Document ID: IMS-K-010252
Last update date: 28/08/2023
Approver: lasse.eriksson@kalmarglobal.com
Version: 1

Kalmar Group Standard

KGS 60104

Part
Method Standards

Group
Requirements for Suppliers

Name
Cleanliness – Hydraulic Systems

1 Scope
This Kalmar Group Standard, hereinafter referred to as KGS, covers the cleanliness requirements for hydraulic systems. This standard targets the verification of the internal system before delivery to the customer.

2 Purpose
The purpose of this KGS is to ensure the cleanliness and maintain high quality of hydraulic systems used in Kalmar products.

3 Responsibilities
Design Engineers - Make a note of the required details on the technical documentation, such as the drawings and BOMs.
Supplier Development Engineers - To inform suppliers about this KGS and make sure that the cleanliness standards set by this KGS are met.
Testing Engineer - Verify the operation of the hydraulic system and the test results to ensure they meet specifications.

4 Definitions
BOM - Bill Of Materials

5 Records / References / Attachments

KGS 60101	Cleanliness - Designation
ISO 11500	Particle counting procedure by automatic particle counter (APC)

6 Procedure Description / Requirements
6.1 Requirement
The hydraulic system cleanliness: 20/18/14

6.2 Test method
Remove all protection caps etc. as late as possible in the installation/mounting process.

Visually control that the components are free from foreign objects.

Fill the machine with hydraulic oil through a filter (cleanliness requirements 19/16/13).

Cleanliness level shall be checked and documented through automatic particle counting method when the hydraulic system is activated and all of its functionalities are being used.

It is advised to conduct particle counting procedures in accordance with ISO 11500 guidelines to determine the number and sizes of particles contained in bottle test samples.

Make sure that test sample particle count reading as per requirement.

6.3 Clean Run

Circulate a fluid through the hydraulic system to remove, transport and filter out foreign particles.

If this is carried out in the finished system, the oil shall be filtered in an external system and all the working functions shall be used to clean the entire system.

It is important that all components are installed during the clean run. If a component isn't installed, it shall be cleaned separately, to the same cleanliness level as the rest of the system.

6.4 Amount of water

Suspicion of high water levels in the hydraulic oil - may occur, for example, in the event of inadequate drying of components – a sample is recommended to be sent to a laboratory for analysis. The amount of water may not exceed 200 ppm (0.02 %).

6.5 Indication on technical documents

The cleanliness requirements shall be indicated on the drawing according to KGS 60101.