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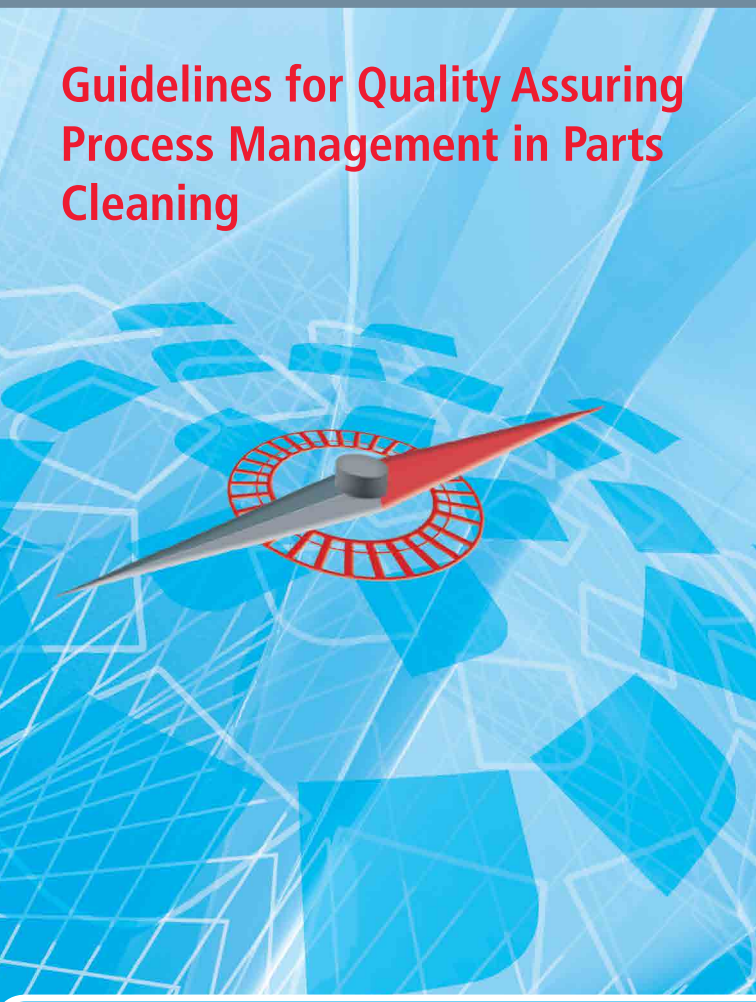
Guidelines for Quality Assuring Process Management in Parts Cleaning



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Expert knowledge and professional competence in industrial parts cleaning

The trade association for parts cleaning technology **Fachverband Industrielle Teilereinigung e. V. (FiT)** represents technical and chemical suppliers, users and service companies, scientific institutes and other institutions for industrial parts cleaning. Its purpose is the perception and promotion of the technical and economic interests of its members. With its guidelines and checklists, FiT offers orientation to the parts cleaning industry and initiates technological progress and innovation through research activities.

FiT offers professional advice on technology, chemistry and processes with experts from the FiT network and imparts knowledge through expert conferences, seminars and workshops, and thus qualifies the employees of the industry.

Use the expert knowledge of FiT members on technology and processes so you can manage your cleaning tasks efficiently and successfully.

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These guidelines, which have been compiled by the FiT expert committee for cleaning, are intended to provide orientation for an exchange of experience and the development of new solutions. They provide a basis for the cooperation between suppliers in the industry of industrial parts cleaning and operators of cleaning plants and machinery within the process chain of parts production.

The guidelines contain principles for designing, controlling and optimising cleaning processes. The objective is the stable assurance of parts cleanliness using a technically, economically and ecologically optimised system solution. The most important aspects from different viewpoints (chemistry/process, systems engineering, measuring/testing/controlling, knowledge transfer/qualification) must be included.

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Fundamentals for Quality Assuring Process Management in Parts Cleaning

1. Producing quality instead of testing it requires quality control by means of:
   - Continuous monitoring of parts cleanliness and process parameters which influence quality
   - Detecting changes
   - Immediate intervention in the cleaning process
2. Quality control is based on the cause-effect relation between required parts cleanliness and process parameters.
3. Process management includes control of the cleaning process by targeted measures implemented by the plant operator as well as targeted measures from the field of process engineering, supported by measuring/testing and controlling technology.
4. Quality assuring process management requires the process-related coordination of cleaners and if necessary, the preservation of parts.
5. The objective of process management in industrial parts cleaning is to assure sufficient parts cleanliness as required for the respective follow-up process with minimal consumption of resources.
6. Knowledge-based process management for a concrete cleaning task is based on fundamental task-independent knowledge ("how does it work in general") and yet to be developed, task-specific knowledge ("the detailed solution for the specific case").
7. The guidelines apply for aqueous cleaning as well as for cleaning with solvents and accordingly for other cleaning processes and cleaning plants.

Guidelines for Quality Assuring Process Management in Parts Cleaning from a Chemistry/ Process Viewpoint

1. Stable parts cleanliness requires the selection of cleaning chemicals to match the process.
2. Quality assuring process management demands an understanding of the cleaning chemicals and their interaction within the process.
3. Selecting cleaning chemicals and defining the process are based on knowledge of the requirements for parts cleanliness.
   Equally important are type and quantity of the contamination and the material of the parts to be cleaned as well as the subsequent process steps such as heat-treatment.
   The specification of cleaning chemicals and procedures restrict the universality of the cleaning process. Only similar parts (geometry, material, contamination) can be cleaned at the same high level of quality.
4. The effectiveness of the selected cleaning chemicals can only be optimised when monitored on a regular basis, dosed in a targeted way and kept stable. The same applies to preservation media for temporary corrosion protection.
   It must be taken into consideration that changes within the process chain such as using new cooling lubricants in the parts production have an influence on parts cleaning. If necessary, the suitability of the cleaning process has to be newly analysed and revaluated.
5. Assuring the required parts cleanliness and the knowledge of the necessary corrosion processes are preconditions for a successful preservation of parts surfaces that are sensitive to corrosion.

6 Quality assuring process management requires the understanding of the chemical characteristics and the effects of the used preservation media, their application, drying behaviour and cleanability.

7 Qualified plant management is a precondition for economic and effective use of chemicals.

Guidelines for Quality Assuring Process Management in Parts Cleaning from a Systems Engineering Viewpoint

1 Stable parts cleanliness is achieved by a suitable plant technology. In this respect, the range of parts as well as the type and amount of contamination must lie within defined limits.

2 Stable parts cleanliness requires a design of the parts that is suitable for cleaning as well as cleaning-optimised carriers or conveyor systems.

3 The design of the plant technology is laid out based on the determination of the required cleaning process and the selection of a suitable cleaning agent.
To guarantee an economic and reliable solution, it is necessary to consider and to possibly optimise the entire process chain of parts production.

4 The selection of applicable procedures in washing mechanics (spraying, flooding, ultrasonic) is determined according to the part geometry, the handling of the part (individual part, set part, bulk material) and the type of contamination.
Ultrasonic parameters such as frequency, duration and output have to be adjusted to the parts and to the contamination.
The same applies to process parameters of spray cleaning.

5 In order to achieve stable parts cleanliness, quality influencing process parameters within the plant technology must be monitored at regular intervals.

6 Stable parts cleanliness requires monitoring and purification of the cleaning agent as well as maintenance of the cleaning plant at regular intervals.

7 Qualified operating and maintenance personnel ensure a stable plant operation.

Guidelines for Quality Assuring Process Management in Parts Cleaning from a Measuring/ Testing and Controlling Viewpoint

1 In addition to the parts and material flow within the cleaning process, an information flow must also be set up and integrated into the process management.

2 Process control is based on knowledge of the effective mechanisms of the cleaning process and possible malfunctions within the entire process chain and their connection with stable parts cleanliness.

3 Experience has shown that regular monitoring of the parameters influencing quality within the cleaning process using appropriate process measuring technology results in higher process quality and therefore in stable parts cleanliness. The same applies for the cleanliness control of parts using appropriate measuring devices. Measuring actual values and comparing them to reference and limit values allow the detection of process-related changes and the initiation of necessary process management measures.

4 To control parts cleanliness, residues of contamination have to be detected. A distinction has to be made between particles and filmic contamination.

5 Laboratory analytics is used for error analyses to identify causes of process malfunctions. Errors are corrected by derivation and implementation of measures for process management optimisation.

Guidelines for Knowledge Transfer and Qualification for Quality Assuring Process Management in Parts Cleaning

1. Knowledge and experience of suppliers and plant operators for developing, optimising and controlling cleaning processes must be combined.
2. A quality assuring process management requires individual training of users by the suppliers involved.
3. Company-internal knowledge and experience must be prepared and made accessible by cross-competitor cooperation amongst suppliers and users.
4. Any knowledge gaps in the area of quality assuring process management must be eliminated by targeted research.
5. It must be the objective of knowledge transfer and qualification to strengthen the expertise of those responsible for making decisions in order to achieve a practical, efficient and high-quality solution, even in the case of special requirements.