



# Installation Recommendations for Chemical Vacuum Systems

INSTRUCTION MANUAL

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You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

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# 1. Introduction

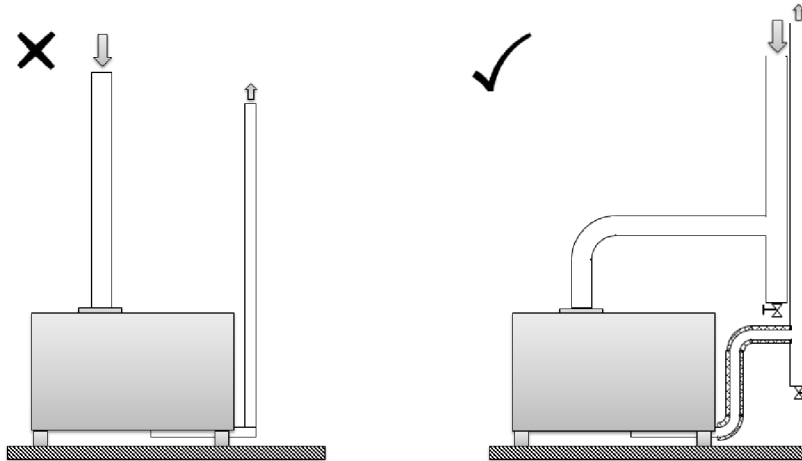
The dry pump mechanism is designed to operate in dry condition, withstand varied applications and to handle quantities of liquid carry-over. Frequent flooding of the mechanism, or prolonged pumping of large quantities of entrained liquids can increase downtime. There are also installation considerations when particulates or flammable mixtures are pumped.

Design the system to take account of these factors which will result in a reliable dry pump installation, and maximum pump life.

If your pump is part of an ATEX certified system, the system will be designed and built to match the area certification you have supplied and achieve the required level of safety. Refer to your System Instruction manual for maintenance recommendations.

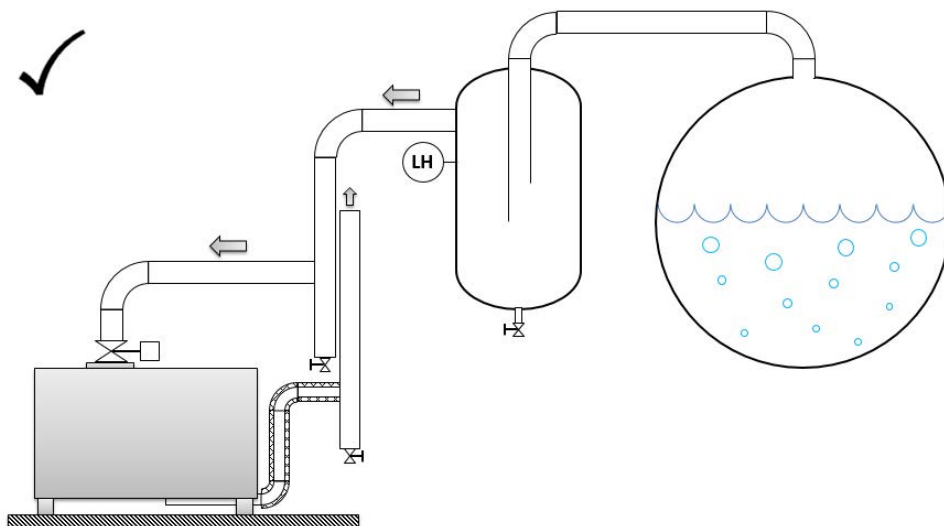
## 2. Installation recommendations

### 2.1 Installation of pipework



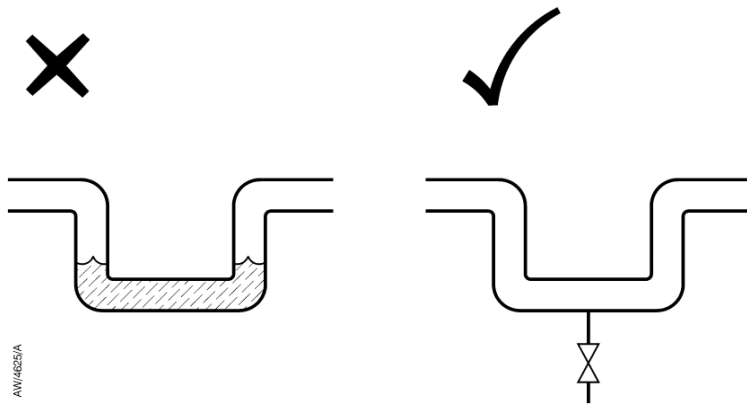
- To prevent liquid or condensate draining into the pump, do not connect the inlet or exhaust ports directly to vertical piping.
- Make sure that the pipework slopes away from the pump.
- Fit traps or knock-out pots with drain points, where vertical drops cannot be prevented.
- Insulate vertical exhaust pipework to prevent condensation.
- Prevent exhaust pipework from blocking.

### 2.2 Installation of knockout pot



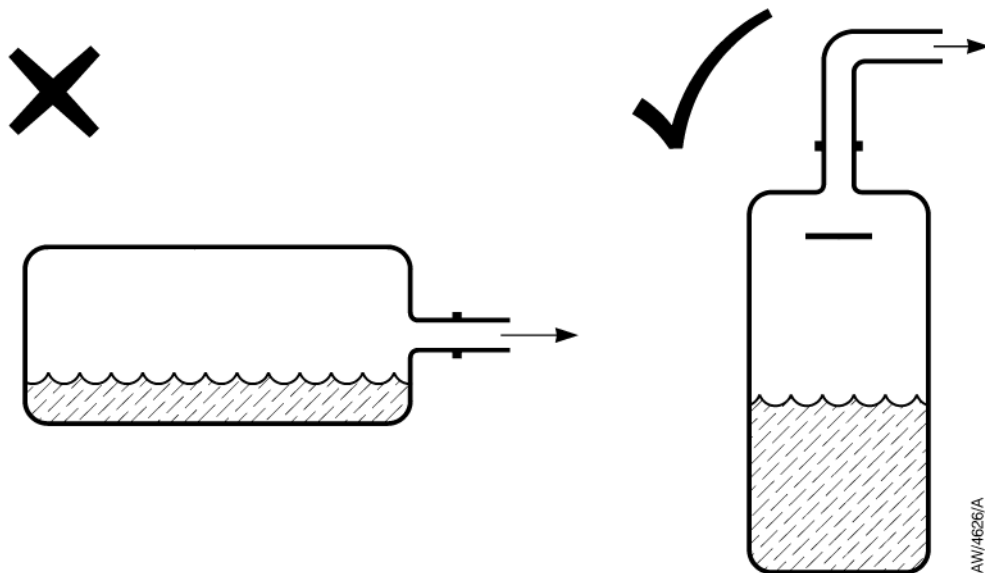
- For installation with frequent process upsets, install a correct sized knock out pot to keep the pump uptime at a maximum.
- If the knock out pot fills up, fit a high level alarm to close the inlet valve and trigger a fault signal or trip to prevent damage to pump.

## 2.3 Installation of drain points



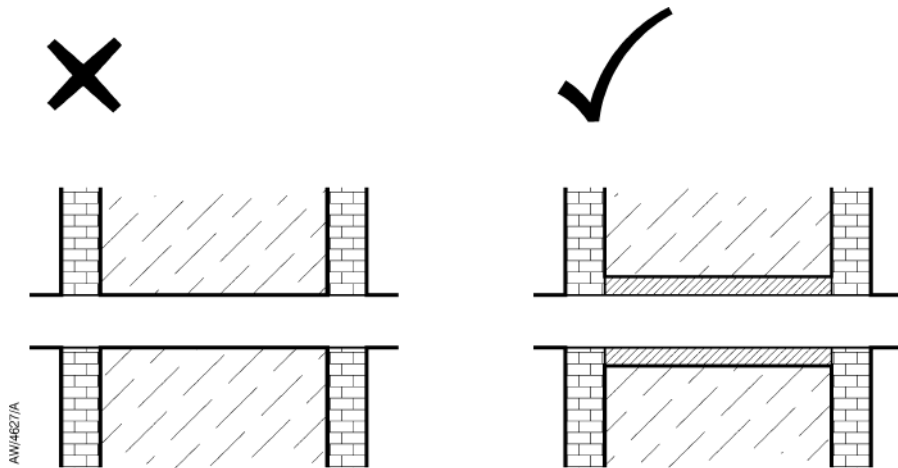
- Do not let liquid to trap in pipework.
- Where traps cannot be prevented, install drain points.
- Always drain the pipework before start up.

## 2.4 Vacuum connections



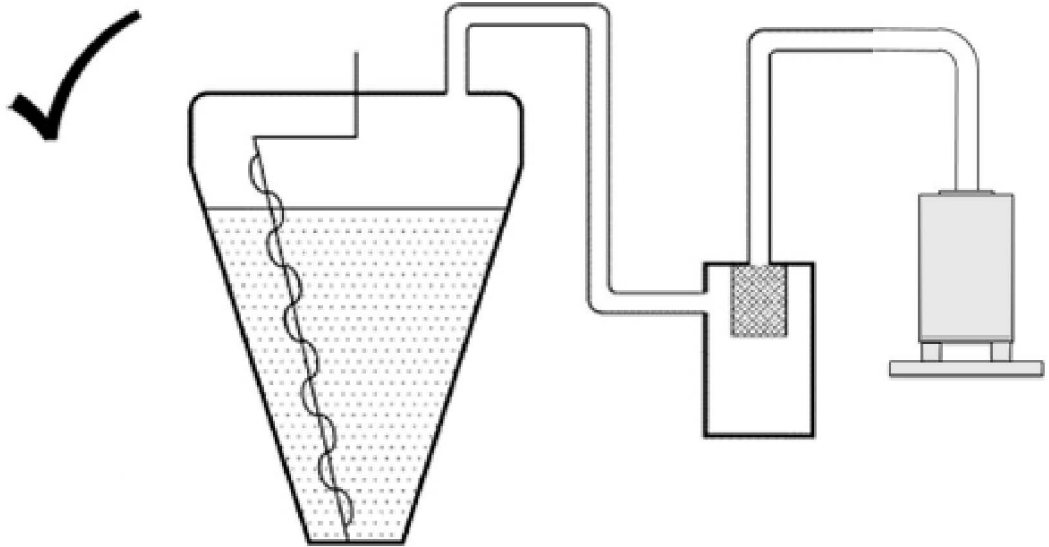
- Make vacuum connections to the top of vessels.
- Fit internal baffles to keep the liquid carry-over to a minimum.

## 2.5 Insulation of pipes



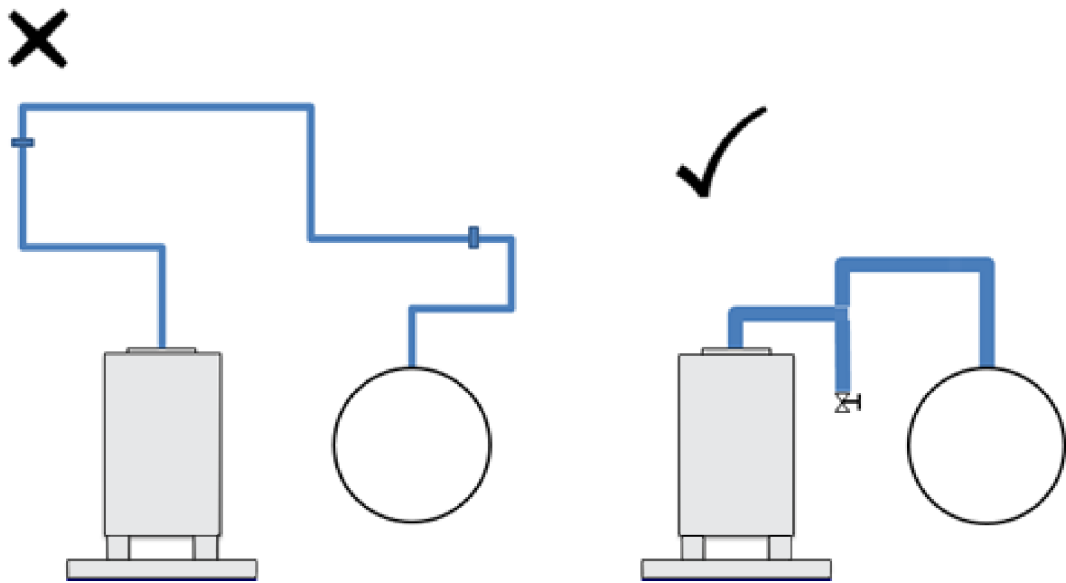
- Do not let temperature change along the pipework, condensation can occur in the lower temperature sections.
- Insulate or trace heat pipework where necessary.

## 2.6 Installation of filter



- Where high particulates carry over is expected, fit correct size (for example, 50 microns) filter or vacuum scrubber in front of the pump.
- If your particulates are likely to build up in the pump or in the exhaust pipework further steps are necessary. Please contact us for advice.

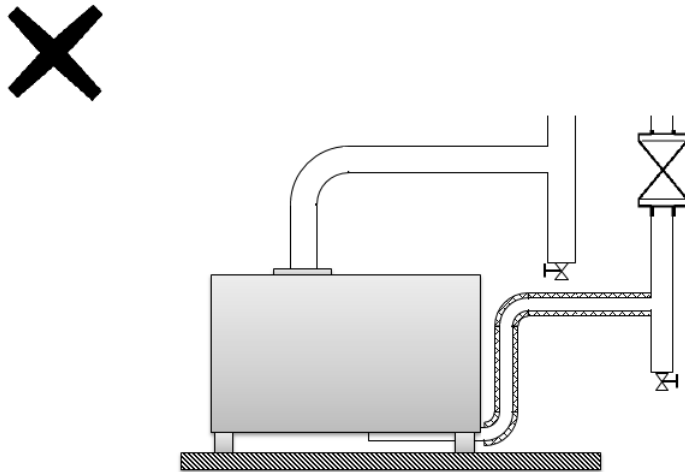
## 2.7 Installation of inlet pipe



GE/10063/A

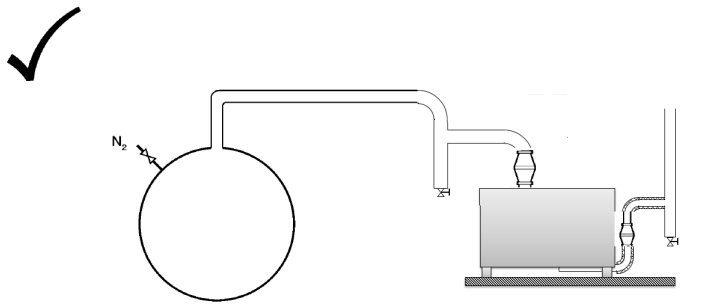
- Install inlet pipework of at least the same size as the inlet connection to the pump to keep the pressure drop to a minimum.
- Make sure that the length of the inlet pipework is kept to a minimum.

## 2.8 Installation of exhaust pipe



- Make sure that exhaust pipework is not restricted. A blocked exhaust will result in high power consumption, and higher exhaust gas temperatures.
- If exhaust isolation valves are required, install the valves close to the pump exhaust with auto actuation and linked to the motor starter. The valves must be fail safe to avoid motor trip due to back pressure or pressure generation.

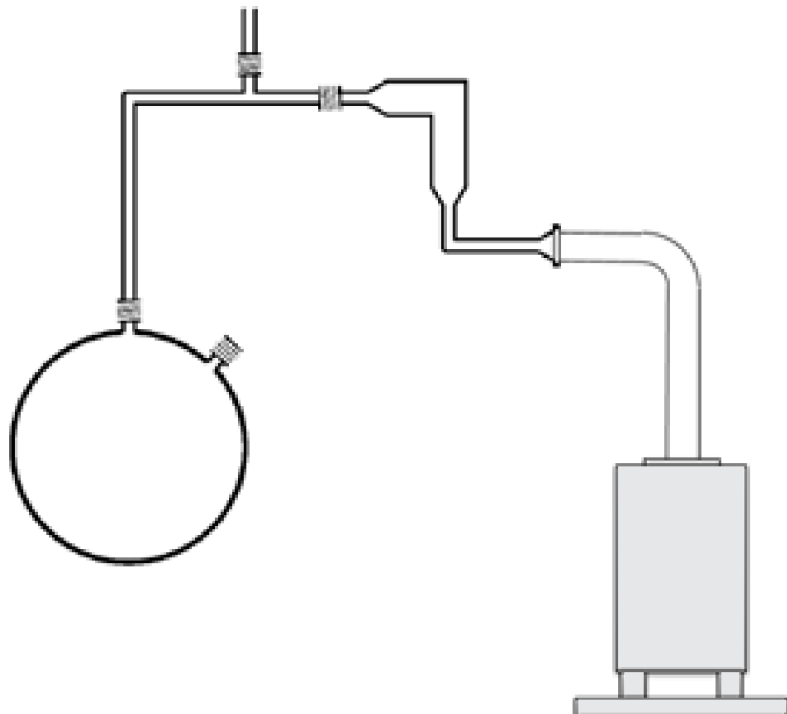
## 2.9 Flammable mixtures



Where flammable mixtures are pumped you must either:

- Make sure to mix the inert gases and bring the pumped gases below the minimum explosion level or outside their explosion range. This means either below the minimum explosion limit/above the maximum explosion limit or to reduce the oxidant concentration to below the minimum oxidant level. For further information please consult our safety manual P40040100.
- Make sure that the pumping system has the correct ATEX certification necessary for the installation area.

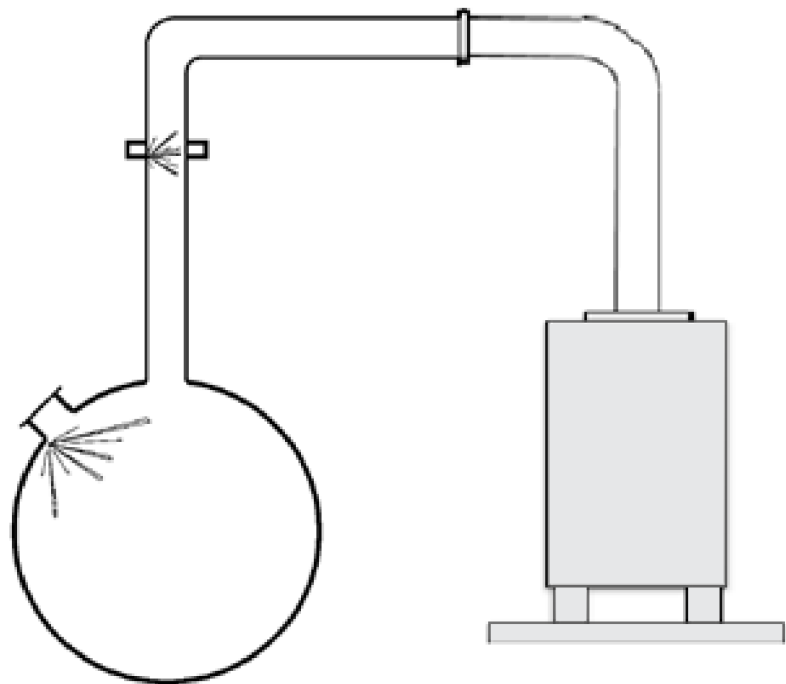
## 2.10 Secure the system from leakage



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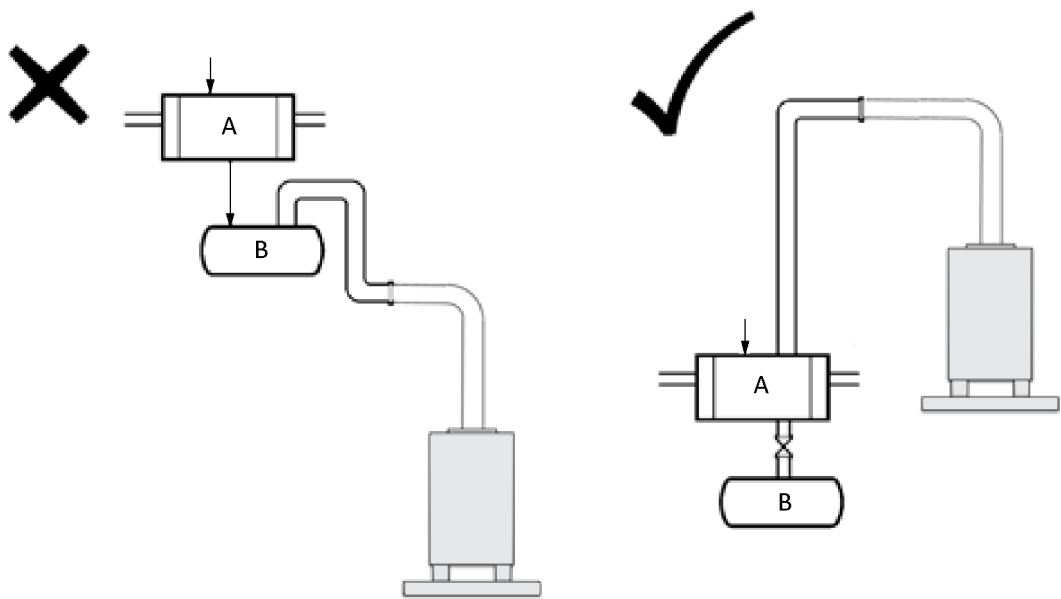
To prevent the system leakage:

- Do not use parallel thread screwed fittings as it will increase air leakage.
- Do not use small radius bends in the pipework as it will increase the pressure drop along the pipework.
- Do not let the cross-section of the pipework change, as it will increase the pressure drop along pipework.
- Use metal trapped O-ring vacuum connections.
- Use tapered thread screwed fittings.
- Use smooth bore pipework.
- Use vacuum duty flanges and gaskets for example, raised-faced flanges with PTFE-encapsulated gaskets or metal trapped O-rings.



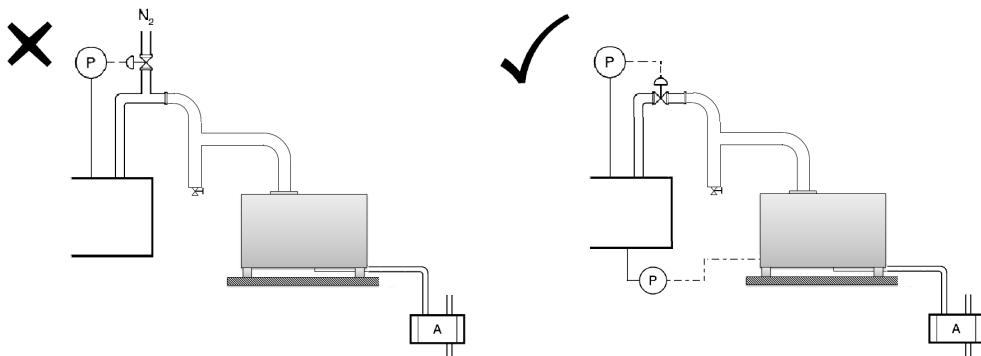
- Make sure that the vacuum system is leak-tight so that:
  - The size of the vacuum pump is minimised.
  - The condensers operate at maximum efficiency.
  - Vapour emissions from the vacuum system exhaust are minimised.

## 2.11 Vacuum connections to condensers



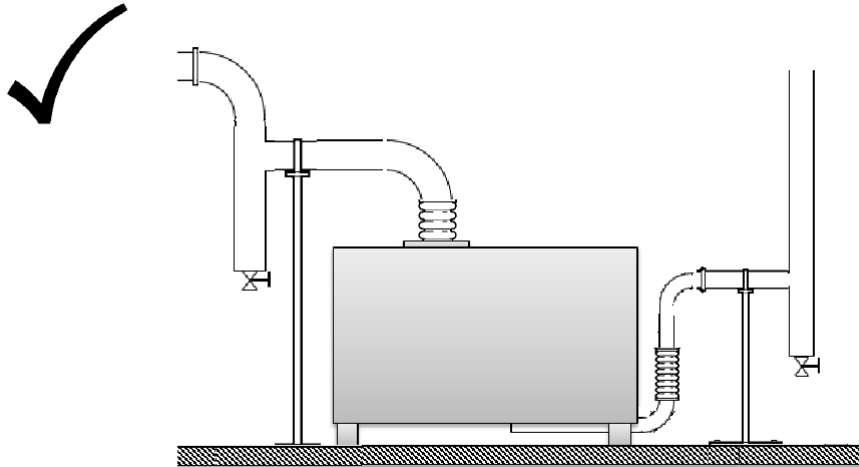
- Make vacuum connections to condensers (A) and not to the receiver vessels (B) to:
  - Allow the receiver to be drained while the rest of the system is under vacuum.
  - Reduce re-evaporation of condensate in the receiver.
  - Keep the vacuum and liquid lines separate and decrease the liquid entrainment.

## 2.12 Exhaust condensers



- When you use the exhaust condensers (A), throttle the pump inlet or control the pump speed to control the system pressure.
- Gas bleeds should not be used as they will decrease the efficiency of exhaust condensation, and increase emission levels.

## 2.13 Inlet and exhaust connections



- Install inlet and exhaust pipework to keep the force on the pump connections to a minimum and isolate the pipework from vibration.
- And/or use flexible connector on inlet and exhaust connections. Use 10 bar pressure rated braided flexible exhaust connector.



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