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Item No.- / Procedure:	Procurement of Purchase Parts	Work Step / Field:	Central Purchasing
Facility-/ Tool. No.:	/	Valid from (Date):	17.02.2011

Area of Application

This inspection requirement is for identifying the amount of residual dirt, particle size and number. It is effective without any drawing entry for any parts bought by SchmitterGroup GmbH.

1. Free of Grease and Oil – Method of Testing

The parts are wetted with test ink or with a test pencil of 36 mN / m of surface tension. The ink must stick to the pipe and must not run within 2 seconds.

2. Short Description of Particle Cleanliness

The inspection for residual dirt, particle number and size has to be carried out on parts which are finished, finally cleaned and approved for dispatch. The samples are taken out of the package in the required quantity and cleaned under laboratory conditions. The residues removed are filtered and analyzed with respect to particle number, size and nature.

2.1 Quantity of Samples

The quantity of parts to be inspected is based on the part's weight.

Weight of part ≤ 50 grams 10 parts

Weight of part > 50 grams 5 parts

3. Execution of Inspection

With respect to the method of inspection differentiations are made between milled, turned and stamped parts (also laser-cutting) as well as hollows such as flexible tubes, pipes and pipelines or the like.

3.1 Cleaning

Cleaning is carried out with a solvent, belonging to flash point – class of hazard A3, eg DE-SOL-VIT 1000 or similar, which has been filtered with a filter of pore size 0.5 – 0.8 µm.

Ultrasonic Method for Milled, Turned, Stamped Parts, Hollows < 100 mm length and Coatings for Parts < 100mm length

Put the samples into a previously cleaned container (eg beaker) holding a sufficient amount of the solvent and clean them with supersonic sound for at least 5 minutes.

Depending on the size, the parts can be cleaned individually or together in the required number of samples.

Remove samples and rinse adherent particles with a clean detergent (eg. pressure-flush bottle). The contaminated detergent is directed to a filter system (see 3.4).

3.3 Spraying Inspection Method for Hollows and Coatings for Parts > 100 mm long

Hollows must be flushed from both ends with the detergent; using this method, the pressure must be between 2 and 3 bar, the cleaning flow rate per side is at least 500 ml. The emerging, contaminated detergent is collected in a previously cleaned container and directed to a filter system (see 3.4).

3.4 Filtration

The contaminated detergent is filtered through a dried, previously weighed filter using a vacuum filtration unit. For this process the collection container and the liquid container of the filtration unit must be flushed and rinsed with clear

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detergent, in order to bring dirt particles adherent to the container to the amount of residual dirt. The choice of the pore size of the filter depends on the smallest particles to be detected. Pore size of 5 µm



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for particles of 20µm or larger.

- Pore size of 1.2 µm for particles of 5 µm or larger

4. Analysis

The weight of the residual dirt is measured by re-weighing the filter which has been dried at 100°C (60 minutes) and cooled down to room temperature (accuracy of min. 0.1 mg). The result, divided by the number of samples, shows the amount of residual dirt in mg / part. The result must be documented in a report. After that, the filter is analyzed visually, using a stereo microscope 100 times magnified, and particle size, quantity and optionally the consistency of the residual dirt are defined. The consistency can provide important evidence with respect to the source of contamination. Particle size, particle quantity and optionally the consistency must be documented in a report. Weight of residual dirt, particle size and quantity are compared with the requirements stated in paragraph 6.

When analyzing the particle size the largest linear extent must be measured under the microscope.

Example for indication of result in a test report

- Test report – No.: XXXXX
- Part number: 42330001XXX
- Description: Pipe 4 x 0,5 x XXX
- Amount of residual dirt: 0,1 mg / part
- Particles >200 µm: none
- Quantity of samples 10
- Consistency:
 - Chipping sporadic
 - Metallic abrasion a lot
 - Textile fiber partly
 - Plastic fiber sporadic
 - Other: Residues similar to resin partly

5. Devices and Reagents

- Exikkator, (eg. VWR)
- Drying furnace, (eg. Heraeus)
- Analytic balance (accuracy of possibly 0.1mg eg. Sartorius)
- Vacuum filtration unit, eg. Sartorius)
- Vacuum pump, (eg. Sartorius)
- Pressure-flushing bottle, (eg. Pall)
- Stereo microscope with measuring eyepiece (100 times magnified)
- Detergent (eg. DE-SOL-VIT 1000 from A + E Fischer)
- Filter with a pore size of 5µm Ø 50 respectively 47 mm (Cellulose membrane filter from eg. Sartorius)
- Forceps, Petri dish



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6. Requirements for Cleanliness of parts**6.1 Any Hollows except Fuel Injection Systems**

Max. Number of Particles					Largest Particle		Total Weight (mg)
5 – 50 µm	51 – 100µm	101 – 200µm	200 – 500 µm	500 – 1000µm	Hard	Fibre	0.05 mg per 100 mm Length
free	free	free	Not allowed	Not allowed	200	500	
Spraying Inspection Method / Ultrasonic Method							

6.2 Hollows for Fuel Injection Systems

Max. Number of Particles					Largest Particle		Total Weight (mg)
5 – 50 µm	51 – 100µm	101 – 200µm	200 – 500 µm	500 – 1000µm	Hard	Fibre	0.2 mg per part
free	40	4	Not allowed	Not allowed	200	500	
Spraying Inspection Method							

6.3 Milled, Turned and Stamped Parts

Max. Number of Particles					Largest Particle		Total Weight (mg)
5 – 50 µm	51 – 100µm	101 – 200µm	200 – 500 µm	500 – 1000µm	Hard	Fibre	0.05 mg per part
free	free	free	2	Not allowed	200	500	
Ultrasonic Method							

6.4 Coatings

Max. Number of Particles					Largest Particle		Total Weight (mg)
5 – 50 µm	51 – 100µm	101 – 200µm	200 – 500 µm	500 – 1000µm	Hard	Fibre	0.2 mg per 100 mm Length
1000	40	4	Nicht zulässig	Not allowed	200	500	
Spraying Inspection Method / Ultrasonic Method							

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Note: This test instruction replaces PV0001 Cleanliness of Parts for Purchase Parts – Inspection for Residual Dirt (Rev. 0 dated 02/06/2004)