

HELIUM RECOVERY SYSTEM

A full closed-loop system that effectively **recovers helium** from a variety of scientific processes such as NMRs, cryostats and more. Quantum Technology's proprietary recovery systems remove contamination through purification, reliquefies and stores recycled helium; drastically reducing helium costs and creating a sustainable system.



A	Recovery Compressor	Medium or high-pressure recovery compressors varying in power and pressure.
B	Liquefier	Various liquefaction instruments reaching 4K temperature to produce 20LPD to 200LPD and greater.
C	QuantumPure™ Purifier	Automatic and manual cryogenic and cryo-free purifiers producing 99.995+% pure helium.
D	Transport Dewar	Allows for flexible floor layout with removable transfer line.
E	Accessories	Upgrade your system with a range of accessories.
F	Storage	Medium or high-pressure helium gas storage options to meet your sizing and volume requirements.
G	Customer Instrument	Integrates seamlessly with NMRs, Cryostats and other helium-based instruments.

**Customization available*

COMPACT & RELIABLE

Our systems are compact and reliable with an overall recovery rate of >90% helium.



SAFETY FEATURES

Equipped with a number of safety features to prevent any over-pressure and vacuum protection



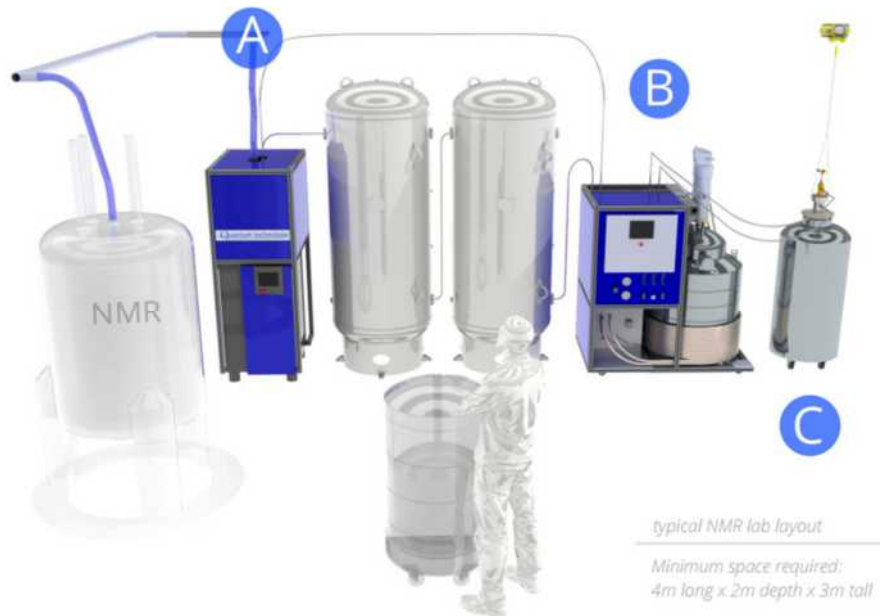
HIGH PURITY

Purity levels of 99.999%+ and higher are achieved by preventing air or H2O contamination.



ALL METAL HELIUM RECOVERY SYSTEM

A full closed-loop system that effectively **recovers helium** from a variety of scientific processes such as NMRs, cryostats and more. Quantum Technology's proprietary **all-metal** recovery systems, purify, reliquefy and store recovered helium, drastically reducing helium cost and creating a more sustainable system.



Quantum Technology ALL-METAL Helium Recovery System

A – Helium Recovery Compressor; B – Helium Recovery Liquefier; C – QuantumPure™ Purifier

Features:

- Integrates seamlessly with customer's instruments.
- Stable and adjustable recovery pressure of 0.1 to 0.3 psi.
- Minimal purification required due to all-metal design.
- Real time parameter monitoring.
- Automatic recovery "start" and "stop" means less monitoring.
- Due to eliminating plastic bags, the result being a more robust system with an overall recovery rate of >90%.

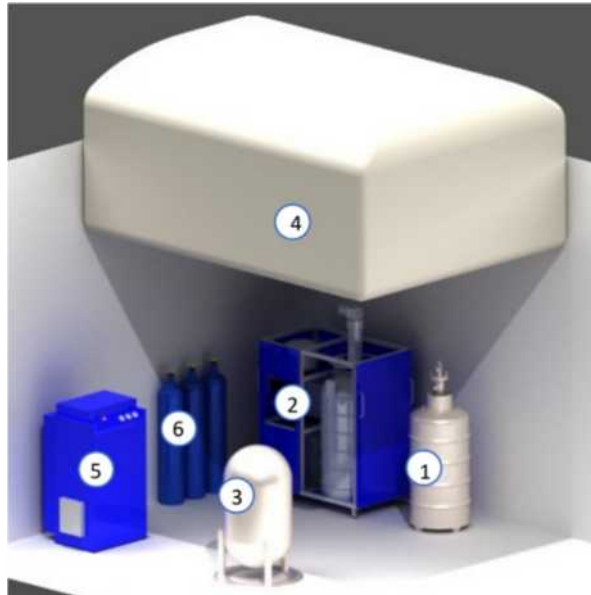
Options:

- Adjustable layouts to fit into most lab spaces.
- Manual to fully automatic options available.
- Dual bed purifier for around the clock operation.
- Mobile liquefier unit available for direct instrument transfers.
- Liquid nitrogen and cryogen free options available.

If you are tired of seeing your helium vented, QUANTUM TECHNOLOGY may have a solution.
Call +1 604 222 5539 to connect with our technical/sales staff.

GAS BAG HELIUM RECOVERY SYSTEM

A full closed-loop system that effectively **recovers helium** from a variety of scientific processes such as NMRs, cryostats and more. Quantum Technology's **gas bag** recovery system removes contamination through purification, reliquefies and stores recycled helium; drastically reducing helium costs and creating a sustainable system.



1- Purifier 2- Liquefier 3- Customer instrument
4- gas bag 5- HP recovery compressor 6- Gas Storage

Features:

- Integrates seamlessly with customer's instruments.
- Atmospheric recovery pressure.
- Real time parameter monitoring.
- Automatic recovery "start" and "stop" means less monitoring.

Options:

- Adjustable layouts to fit into most lab spaces.
- Manual to fully automatic options available.
- Dual bed purifier for around the clock operation.
- Mobile liquefier or extra long transfer line available for direct instrument transfers.
- Liquid nitrogen and cryogen free options available.

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A. Q9.1HR3-XX Helium Recovery compressor 7.5/10/15 HP



HR3-XX Helium recovery compressor

Features:

- High Capacity Helium Recovery Compressor to take the full flow of recovered gas.
- Different sizes to fit production needs.
- Fully automated and operates with no/minimal monitoring.
- Ideal for QuantumPure™ All Metal Recovery, Purification and Liquefaction System
- Recovers full boil-off (regular and flash) in a liquid system (helium, neon, etc.)
- Easy to install, small floor footprint
- Base Models are air-cooled. Quantum offers a water-cooled version as well.
- All models have coalescing and charcoal filters for purification.
- Pressure controller
- Low energy Solution
- When ordering, please specify power frequency (50/60Hz) and voltage (208/230/460).
- Model number is: HR3-7.5/10/15-50/60-208/230/460.

Specification/Model	HR3-7.5	HR3-10	HR3-15
Power Consumption	7.5 HP	10 HP	15 HP
Flowrate @210psig	19 cfm	28 cfm	36 cfm
Dimensions (W x L x H)	29" x 41" x 76"	29" x 41" x 76"	29" x 41" x 76"
Weight	1,100 lbs	1,150 lbs	1,150 lbs
Noise Level	65 dB	67 dB	68 dB

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A. Q9.1HRHP-XX High Pressure Helium Recovery Compressor 10/12/15/17 HP



Features:

- High pressure Helium Recovery Compressor to take the full flow of recovered gas.
- High-purity recovery with room temperature purification.
- Ideal for high-purity recovery.
- Air cooling system.
- Different sizes to fit production needs.
- Fully automated and operates with no/minimal monitoring.
- Ideal for QuantumPure™ HP Recovery, Purification and Liquefaction System.
- Easy to install and operate, small floor footprint.
- 3-phase power, specifications of local power to be provided with order.

HRHP-XX Helium recovery compressor

Model Number:	Q9.1HRHP-17	Q9.1HRHP-21	Q9.1HRHP-25	Q9.1HRHP-29
Capacity	10.4 SCFM	12.4 SCFM	15.0 SCFM	16.9 SCFM
Power	10 HP (7.5kW)	12 HP (9kW)	15 HP (11kW)	20 HP (15kW)
MCA/MOP	33A/50A	39A/60A	48A/80A	65A/100A
Type	4 stage 3 phase Squirrel Cage Motor			
Inlet Pressure	Atmospheric			
Cooling Method	Air Cooled			
Discharge Pressure	Adjustable to 3000 PSIG			
Inlet He Temp.	40°F – 115°F			
Oil Content	<1 ppm after outlet filtration			
Dimensions/Weight	935 x 1302 x 1735 mm / 445kg			
Protection	IP55 (TEFC)			
Electrics	230V/60Hz/3Φ			
Oil Change Interval	every year/ 1,000h			
Purification System	2 x HYPERFILTER			

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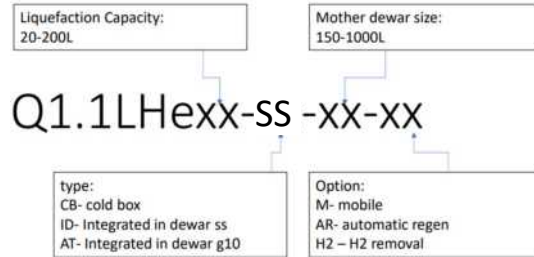
B. Q1.1LHeXX-SS Helium Liquefier Integrated Stainless Steel Dewar (SS)



QLHe20 Quantum Helium Liquefier 20L/day

Features:

- GM cold head: more cooling power/ less energy consumption
- Integrated stainless steel Dewar (SS).
- Fully automated and operates with no/minimal monitoring
- Large HMI touch screen + Ethernet connection
- Operates in a range of 1 to 10 PSI.
- Automatic Transfer Lines available.
- Easy to install, small floor footprint
- Can liquefy gas either from cylinder or experimental equipment
- <30 hours cooldown time.



Specification/ Model	QLHe20	QLHe40
Liquefaction Rate	20L/day	40L/day
Dewar size	<ul style="list-style-type: none"> • 100 liters* • 150 liters* • 200 liters* • 250 liters* • 350 liters* 	
Options	<ul style="list-style-type: none"> • Mobile unit (MU) • Manual LHe transfer line (ML) • Automatic LHe transfer line (AT) 	
Model Number	Example: Q1.1LHe20-200-AT or Q1.1LHe40-350-ML	
Cooling Water Requirement	> 1.8 GPM (7 l/min)	> 3.6 GPM (14 l/min)
Power Consumption	7.8kW@60Hz 6.5kW@50Hz	15kW@60Hz 13kW@50Hz
Weight	~582 lbs (254 kg)	~1,074 lbs (487 kg)
Dimensions (WxLxH)	76"x46"x100"	76"x46"x100"

Different Dewar sizes are available upon request.*Dimensions are an estimate and depend on selections.

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B. Q1.1LHexx-G10 Helium Liquefier Metal G10 (G10)



QLHe40 Quantum Helium Liquefier 40L/day

Features:

- GM cold head: more cooling power/ less energy consumption
- Metal G10 (G10) cooling.
- Fully automated and operates with no/minimal monitoring
- Large HMI touch screen + Ethernet connection
- Operates in a range of 1 to 10 PSI.
- Automatic Transfer Lines available.
- Easy to install, small floor footprint
- Can liquefy gas either from cylinder or experimental equipment
- <30 hours cooldown time.

Specification/ Model	QLHe20
Liquefaction Rate	20L/day
Dewar size	30L
Options	<ul style="list-style-type: none"> • Mobile unit (MU) • Manual LHe transfer line (ML) • Automatic LHe transfer line (AT)
Model Number	Example: Q1.1LHe20-G10-30-AT
Cooling Water Requirement	> 1.8 GPM – 7 l/min
Power Consumption	7.8kW@60Hz 6.5kW@50Hz
Weight	~ 582 lbs (254 kg) ~1,828 lbs (829 kg)
Dimensions (WxLxH)	76"x46"x100"

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*Dimensions are an estimate and depend on selections

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B. Q1.1LHeXX-CB Helium Liquefier Cold Box (CB)

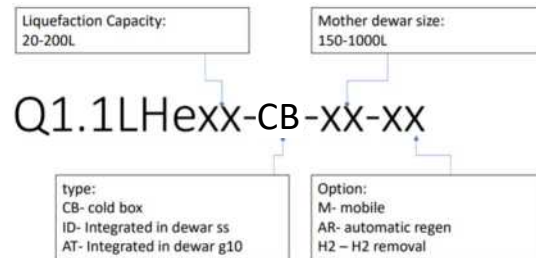


QLHe20 Quantum Helium Liquefier 20L/day

With Cold Box.

Features:

- GM cold head: more cooling power/ less energy consumption
- Cold Box cooled.
- Fully automated and operates with no/minimal monitoring
- Large HMI touch screen + Ethernet connection
- Operates in a range of 1 to 10 PSI.
- Automatic Transfer Lines available.
- Easy to install, small floor footprint
- Can liquefy gas either from cylinder or experimental equipment
- <30 hours cooldown time.



Specification/ Model	QLHe60	QLHe80	QLHe100	QLHe200
Liquefaction Rate	60L/day	80L/day	100L/day	200L/day
Dewar size	<ul style="list-style-type: none"> • 100 liters* • 150 liters* • 200 liters* • 250 liters* 		<ul style="list-style-type: none"> • 350 liters* • 500 liters* • Customized* 	
Options	<ul style="list-style-type: none"> • Mobile unit (MU) • Manual LHe transfer line (ML) • Automatic LHe transfer line (AT) 			
Model Number	Example: Q1.1LHe20-200-AT or Q1.1LHe80-350-ML			
Cooling Water Requirement	> 5.4 GPM - 21 l/min	> 7.2 GPM - 28l/min	> 9.0 GPM - 35l/min	> 18 GPM - 70l/min
Power Consumption	23kW@60Hz 19kW@50Hz	31kW@60Hz 26kW@50Hz	39kW@60Hz 32kW@50Hz	78kW@60Hz 64kW@50Hz
Weight	~ 1,406 lbs (638 kg)	~1,828 lbs (829 kg)	~ 2,247 lbs (1,019 kg)	~ 4,270 lbs (1,937 kg)
Dimensions (WxLxH)	76"x46"x100"	80"x48"x100"	80"x48"x100"	67"x90"x110"

*Different Dewar sizes are available upon request.

*Dimensions are an estimate and depend on selections.

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C. Q16.1QPure-CF QuantumPure™ Cryogen-Free Purifier

C. Q16.1QPURE-CF



*QuantumPure™ Cryogen-Free Purifier
ideal for Quantum Recovery,
Purification and Liquefaction Systems*

Features:

- Cryogen-Free Cryogenic Purifier for small and medium capacity systems (~60LPD helium).
- Cools gas to LN2 temperatures to remove air and moisture.
- Purifies gas to over 99.995%, sufficient for inlet of liquefier.
- Ideal for QuantumPure™ Recovery Purification and Liquefaction Systems.
- Easy to install, small floor footprint.

Options:

- Various footprints available
- Fully automatic option
- Dual bed for continuous operation
- Movable option
- LN2 purifier available

Specification / Model	Q16.1QPure-CH/LN2/M/PSA-CF
Operating Pressure	12 psig (maximum 15 psig)
Type of Adsorbents	Proprietary mix
Volume of Adsorbents	3.5 L
Volume of Adsorbed Impurities	500 L
Regeneration at Ambient Temperature	~12 hrs
Cooling Power	200W at 70K
Power Required	7.5 kW @60Hz
Cooling Water	7 LPM @27C
Dimensions	26.5" x 33" x 90" (Subject to change)

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C. Q16.1QPure QuantumPure™ Cryogenic Purifier



Features:

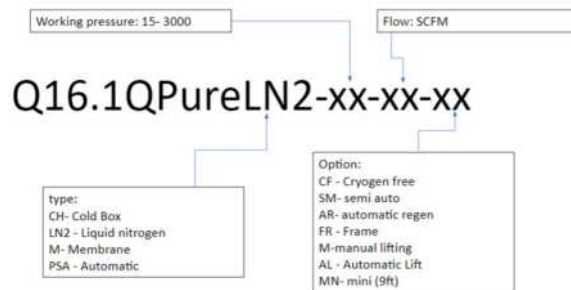
- Cryogenic Purifier for small and medium capacity systems (~60LPD helium).
- Cools gas to using liquid nitrogen.
- Ideal for QuantumPure™ Recovery Purification and Liquefaction Systems.
- Easy to install, small floor footprint.
- No power required.

Options:

- Various footprints available
- Semi-automatic option
- Dual bed for continuous operation

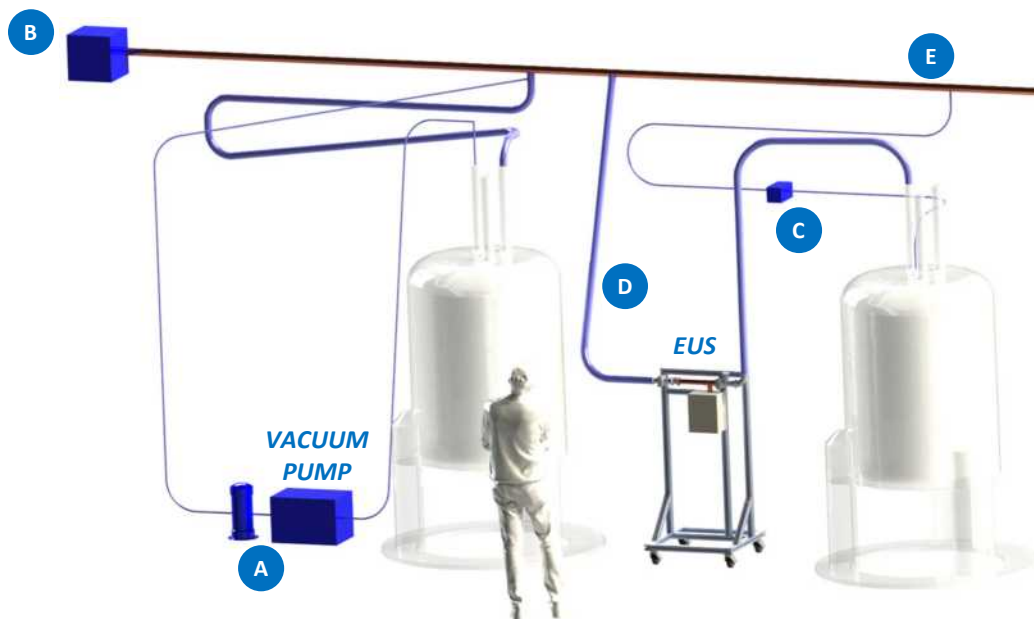
Specification / Model	Q16.1QPure-CH/LN2/M/PSA
Operating Pressure	12 psig (maximum 15 psig)
Type of Adsorbents	Proprietary mix
Volume of Adsorbents	3.5 L
Volume of Adsorbed Impurities	500 L
Regeneration at Ambient Temperature	~12 hrs
Cooling Power	200W at 70K
Power Required	None
Cooling Water	7 LPM @27C
Dimensions	26.5" x 33" x 110" (Subject to change)

QuantumPure™ Cryogenic Purifier ideal for Quantum Recovery, Purification and Liquefaction Systems



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Q12.1ACC Accessories for Helium Recovery System



Helium Recovery System Optional Accessories

Q12.1ACC Accessories		
A	NMR VACUUM PUMP FILTER	
	High-Efficiency Filtration for oil removal from VACUUM PUMP	Model: Q12.1ACC-HOR Includes safety relief valve Options: Oil check station
B	GAS MEASUREMENT DEVICE	
	Flow totalizer measuring total volume recovered	Model: Q12.1ACC-GM Options: Database (DB)
C	PRESSURE CONTROLLER	
	High precision absolute pressure controller	Model: Q12.1ACC-BPR Options: Remote monitoring
D	INTERCONNECTION LINES	
	Interconnection line from customer instrument to recovery line, includes heat exchanger to warm up the gas	Model: Q12.1ACC-DROP Options: Inline heater and temperature controlled (EUS) Air ventilated with drain (AV)
E	RECOVERY LINE/S	
	Assists with the recovery of helium from the customer's instrument/s	Model: Q12.1ACC-L1

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PRIOR PROJECTS

Quantum Technology Corp.