### TSC Category
Manufacturing and Operations

### TSC
Cleanliness and Contamination Control

### TSC Description
Establish and implement contamination and cleanliness controls in the manufacturing work environment

<table>
<thead>
<tr>
<th>TSC Proficiency Description</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
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<tr>
<td></td>
<td>PRE-CLO-1008-1.1</td>
<td>PRE-CLO-2008-1.1</td>
<td>PRE-CLO-3008-1.1</td>
<td>PRE-CLO-4008-1.1</td>
<td>PRE-CLO-5008-1.1</td>
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<tr>
<td>Perform good cleanroom practices when carrying out work tasks in cleanrooms</td>
<td>Facilitate continual cleanroom practices in manufacturing tasks</td>
<td>Manage workplace cleanliness and contaminants by defining and assessing proposed solutions to meet cleanliness requirements</td>
<td>Develop cleaning plans by differentiating requirements when using manual and automatic cleaning technology, and conducting contamination risk management activities</td>
<td>Evaluate cleaning process plans to determine appropriate cleaning processes for manufacturing</td>
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### Knowledge
- Types of cleanroom and zoning classifications
- Types of cleanroom clothing, machinery, equipment and materials
- Cleanroom gowning procedures
- Principles of cleanroom testing
- Types of contamination and cleanroom contamination control procedures
- Types of aseptic monitoring in cleanrooms
- Requirements for personnel hygiene
- Types of cleanroom and zoning classifications
- Types of cleanroom clothing, machinery, equipment and materials
- Cleanroom gowning procedures
- Types, sources and impact of contaminants on tasks and products worked on
- Requirements for proper contaminant risk management systems
- Requirements for proper cleaning and sanitation programmes
- Concepts of management control programmes and systems for cleanliness and contamination control
- Types of contamination and cleanroom contamination control procedures
- Types of aseptic monitoring in cleanrooms
- Requirements for personnel hygiene
- Types, sources and impact of contaminants on tasks and products worked on
- Types of cleaning processes
- Types of cleaning technologies and process methods
- Factors affecting cleaning process efficiency
- Types of cleanliness validation methods
- Concept and principles of technical specifications for cleanliness requirements
- Type of contaminations applicable to manufacturing and/or cleanrooms
- Principles of contamination transfer and risk management
- Sampling methods to monitor hazards and control of contaminants
- Testing methods for cleanliness
- Alert activation levels related to contaminants
- Cleaning equipment and procedures for use
- Types of quality requirements for parts cleaning
- Methods, tools, systems and implements of contamination cleaning plans
- Contamination management legislation, regulations, practices and guides
- Staff training related to risk management
- Principles of precision engineering
- Methods for evaluating engineering processes
- Tools for evaluating engineering processes
- Criteria for evaluating engineering processes
- Types and impact of recommendations on engineering processes
- Workplace safety and health (WSH) requirements
### Abilities

- Identify types of clothing, machinery, equipment and materials associated with cleanroom environments
- Perform gowning procedures
- Perform cleanroom contamination control procedures
- Perform aseptic monitoring in cleanroom
- Perform checks for personnel hygiene

<table>
<thead>
<tr>
<th>Abilities</th>
<th>Develop personal hygiene training programmes for workers</th>
<th>Identify different types of contaminants in the workplace and operational environment</th>
<th>Analyse manufacturing processes to determine sources of contamination and cleaning requirements</th>
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<tbody>
<tr>
<td></td>
<td>Develop strategies to prevent potential sources of contamination that could arise from manufacturing processes and staff behaviour</td>
<td>Identify suitable cleaning technologies and processes</td>
<td>Analyse sources of contamination in manufacturing processes to determine risks due to air transfer, worker behaviour, material, equipment and machinery handling</td>
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<td>Verify proper performance of gowning, contamination control procedures and personnel hygiene by staff</td>
<td>Contribute ideas to evaluate potential risks of contamination at the workplace</td>
<td>Determine appropriate cleaning processes to suit application requirements, contamination and hazards risk control measures and contamination cleaning plans</td>
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<td>Verify aseptic monitoring in cleanroom by staff</td>
<td>Communicate cleanliness requirement specifications with vendors and specialists</td>
<td>Develop cleaning process plans for specific applications</td>
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<td>Identify relevant methods for cleanliness testing</td>
<td>Supervise cleaning processes to ensure required solutions are achieved</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Evaluate cleaning recipes and contamination cleaning plans, and advise on defects</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Design quality control procedures to address aspects of product cleanliness and compliance to regulatory requirements</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Review, update and document contamination risk management systems, in accordance with standards and requirements</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Develop measures for enhancing contamination</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Apply analysis methods to determine cleaning requirements, in accordance with work specifications</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Review cleaning processes for suitability to application requirements</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Evaluate selected cleaning applications for suitability to work specifications</td>
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<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Evaluate cleaning process plans for effectiveness to particular applications</td>
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<tr>
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<td></td>
<td>Review the adequacy of cleaning processes in proposed solutions by suppliers</td>
<td>Evaluate quality control procedures for effectiveness in addressing product quality and compliance to regulatory requirements</td>
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<td>risk management skills and knowledge of staff</td>
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