|  |  |
| --- | --- |
| Objective | To assure the quality of equipment and materials received at site, by applying a quality process system commensurate with the criticality of the equipment or material. This guideline is intended to define those processes that will contribute to effective inspection and quality control, when assessed against selected criteria.Use this guideline in conjunction with the[Equipment Criticality Rating Procedure](https://ems4.worleyparsons.com/EMS4/EPP-0029-COR-EN.pdf?Web=1)(TIS‑0029), the [Equipment Criticality Rating Worksheet](https://ems4.worleyparsons.com/EMS4/EPF--ZZZ-EN.xlsx?Web=1)(TIS-0066) and [Inspection Test Plan Guideline](https://ems4.worleyparsons.com/Pages/InvalidLink.aspx?file:///C:/Temp/MigrateArea/Reference=CQW-084)(TIS-0081). |

Equipment types that typically require Critical Rating Assessment include:

* Vessels (e.g. Reactors, Drums, Towers, Columns).
* Heat Transfer equipment (e.g. Heat Exchangers, Air-Coolers, Flares, Fired Heater Coils).
* Rotating equipment (e.g. Compressors, Turbines, Blowers, Pumps).
* Mechanical Equipment (Filters, Drives, Conveyors, etc.).
* Electrical Equipment (Motors, Variable Speed Drivers, Switch-gear, Uninterruptible Power Supplies, Motor Control Centers, Control Panels).
* Transformers
* Instrumentation (Distributed Control Systems, Emergency Shutdown Systems, Analyzers, Safety Instrumented Systems, Severe Service control valves, Specialty alloy instruments/valves, and Sample Systems).
* Heavy Wall Pipe, HP Valves, Alloy Piping, Pig Launchers
* Pre-fabricated Tanks.

Note –

1. Catalog type equipment or equipment with very limited customization, will not generally be subject to a HIGH Criticality Rating assessment except where subjected to severe service conditions or where specialty materials are employed.
2. For an extensive list of commonly purchased equipment with pre-determined criticality ratings and minimum inspection and testing requirements, refer to [Inspection Test Plan Guideline](https://ems4.worleyparsons.com/Pages/InvalidLink.aspx?file:///C:/Temp/MigrateArea/Reference=CQW-084) (TIS-0081).
3. For Major Packages, refer to [Major Package Management Guideline](https://ems4.worleyparsons.com/EMS4/EPP-0336-COR-EN.docx?Web=1) (TIS-0336)

TABLE 1:Typical equipment bY category

Only use this table when there is insufficient information available to carry out an assessment using the [Equipment Criticality Rating Worksheet](https://ems4.worleyparsons.com/EMS4/EPF--ZZZ-EN.xlsx?Web=1)(EPF-0066).

| Criticality Rating | Typical Equipment | Criticality Criteria |
| --- | --- | --- |
| A | * Heavy Wall Pressure Vessels/H.T. Exchangers
 | New Technology |
|  | * Special Reactors/Regenerators/Towers
 | Complex equipment/ construction |
|  | * Project specific critical items
 | High cost/schedule critical equipment |
|  | * Special purpose machinery
 | High hazard risk equipment |
|  | * Main Power Generation Package
 | Extensive testing requirements |
|  | * Long lead items
 | Requires extensive Supplier/Customer Interface |
|  | * Large turbines and compressors
 | Extensive testing requirements |
| B | * Air Fin Exchangers
 | * Packaged Units
 | Proven design (ASME, API, TEMA, etc.). |
|  | * Alloy Exchangers
 | * Transformers
 | Maybe high cost |
|  | * Alloy/Clad Vessels
 | * DCS/ESD Systems
 | Moderate fabrication complexity |
|  | * Compressors
 | * Spheres
 | Multi discipline engineered |
|  | * Boiler Packages
 | * Turbines
 | High level of Supplier/Customer Engineer Interface |
|  | * Heater Coils
 | * Metering Packages
 | Stainless/Alloy steels (to 75mm) |
|  | * Refractory Linings
 | * Fixed Heaters
 | Customer Engineered items/process |
|  | * Engineered Pumps
 | * Switchgear
 | CS/Killed CS material over 50mm W.T |
|  | * actuated valves
 |  | Low Temperature Carbon Steel |
| C | * CS/Killed CS Vessels (<2m)
 | Designed to ASME/B.P.V.C’s |
|  | * Control Panels
 |  |  |
|  | * CS/Killed CS Exchanger (<50mm)
 | Not complex to fabricate |
|  | * Instrument Panels
 |  |  |
|  | * Engineering valves (including Control)
 | Easily obtained materials/parts |
|  | * Fabricated Piping items
 | Mainly low cost/low technology |
|  | * Tankage
 | * Glass Reinforced Epoxy Pipe
 |  |
|  | * Standard Pumps
 | * Cement Lined Pipe
 | Limited materials testing |
|  | * Filters/Mixers
 | * Simple Packages
 | Testing primarily to National Standards |
| D | * Bulk Piping Materials
 |  | Limited Customer engineering input |
|  | * Cranes/hoists
 |  |  |
|  | * Standard valves
 |  | Low cost/easily replaced items |
|  | * Standard Instruments
 |  |  |
|  | * Steam traps
 | Non critical services items |
|  | * Standard Motors
 |  |  |
|  | * Hoses
 |  | Batch tested items |
|  | * Couplings/seals, etc.
 |  |  |
|  | * Fire Protection equipment
 |  | Possibly non-inspectable  |
|  | * Cable (LV/MV) Bolting/Gaskets
 |  |
|  | * Engineered Pipe Supports
 |  |

TABLE 2: Required inspection levels

|  |  |  |
| --- | --- | --- |
| Criticality Rating | Inspection Level | Inspection Description |
| **A** | **4** | **Resident Inspector:** Verification of supplier’s process and personnel qualifications, continuous monitoring of processes and associated records and in-process and final inspection and release of products as per Supplier’s Quality Plan and Inspection & Test Plan/s. |
| **B** | **3** | **Surveillance Inspection:** Specific Hold/Witness Point inspection as per approved Inspection & Test Plan/s supplemented by regular surveillance of supplier’s special processes and associated records. (Surveillance frequency agreed on a case by case basis). |
| **C** | **2** | **Specific Inspection:** Specific Hold/Witness Point inspection as per approved Inspection & Test Plan. (Minimum to include pre-inspection meeting, validation of special processes, where applicable and final product inspection and certification review). |
| **D** | **1** | **Final Product Inspection:** Inspection against specification and/or specific inspection instructions and review of associated records/certification prior to acceptance.**NB:** Final product inspection is to be routinely undertaken prior to release/dispatch but may be deferred to receipt of goods **ONLY** when rejection of goods on receipt would **NOT** adversely impact schedule. |

The inspection level for a particular item may be increased above that shown in Table 2 depending on the supplier’s quality history, current level of activity, experience, etc. This adjustment should only be done in consultation with the Project Engineering Manager Inspection Coordinator.