

Installation, Operating and Maintenance Instructions.

of

Kelburn KSS Type Cyclone Separators.



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This instruction manual must be read by all personnel who are responsible for installation, operating and maintenance of the following described equipment.

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1. **Introduction**

Kelburn KSS Type Cyclone Separators, when properly installed, drained and commissioned as per these instructions, are designed to remove liquid droplets, liquid mist and particulates from compressed air, gas and steam flows. If unsure about the selection and suitability of Kelburn Cyclone Separators please contact Kelburn Engineering Limited for confirmation.

WARNING!

To ensure continuing good performance and safe operation of the KSS Cyclone Separator, everyone concerned with its installation, use and maintenance must carefully follow the instructions given in these instructions.

Please refer to the data plate attached to the KSS Cyclone Separator which states the maximum allowable operating pressure and temperature, the end user must ensure that suitable devices are fitted to prevent these from being exceeded

When the ambient temperature is lower than the minimum design temperature for the vessel. The vessel will require warming before any pressure can be applied.

The use of replacement parts other than those supplied by Kelburn Engineering Limited may cause failure of the KSS Cyclone Separator, property damage or serious personal injury. Therefore, Kelburn Engineering Limited accepts no responsibility for the consequences of use of Kelburn Engineering equipment containing non-approved parts.

Kelburn Engineering Limited KSS Cyclone Separators comply with the requirements of the European Pressure Equipment Regulations 2014/68/EU and will carry the CE mark on the Cyclone Separator data plate when and where required.

Kelburn Engineering Limited KSS Cyclone Separators comply with the requirements of the Pressure Equipment Safety Regulations 2016 and will carry the UKCA mark on the Cyclone Separator data plate when and where required.

Kelburn Engineering Limited recommends all KSS Cyclone Separators, and ancillary equipment, installed in pipes carrying steam or high temperature gases for process, when exposed to contact and located within two (2) metres of the floor or working platform shall be covered with a heat-insulating material, or otherwise properly guarded.

2. **Receiving and Inspection**

Immediately upon receipt of the Cyclone Separator, check for damage that may have occurred during shipping. If there is any damage, do not install or attempt to repair the Cyclone Separator. File a claim with the shipping company and contact Kelburn Engineering Limited for further instructions. Since the Cyclone Separator is shipped ex-works (unless otherwise agreed), UK address, the carrier is legally responsible for shipping damage. Such damage is not covered by the Cyclone Separator warranty.

3. **Installation / Checklist for Cyclone Separators.**

- 3.1 Ensure that there is suitable access and lifting equipment to be able to work safely during the Cyclone Separator installation.
- 3.2 If the Cyclone Separator is being installed into an existing pipework system, ensure that the pipe where the Cyclone Separator is being installed has been properly isolated, drained and vented in accordance with site regulations. Always allow for high temperature pipework to cool down before Cyclone Separator installation.
- 3.3 All persons responsible for the installation of Cyclone Separators should wear protective clothing in accordance with site requirements.

- 3.4 Manual handling of Cyclone Separators is not recommended, suitable lifting equipment should be used at all times to prevent damage to equipment or injury to personnel.
- 3.5 Please refer to the nameplate (Figure 1, Figure 2 or Figure 3) attached to the Cyclone Separator which states the maximum allowable pressure (MAP), maximum temperature (MaxT) and minimum temperature (MinT). The end user must ensure that suitable devices are fitted to prevent these pressure and temperatures from being exceeded.

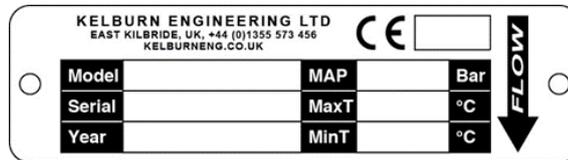


Figure 1
CE Marked Cyclone Separator Nameplate

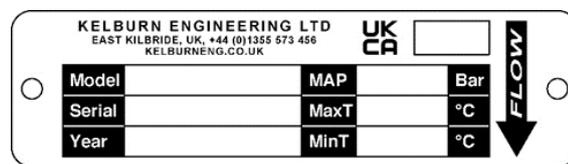


Figure 2
UKCA Marked Cyclone Separator Nameplate

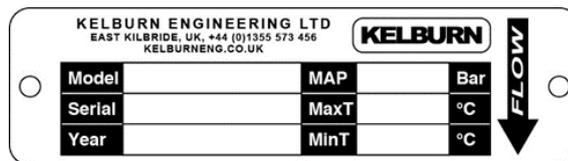


Figure 3
Cyclone Separator Nameplate

4. KSS Cyclone Separator Installation

4.1 The KSS Type Cyclone Separator must be installed in a horizontal position as illustrated in Figure 2.

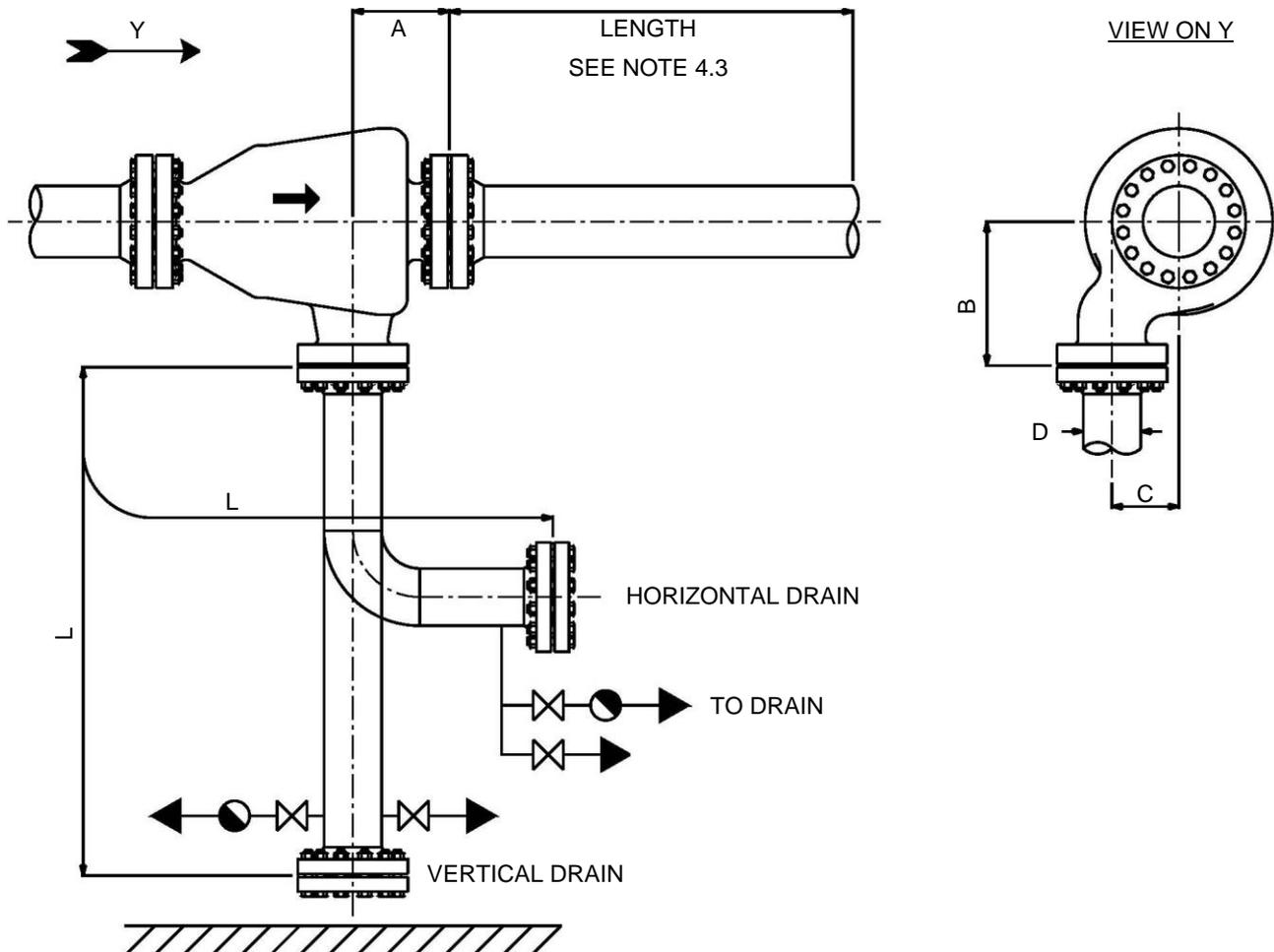


Figure 2

4.2 KSS Type Cyclone Separators with flanged connections must be bolted in position using correctly sized bolting. The tightening of bolting must be in accordance with recommended tightening torques for gasket type and thread form.

4.3 For optimum separation efficiency Kelburn Engineering Limited recommends a straight length of pipe directly downstream of the KSS Type Cyclone Separator outlet. The ideal length should be equal to 12 x the nominal bore of the Cyclone Separator outlet connection. At the very least, the recommended straight length of pipe can be 8 x the Cyclone Separator outlet connection. No valves or instrumentation should be fitted within the recommended straight length of pipe downstream of the Cyclone Separator. If a straight length of pipe is not possible due to site conditions, please consult Kelburn Engineering Limited for alternative recommendations. No straight length of pipe is required upstream of the Cyclone Separator.

4.4 Dimensions A, B, C, D and L are determined by individual KSS Cyclone Separator dimensions, operating and site conditions, and will be confirmed by Kelburn Engineering Limited for individual installations.

4.5 Any steam trap, liquid drainer or valve installed on the drain system must be installed in accordance with manufacturer's standard installation instructions. Any steam trap, liquid drainer or valves installed must be included in a maintenance programme. Kelburn Engineering Limited can recommend a suitable drain configuration for individual applications, on request.

4.6 Do not use the KSS Type Cyclone Separator drain reservoir as a pipe support.

5. Commissioning.

Kelburn Engineering Limited KSS Type Cyclone Separators when properly installed do not require any commissioning. Any instrumentation, alarms, control equipment installed upstream or downstream of the Cyclone Separator should be commissioned as per manufacturer's recommendations.

6. Operating Instructions.

Kelburn KSS Type Cyclone Separators have no moving parts and when installed correctly do not require any operating procedures.

7. KSS Knockout Cyclone Separator Maintenance Instructions.

7.1 The Kelburn KSS Type Knockout Type Cyclone Separators are low maintenance items and do not require a regular maintenance programme. Any control equipment installed on the drainage system of the Cyclone Separator must be included in a routine maintenance programme. Please refer to the control equipment manufacturer's standard maintenance procedures for guidelines.

7.2 Kelburn Engineering Limited recommends that all Cyclone Separators should be periodically inspected during any major plant maintenance downtime. Reasonable care and attention should be taken when removing the Cyclone Separator from an existing pipeline ensuring that the Cyclone Separator is properly supported before the loosening of the Cyclone Separator takes place.

7.3 Once removed from the pipeline, the Cyclone Separator must be placed on a suitable surface to protect and avoid any damage to the machined surfaces. Special attention should be taken to protect all flange raised faces as any damage to raised faces may result in the flange to flange surface not resealing after re-installation.

7.4 Once removed from the pipeline the Cyclone Separator should be visually inspected in a well lit area. The person responsible for inspecting the cyclone separator should also use adequate illumination for inspecting the Cyclone Separator internally. The Cyclone Separator should be inspected as per the following instructions:

- A. Inspect all separator surfaces against corrosion and wear, special attention should be taken to inspect the separator deflector making sure that the deflector vanes are not blocked. Any blocked vanes should be manually cleaned if possible.
- B. Inspect the separator drain outlet making sure that the outlet is clean and clear of any build-up of separated particles.
- C. On satisfactory inspection, the cyclone separator should be thoroughly cleaned by hand and blown down with compressed air to remove any loose dirt or dust particles.

NOTE:

When operating at elevated temperatures refer to Technical Documentation ESRs and material PMAs for additional requirements and restrictions.

7.5 On satisfactory inspection and maintenance, the Cyclone Separator should be re-installed as per the standard installation procedures for Kelburn KSS Type Knockout Type Cyclone Separators.

8 SPARE PARTS.

Kelburn Engineering Limited does not recommend any spares parts for KSS Type Cyclone Separator's.