

Annex C04: Definitions of maintenance and services.

Preventive maintenance: Regularly scheduled maintenance tasks are carried out to prevent equipment failures and minimize downtime. Preventive maintenance activities include cleaning, inspection, lubricating, calibrating, monitoring and tracking equipment reliability as well as alignment and replacing worn-out parts. This proactive approach supports equipment reliability, preventing breakdowns, contaminations and extending the lifespan of semiconductor equipment.

Predictive maintenance: A proactive approach that utilizes data analysis and machine learning algorithms to predict equipment failures and schedule maintenance accordingly. Predictive maintenance helps to reduce downtime and improve overall equipment effectiveness by addressing potential issues before they escalate into major problems.

Corrective maintenance: Maintenance activities are performed to repair or to replace faulty equipment. This type of maintenance is typically carried out after a failure has occurred, with the aim of restoring the equipment to its optimal performance levels (unplanned maintenance).

Condition based maintenance: Maintenance activities are carried out based on the actual condition of the equipment. This approach leverages real-time data from sensors and monitoring systems to determine when maintenance and services is required, ensuring that efforts are both targeted and efficient.

Software Maintenance: the process of modifying and updating a software system after it has been delivered to the customer. The goal of software maintenance is to keep the software system working correctly, efficiently, and securely, and to ensure that it continues to meet the needs of TNO. Maintenance can be categorized into proactive and reactive types whereas proactive maintenance involves taking preventive measures to avoid problems from occurring, while reactive maintenance involves addressing problems that have already occurred. It involves in more detail:

- Corrective maintenance: fixing bugs and installing updates* (finding and fixing errors and problems in software including patching),
- Adding enhancements: installing upgrades** (adding new features or improvements),
- Perfective maintenance: performance optimization (improving speed, efficiency, and reliability),
- Porting and migration (adapting to new hardware or software platforms)
- Adaptive maintenance: re-engineering (improving design and architecture of the software for scalability and maintainability)
- Preventive maintenance: optimization, documentation management (creating, updating, and maintaining the documentation for the software, including user manuals, technical specifications, and design documents), reviewing and testing the system, and implementing preventive measures such as backups.

() Updates refer to enhancements or fixes to existing software (through operational patch management), such as security patches or bug fixes, aimed at improving performance and security.*

*(**) Upgrades, on the other hand, involve a significant change or enhancement to the software, often introducing new features or a new software versions (through software release management).*

Other activities:

- 1st Line / 2nd Line Support (helpdesk, on-line, on-site);
- (Critical) Spare parts policy;
- Provision of Consumables;
- Training services for technical staff such as engineers and operators;
- Any other services required.