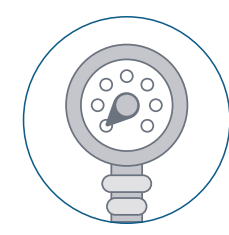


LIQUID MEDICAL OXYGEN TANK & SUPPLY MANIFOLD

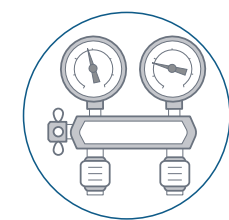
TROUBLESHOOTING GUIDE



Problem

FAILURE TO REACH OR MAINTAIN OPERATING PRESSURE

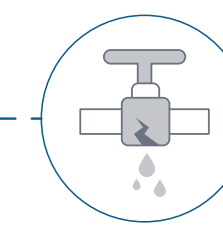
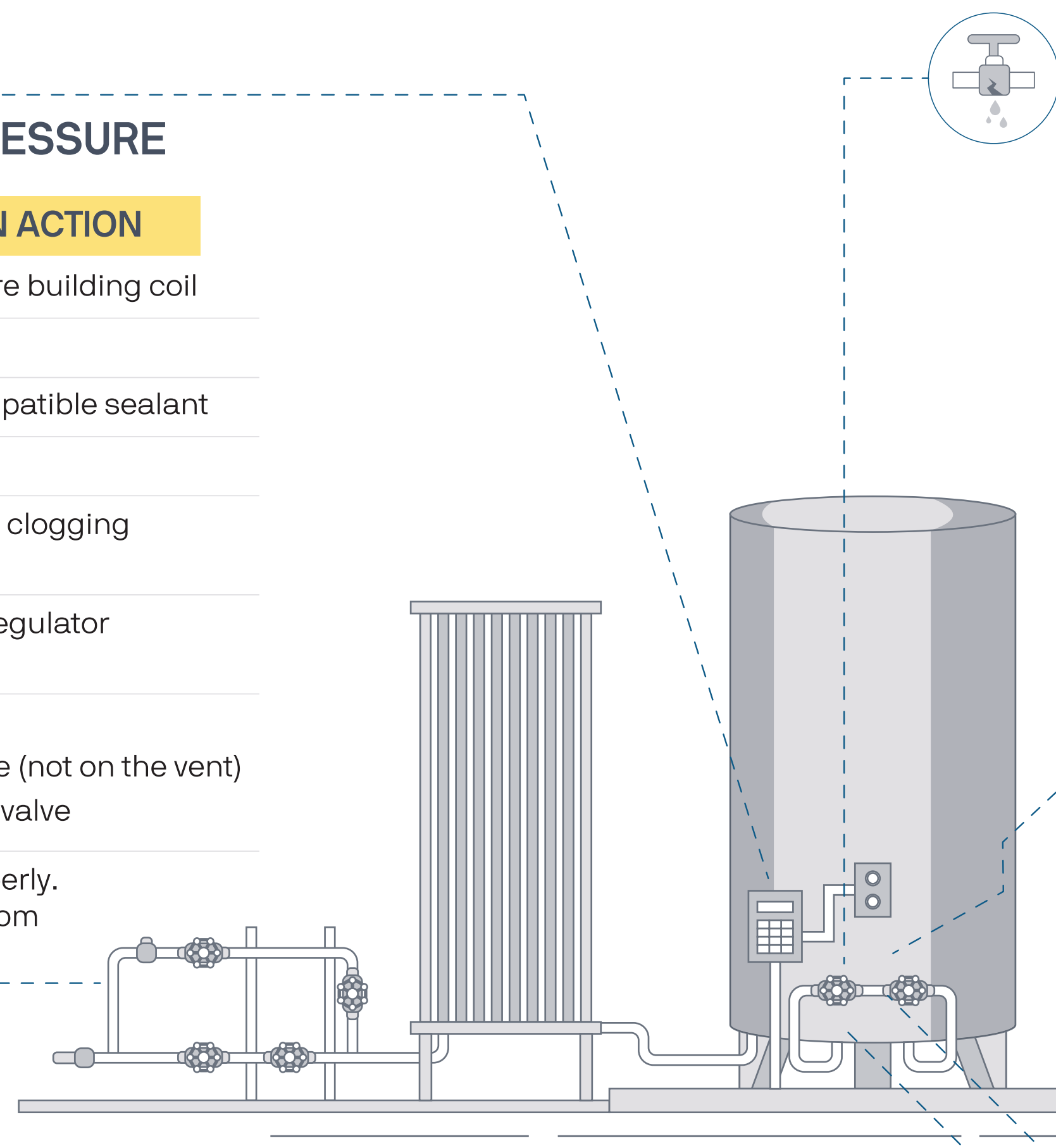
POSSIBLE CAUSE	REMARKS/ RECTIFICATION ACTION
• Excessive withdrawal of oxygen	Increase the capacity of pressure building coil
• Liquid oxygen level is too low	Refill the liquid oxygen tank
• Leaks on outer piping	Seal the piping with oxygen compatible sealant
• Safety valves do not close/seat back	Replace the safety valves
• Strainer at the inlet of pressure regulator clogged	Clean the strainer to remove the clogging
• Improper adjustment of pressure regulator, or regulator defective	Correct adjustment or replace regulator
• Cryogenic safety valve jammed	1. De-icing 2. Spray water on top of the valve (not on the vent) 3. Change direction of diverting valve
• Improper pipe design	Check the design/diagram properly. Liquid should flow from the bottom of the tank.



Problem

ERRONEOUS OR IRREGULAR CONTENTS & PRESSURE GAUGE READINGS

POSSIBLE CAUSE	REMARKS/ RECTIFICATION ACTION
• Equalizer valve is not closed	Check "equalizer" valve & close properly
• Stop leakage from fittings	Re-adjust
• Gauge damaged or leaking	1. Replace the gauge 2. Stop leakage from fittings 3. Recalibrate or replace the gauge 4. Ensure no leakage on tubes/fittings
• Ensure no leakage on tubes/fittings	1. Calibrate/ change gauge 2. Check for damage 3. Check the pressure regulator valve setting
• Gaseous pressure gauge showing under/over pressure	1. Calibrate/ change gauge 2. Check for damage 3. Check the pressure regulator valve setting



Problem

SAFETY VALVE LEAKING

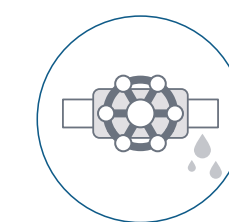
POSSIBLE CAUSE	REMARKS/ RECTIFICATION ACTION
LIQUID tank safety valve not passing liquid	
• Foreign particle / Ice on the valve seat	De-icing
• Spring stuck	Change position of Diverter valve direction Resetting/ calibrate (by 3rd party)
• Wrong setting	Replace the safety valves
GASEOUS Manifold Safety valve Passing	
• Foreign particle / Dirt on the valve seat	Servicing the valve
Spring stuck	
• Wrong setting	Resetting/calibrate set pressure, (by 3rd party) Replace valve



Problem

LIQUID VESSEL BURSTING DISK HAS BURST

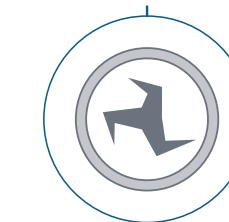
POSSIBLE CAUSE	REMARKS/ RECTIFICATION ACTION
• Under capacity bursting disk fitted	Replace with a new burst disc having appropriate pressure rating
• Corrosion or material fatigue	Replace with a new burst disc having appropriate pressure rating
• Tank pressure goes beyond MAWP	1. Maintain MAWP pressure by venting the gas when PRV doesn't pop-up/works at MAWP 2. Replace with a new burst disc having appropriate pressure rating 3. Change the direction of diverter valve



Problem

SHUT-OFF VALVES ARE LEAKING/NOT PASSING LIQUID

POSSIBLE CAUSE	REMARKS/ RECTIFICATION ACTION
• Valve seat loose/ not tighten due to ice	De-icing and tightening of the valve by clockwise rotating the wheel
• Valve sheet broken/crack	Replace the sheet (but tank must be empty and depressurized)
• Gland leaking	Slightly tighten Gland nut
• Leaking from body stem	Change PTFE gasket (but tank must be empty and depressurized)



Problem

LOSS OF VACUUM

POSSIBLE CAUSE	REMARKS/ RECTIFICATION ACTION
• Vacuum lost through port and valve	1. Check the valve and vacuum port 2. Add vacuum to the tank
• Leaking measuring socket	Seal the socket
• Vacuum disk "O-ring" Damaged/Dried	1. Check the O-ring of Disc 2. Add vacuum to the tank
• Tank body/join crack	1. Visual inspection required to check frosting 2. Check for possible cracks in body wall or joints of the tank

ARE YOU FACING A PROBLEM NOT LISTED HERE?

Contact your supervisor or liquid oxygen supply partner immediately for additional troubleshooting support

Disclaimer: This poster has been adapted and customized from PATH's Oxygen Delivery Toolkit.