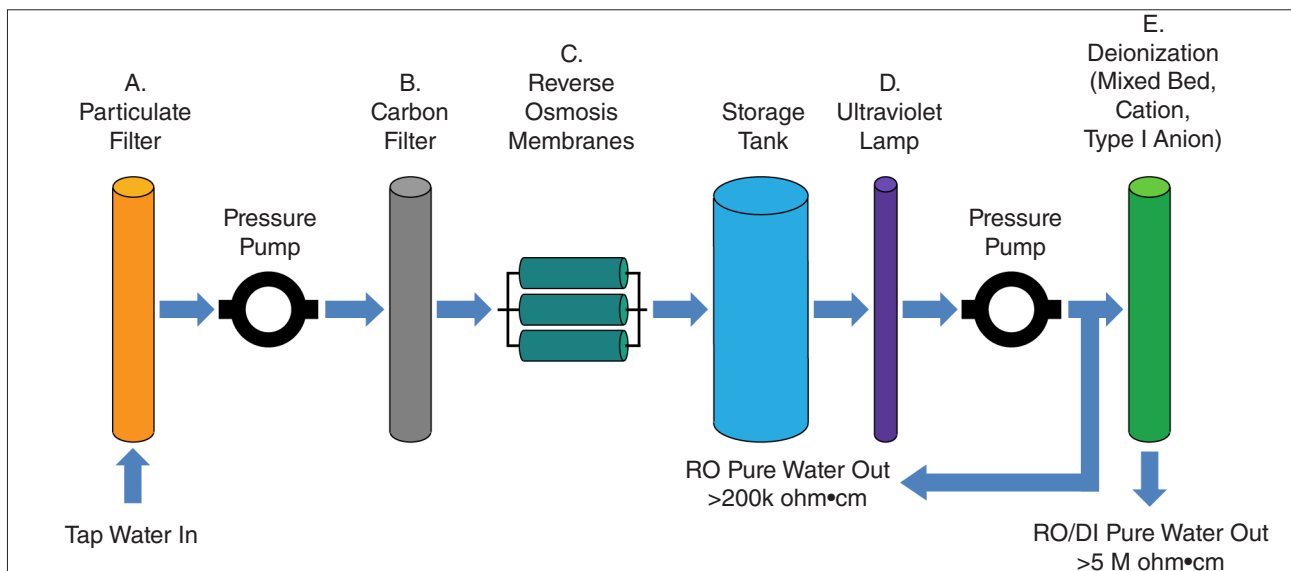


Figure 6.6a: Reverse Osmosis / Deionized water system.

Stage	Purpose	Outgoing Purity	Notes
A. Particulate Filter	Remove small particles		Replace once per year
B. Carbon Filter	Remove chlorine		Replace once or twice per year
C. R/O Membranes	Remove dissolved solids, colloidal silica, organic and biological contaminants	>200k ohm•cm	Produces pure (RO) water
D. Ultraviolet Lamp	Disinfect water		Any bacteria or algae from the storage tank is removed
E. Mixed Bed Tank	Final polishing to remove positively and negatively charged ions	> 5 M ohm•cm	Produces ultra pure (RO/DI) water required for the Q-FOG CRH

Figure 6.6b: Additional RO/DI system information.

Installation



Flush out the water supply line prior to connecting to the Q-FOG tester.

- A 9 mm (3/8") inside diameter purified water supply hose is required to connect to the water inlet at the rear of the cabinet (Figure 6.6c and Figure 6.6d).
- Optionally, for connection to 10 mm water supply tubing, a metric installation kit (part number F-70099-K) is available.
- The water supply connection should be fitted with a stop valve.

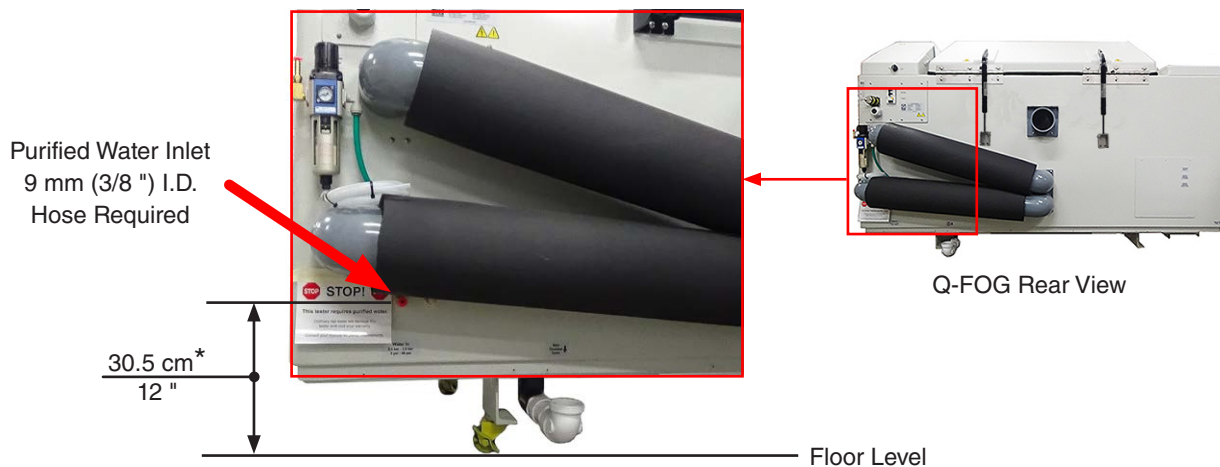


Figure 6.6c: Purified water inlet location.

* Actual distance from the floor to the center of the chamber drain will vary based upon adjustment of leveling feet or installation of optional casters. Once the tester is in position, measure the distance to determine the actual height.

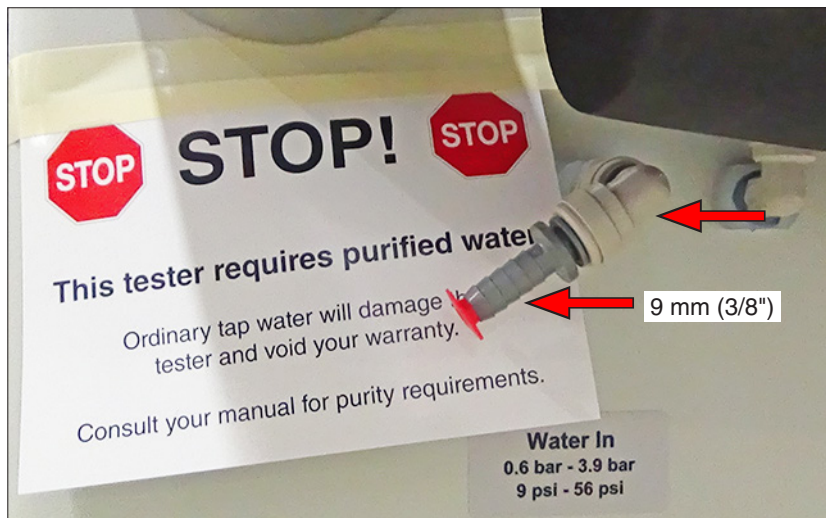


Figure 6.6d: Supplied hose barb and elbow for water connection.



IMPORTANT: When electrical, compressed air, and purified water have been connected, turn on the air and water, and check for leaks at the connection points.

6.7. Water Drainage (Nov 2020)



A floor drain is required.

- The Q-FOG tester has multiple drains (Figure 6.7a through Figure 6.7j).
- Waste water disposal must be made in accordance with local ordinances regarding chemical disposal.
- Usually simple salt water is not regulated. Check local disposal regulations.

Q-FOG Drain Connections

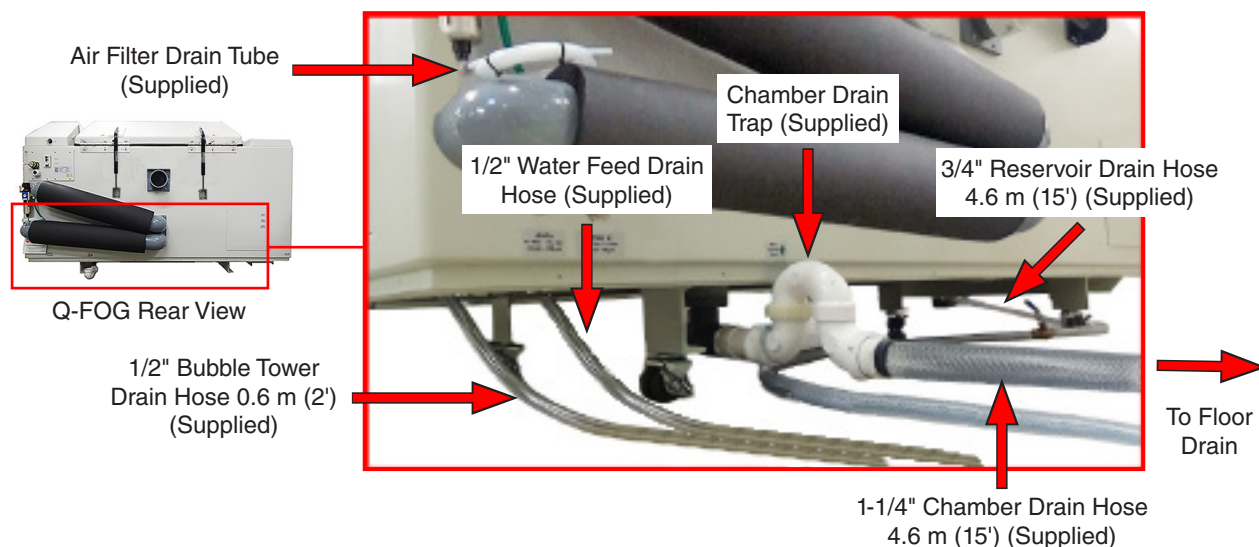


Figure 6.7a: Water drainage connections.

Chamber Drain

- The main testing chamber is fitted with a drain to enable excess solution to go to a sanitary sewer drain.
- A supplied trap must be installed on the drain so that corrosive vapors cannot escape (Figure 6.7b through Figure 6.7d).
- Run the supplied hose from the trap to a drain.



Figure 6.7b: Chamber drain.

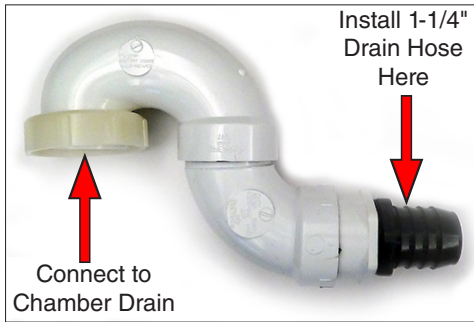


Figure 6.7c: Chamber drain trap (supplied).

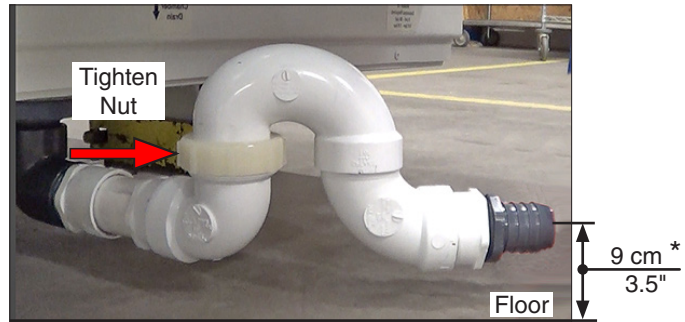


Figure 6.7d: Chamber drain trap installed.

*Distance from floor to center of chamber drain varies based upon adjustment of leveling feet or installation of optional casters. Measure tester to determine actual height.

Solution Reservoir Drain

- The user must attach a 19 mm (3/4") hose and ball valve shut off (all supplied) to the reservoir drain (Figure 6.7e).
- This hose is used only when cleaning out the reservoir and does not have to be run to a drain.
- However, for convenience, we recommend that this hose be connected to a drain.
- The user may want to supply their own plastic pipe and plumb all the drains permanently into a sanitary drain.
- Make sure the ball valve is attached and closed before filling the reservoir.

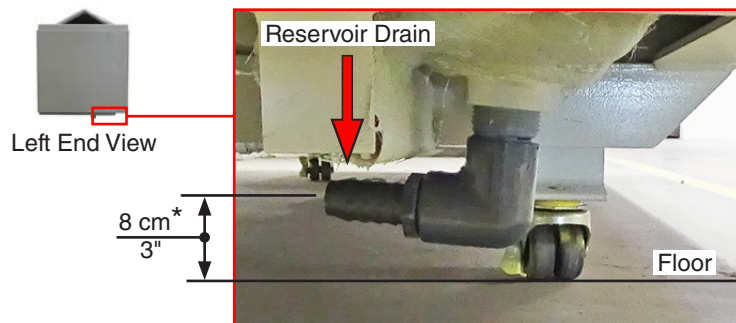


Figure 6.7e: Solution reservoir drain location.

*Distance from floor to center of reservoir drain varies based upon adjustment of leveling feet or installation of optional casters. Measure tester to determine actual height.

Water Feed Assembly Drain

- This 13 mm (1/2") hose (Figure 6.7f) is connected to the water feed assembly (see LF-8165-TM) overflow port.
- Route the hose under the lower duct. Unroll the hose and connected to a floor drain (Figure 6.7g).



Figure 6.7f: Water feed assembly drain hose.



Figure 6.7g: Unroll and connect to drain.

Air Filter Drain

- The end of the supplied 1/4" tubing from the bottom of the air filter should be placed into a floor drain (Figure 6.7h).

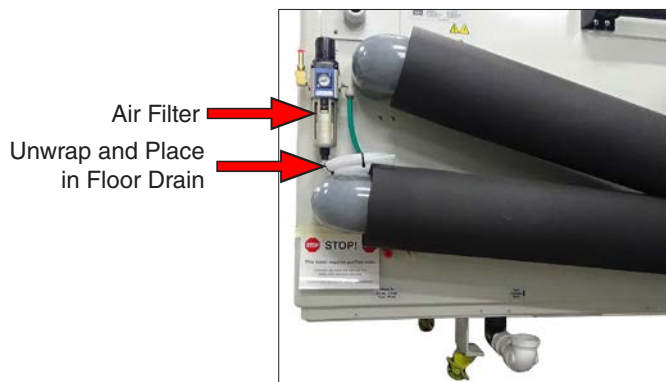


Figure 6.7h: Air filter drain.

Bubble Tower Drain

- This system consists of a 13 mm (1/2") hose. See Figure 6.7i.
- This hose is used only when cleaning out the Bubble Tower and does not have to be run to a drain.
- However, for convenience, we recommend that this hose be connected to a drain.



Figure 6.7i: Bubble tower drain connection.

Air Preconditioner Drain Connection

- The end of the Air Preconditioner drainage hose should be connected to a floor drain (Figure 6.7j).

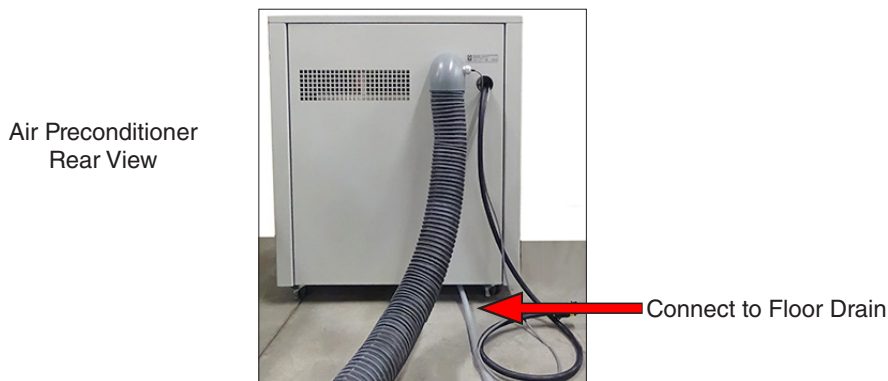


Figure 6.7j: Air Preconditioner drain hose location.

6.8. Venting (Nov 2020)

- Be sure to comply with all local regulations regarding chemical exhaust. Usually simple salt water is not regulated.
- The Q-FOG exhausts air from the test chamber at a rate of approximately 60 CFM.
- For proper operation of the venting system, 60 CFM of replacement (make up) air must be available to the room where the Q-FOG is installed.
- The heat load dissipation is 2000 W for CRH600 models and 2500 W for the CRH1100 models.
- Proper venting will prevent corrosive mist from entering the laboratory and assure correct performance of the Q-FOG tester.
- Air venting from the chamber is done via a 114 mm (4.5") outside diameter vent tube (Figure 6.8a).
- The customer must connect an exhaust system with a 102 mm (4.0") inside diameter (minimum) vent line.
- Optionally, for connection to an exhaust system having 100 or 110 mm outside diameter tubing, a metric installation kit (part number F-70099-K) is available. See Figure 6.8b through Figure 6.8d for various metric installation configurations.
- Because of the typically corrosive nature of the exhaust, plastic vent tubing is strongly recommended.
- The length of the venting system must be less than 30 meters (100 feet) and contain fewer than 10 elbows (i.e. 90° turns).
- If it must be longer, or if it must contain more turns, there could be significant back pressure on the chamber and this might cause corrosive mist to enter the laboratory and/or reduce the tester's performance capabilities.
- A "tee" is recommended at the end of the vent to reduce the risk of periodic back-pressure from the wind.
- Place a screen over the vent to discourage birds and small animals.

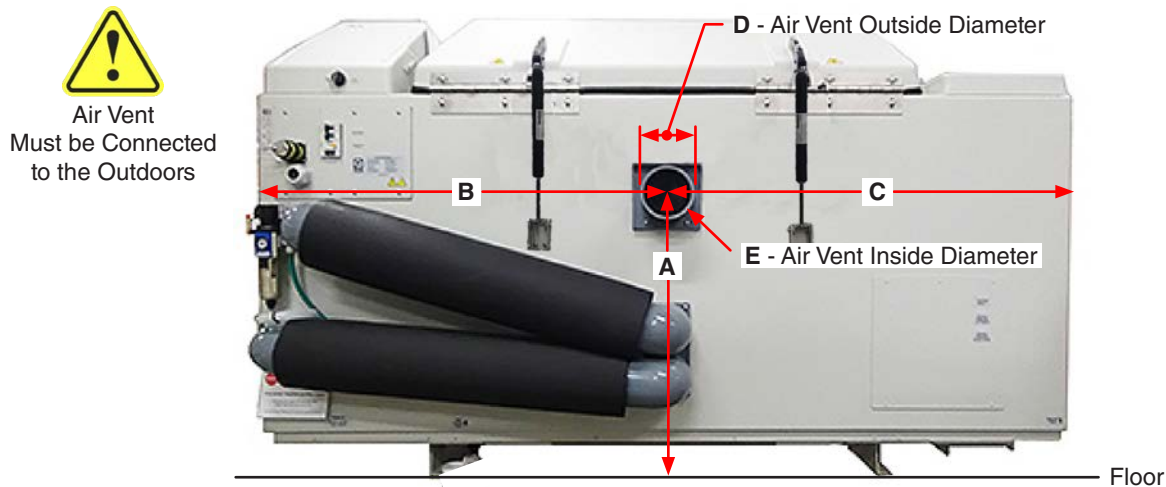


Figure 6.8a: Vent location.

Air Vent Location				
	Model 600		Model 1100	
A*	71.1 cm	28.0"	71.1 cm	28.0"
B	90.2 cm	35.5"	109.2 cm	43.0"
C	91.4 cm	36.0"	110.5 cm	43.5"
D	11.4 cm	4.5"	11.4 cm	4.5"
E	10.2 cm	4.0"	10.2 cm	4.0"

* Distance from floor to center of vent varies based upon adjustment of leveling feet and installation of optional casters. Measure tester to determine actual height.

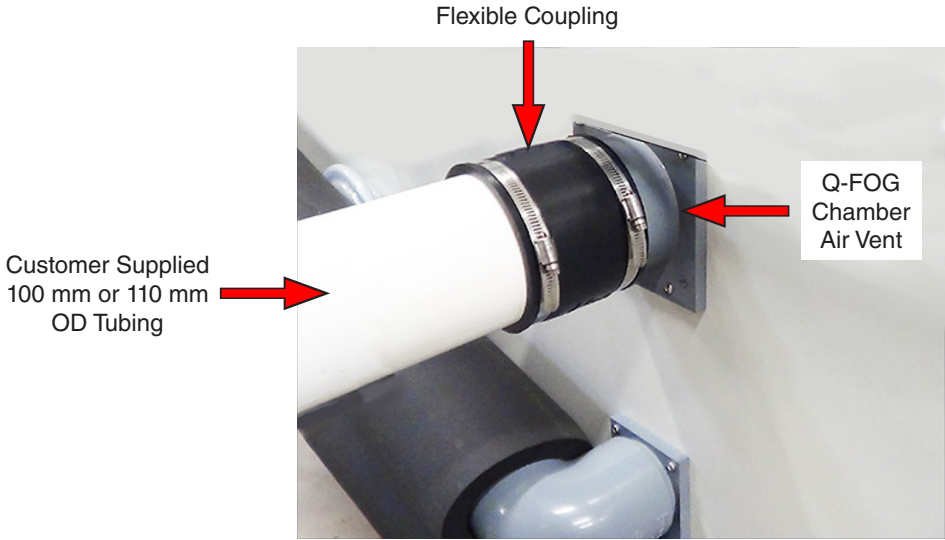


Figure 6.8b: Metric kit straight-out venting installation.

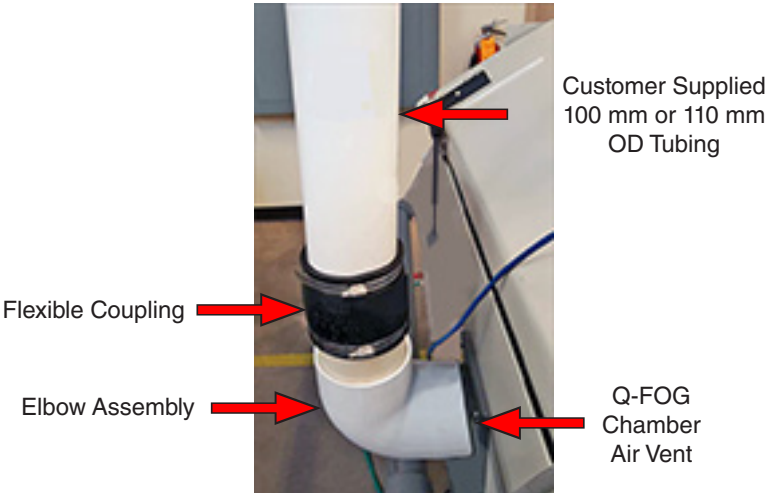


Figure 6.8c: Metric kit vertical venting installation.

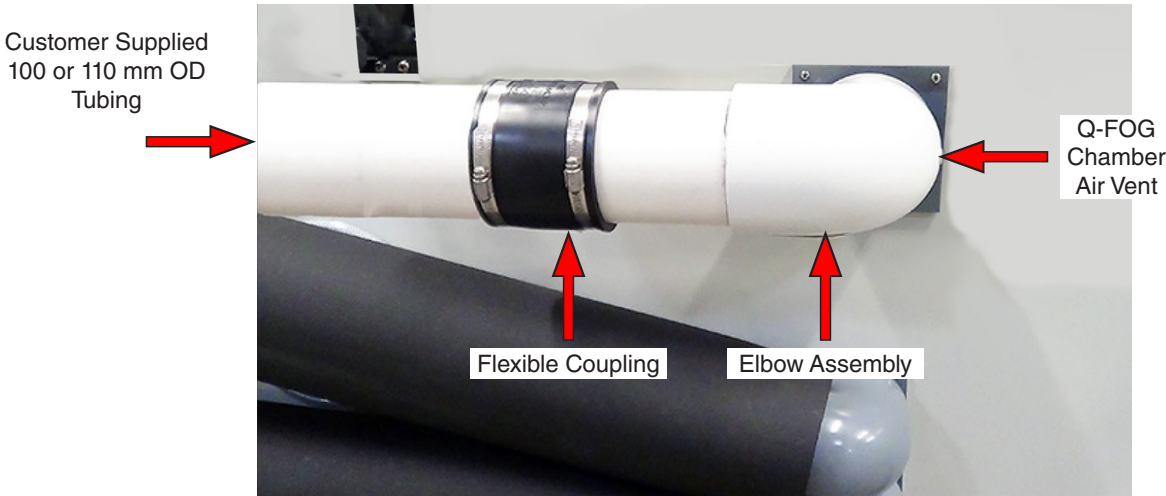


Figure 6.8d: Metric kit horizontal venting installation.

Connections

- The Q-FOG must be vented to the outdoors. See [Figure 6.8e](#).
- Because some liquid from the salt fog may condense on the inside of the vent tube, we recommend that all sections of the vent tube have a slope either back toward the chamber or away to a drain. See [Figure 6.8f](#).
- Otherwise, liquid may build up in the vent tube and cause problems with back pressure.
- Avoid all installations that could create moisture traps. See [Figure 6.8g](#).
- Flexible vent tubing is not recommended due to the potential for creating moisture traps.
- Excessive amounts of moisture build up can create a weight load on the vent tubing.
- [Figure 6.8f](#) and [Figure 6.8g](#) illustrate correct and incorrect ways to connect the Q-FOG chamber vent.
- When venting variations are necessary, please consult Q-Lab Corporation for recommendations.
- See [Section 8](#) for Q-Lab contact information.

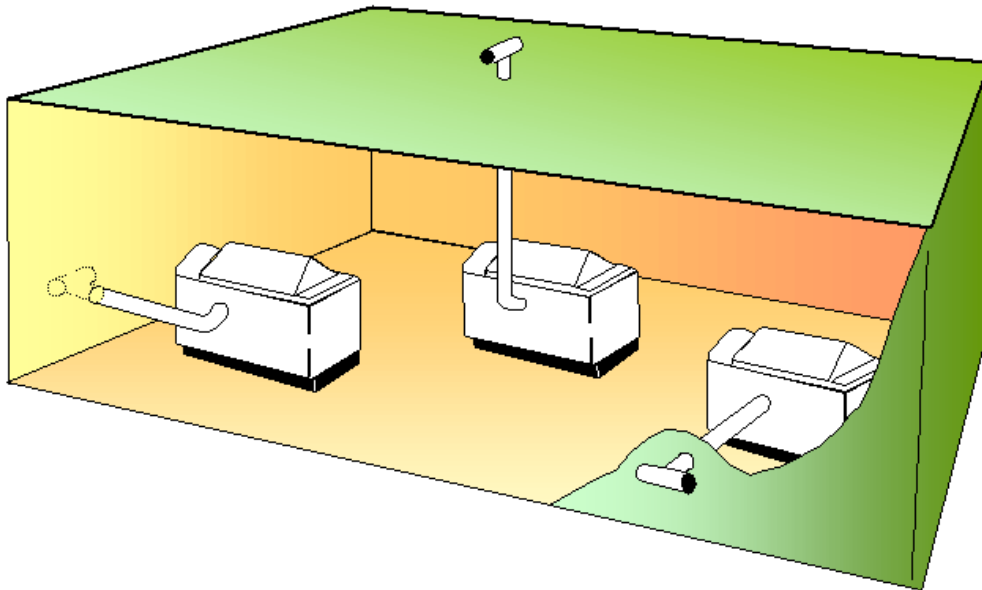


Figure 6.8e: Recommended outdoor venting configurations.



Figure 6.8f: Correct vent installations.



Make sure the vent is installed so that moisture cannot build up and create a trap as shown below.

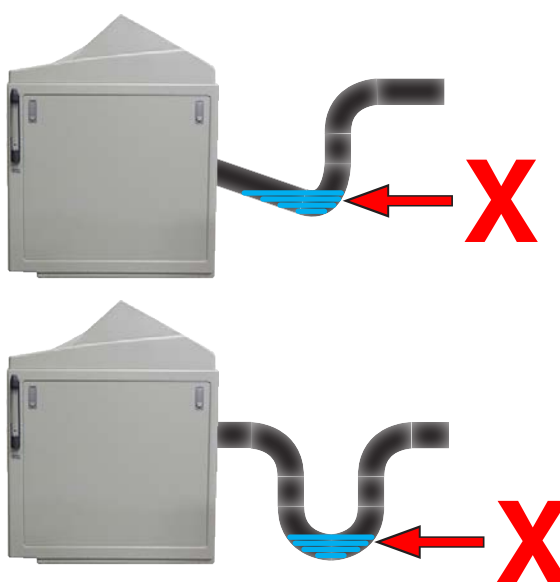


Figure 6.8g: Incorrect vent installations.

6.9. Test Chamber (Mar 2021)

Return Tube

- The return tube (Figure 6.9a) is packed with the accessories in the test chamber (see Section 5.5).
- If using the shower module, it should be installed before installing the return tube (see Section 5.5).
- Install the return tube in the chamber elbow coupling with the sensor bracket toward the rear of the chamber as shown in Figure 6.9b.



Figure 6.9a: Return tube.

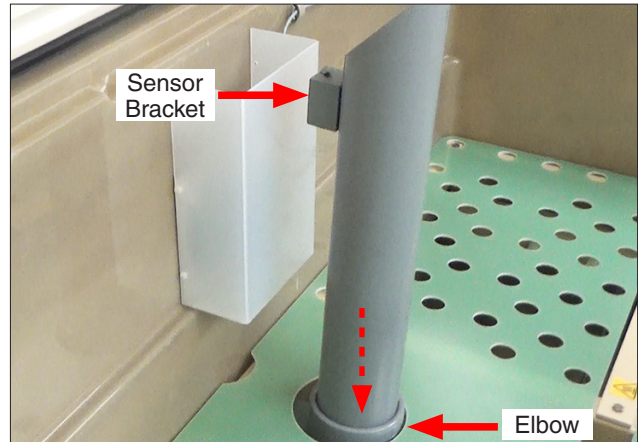


Figure 6.9b: Install the return tube in the test chamber with the bracket toward the rear as shown.

Chamber Temperature Sensor Assembly

- The chamber temperature sensor is shipped in the purge outlet baffle in the test chamber (Figure 6.9c).
- Remove the sensor from the baffle (Figure 6.9d).
- Install the sensor in the chamber temp sensor bracket on the return tube as shown in Figure 6.9e.
- Make sure the sensor cable is installed in the clips on the chamber wall as shown in Figure 6.9f.

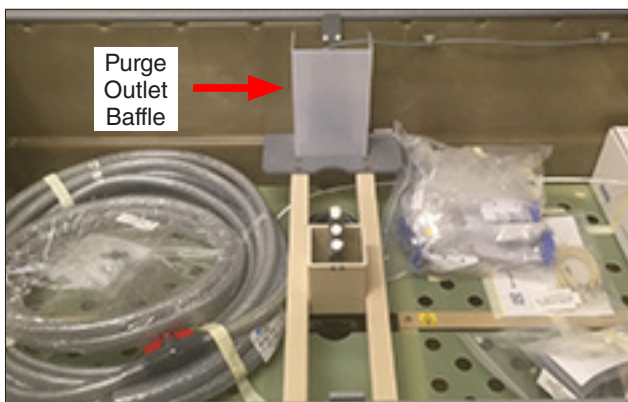


Figure 6.9c: Sensor packed in purge outlet baffle.

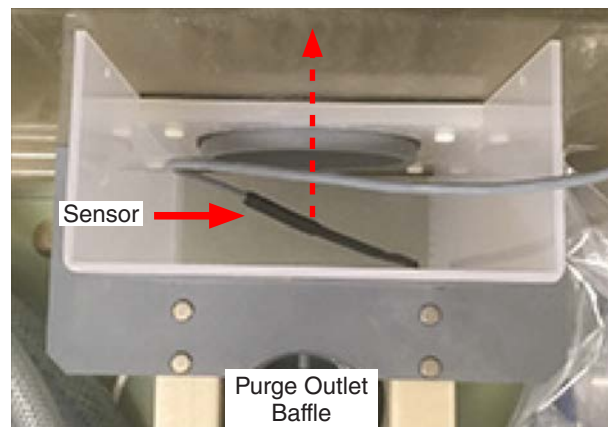


Figure 6.9d: Remove sensor from purge outlet baffle.

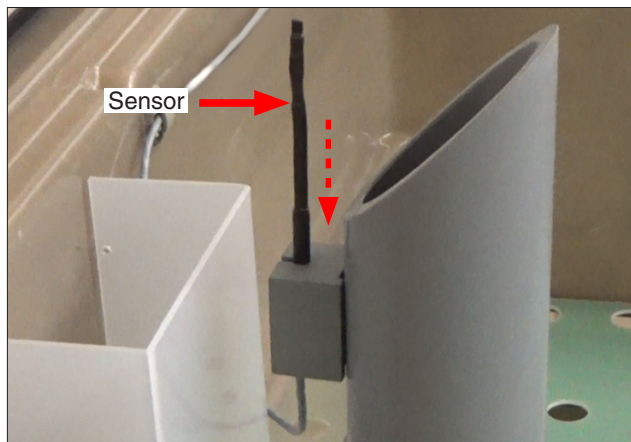


Figure 6.9e: Install the sensor as shown.

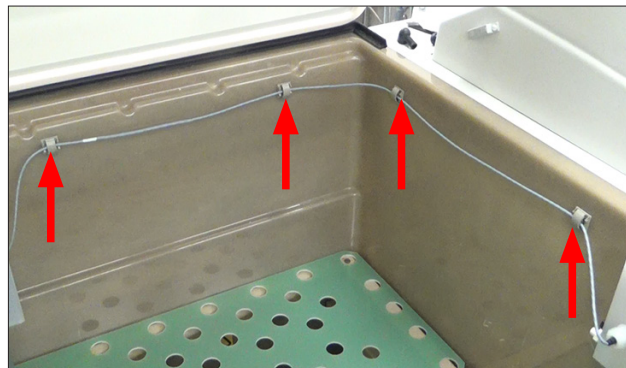


Figure 6.9f: Sensor cable installed in clips.

Chamber Configuration

- Test chamber configuration ready for specimen mounting is shown in [Figure 6.9g](#).
- See LF-8165-TM Q-FOG CRH Technical Manual for specimen mounting options.

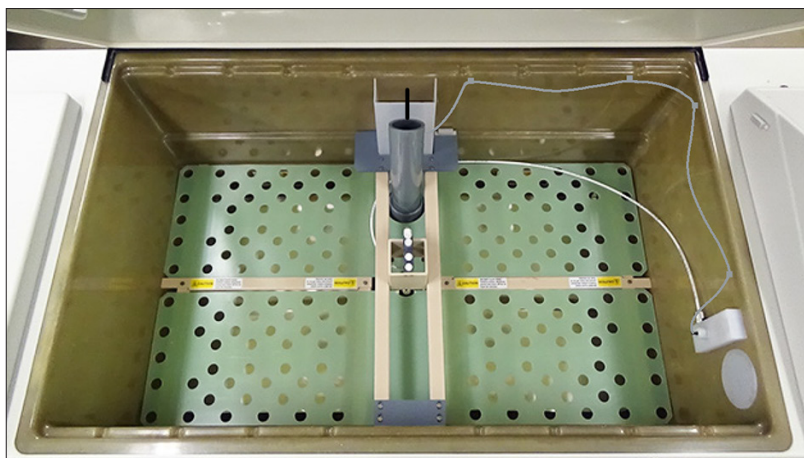


Figure 6.9g: Test chamber ready for specimen mounting.
Shown with shower module installed.

7. Warranty (Aug 2014)

- All Q-FOG CRH cyclic corrosion chambers and components are guaranteed against defects in workmanship or materials for one year.
- Liability is limited to replacing or repairing any part or parts that are defective in materials or workmanship.
- Liability in all events is limited to the purchase price paid.
- Damage due to accident or abuse is not covered. Labor cost is not covered.
- Q-Lab Corporation makes no other warranties, including implied warranties of merchantability or fitness for a particular purpose, except as may be expressly provided by the Q-Lab Corporation in writing.
- Q-Lab Corporation shall not be liable for any incidental, consequential, special or contingent damages arising out of the sale or use of any product.
- Q-FOG test chambers are manufactured by Q-Lab Corporation in the USA.

8. Repair and Tester Support (Sep 2019)

- Repair and Tester Support is available by telephone (+1-440-835-8700) Monday - Friday from 8:30 AM to 5 PM.
- Please contact the nearest international branch office by [phone](#) or [email](#) for technical support.
- You can also visit our website at www.q-lab.com to register your tester to access additional useful troubleshooting guides, operating manuals, and technical information.



For sales, technical, or repair support, please visit:

Q-Lab.com/support

Westlake, Ohio USA • Homestead, Florida USA • Buckeye, Arizona USA
Bolton, England • Saarbrücken, Germany • Shanghai, China