
Kalmar Group Standard

KGS 60103

Part

Method Standard

Name

Cleanliness - Hoses, Tubes & Fittings

Group

Requirements for Suppliers

1 Scope

This Kalmar Group Standard, hereinafter referred to as KGS, specifies the cleanliness requirements for hoses, tubes and fittings prior to installation/assembly.

2 Purpose

The purpose of this KGS is to ensure sufficient cleanliness of hoses, tubes and fittings.

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.

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

	Cleanliness Requirements	Max. Metallic Particle size	Hydraulic oil for testing
Hoses	19/16/13	100 µm	AW46 Grade or Equivalent
Tubes	19/16/13	100 µm	AW46 Grade or Equivalent
Fittings	19/16/13	100 µm	AW46 Grade or Equivalent

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6.2 Test Procedure

Hoses/Tubes: Fill with the appropriate volume of extraction fluid and shake it vigorously to remove contaminants from the inner surface.

After shaking collect oil samples in a bottle for particle analysis.

Hose/tube fittings: Rinse with the pressurized extraction fluid inside fitting to remove contaminants from the inner surface.

After washing collect extraction fluid samples in a bottle for particle counting analysis.

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 oil sample particle count reading as per requirement, if not repeat procedure with new extraction fluid.

6.3 Cleaning and Washing

During cutting of hoses generates impurities which remain inside the hose. To ensure hydraulic fluid remains contaminant free, it is imperative to clean all new hoses prior to installation.

The following required method shall be used for cleaning hoses/tubes prior to assembly.

6.3.1 Foam base projectile cleaner

The system is based on mechanical cleaning by shooting a polymer foam plug through tube/hoses with compressed air.

The cleaning plugs are approx. 20% larger than the inner diameter. of the hose/tube. The compressed plug will rotate, and absorb, "on its way", dirt and other impurities from the inside walls on the hose/tube.

Repeat this operation until normal cleanliness requirements will be achieved.

6.3.2 Pressurised Air

Hoses/Tube/Fittings/Assembly shall be clean with pressurized air.

6.3.3 Fluid Flushing

Flush cleaning fluid at a high velocity through the Hoses/Tube/Fittings/Assembly until the cleanliness requirements are met.

6.4 Drying

Finished Hoses/Tube/Fittings/Assembly must be dried, either by heat drying or by blowing dry filtered pressure air before protection caps are installed.

6.5 Anti-corrosive treatment

Surfaces that will come into contact with fluids should be free of corrosion and corrosive products.

To maintain cleanliness until installation, the washed component shall be treated with an anti-corrosive agent that does not influence the system fluid or the component.

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6.6 Sealing

Ensure fittings cleanliness as per specified prior to assembly with hose/tube.

To eliminate possible re-contamination, hose assembly should be secured with heat shrink capsules using hot air.

Hose/Tube assembly fittings should be capped against damage and contamination.

6.7 Storage

Ensure hoses are stored in a cool, dry, and dust-free location. Avoid direct sunlight or UV radiation.
Note: If stored below freezing, warm the hose up before handling and using.

Hoses and hose assemblies should be stored in a stress-free condition either straight, in a coil, or on a drum.

Hoses/Fittings with O-rings Assure that storage period does not exceed 2 years.

6.8 Indication on technical documents

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