



# Technical Standard

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## **IMPLEMENTATION PROCEDURE FOR QUALITY SYSTEMS (QCS, WEB BREAK SYSTEM, WEB INSPECTION SYSTEM, CONDITION MONITORING SYSTEM)**

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**ABBREVIATIONS**

CMS	Condition Monitoring System
CPU	Central Processing Unit
FAT	Factory Acceptance Test
I/O	Input/Output
MCS	Machine Control System
QCS	Quality Control System
RMS	Root Mean Square
ROI	Region Of Interest
WBS	Web Break System
WIS	Web Inspection System

## 1 PURPOSE

The purpose of this instruction is to specify *in general* the Factory Acceptance Test (FAT) procedure of the Quality Control System (QCS), Web Break System (WBS), Web Inspector System (WIS) and Condition Monitoring System (CMS).

More specific instructions are shown on the document “*Quality System Test Plan*” which will be separately made for each project/contract by the quality system supplier.

## 2 GENERAL

The purpose of the factory acceptance test of quality system (QCS, WBS, WIS or CMS) is to verify the correctness of the quality system configuration (both software and hardware) before connecting the field equipment. Thus, FAT covers all programs, displays, and I/Os of each department / sub process. FAT for links to other systems (like MCS) shall be done according to same principles.

### Quality Control System (QCS)

The Quality Control System (QCS) takes care of the measurement and controlling of the quality parameters of the paper web of the paper machine. QCS controls the headbox, steam box, coordinates speed changes and optimizes grammage transitions. The measurement typically included to the QCS are for example thickness or caliper, grammage, moisture, gloss, filler content (ash), brightness and colour properties.

### Web Break System (WBS)

The Web Break System (WBS) is a camera-based monitoring system for detecting web breaks and analyzing their causes. The system includes cameras and lights for web monitoring.

### Web Inspection System (WIS)

The Web Inspection System (WIS) are used for the detection and identifying of defects the paper web of the paper machine. The system includes cameras and lights for web monitoring.

### Condition Monitoring System (CMS)

The Condition Monitoring System (CMS) are used for condition-based maintenance of machines and installations. Running electric motors generate vibrations, which contain a lot of information about their condition. CMS helps to detect machine failures.

## 3 READINESS FOR FAT

The Supplier shall complete his own testing before any formal acceptance testing commences (Factory Acceptance Test for instance).

## 4 DOCUMENTATION

The Supplier will provide all related documentation of the quality system for testing.

## **5 EXECUTION OF FAT**

### **5.1 General**

FAT is performed to assure that all signal connections between I/O connectors and displays as well as programs and displays have been implemented. Link to other systems shall be also tested.

The interfaces to foreign systems shall be tested in co-operation with other Suppliers.

The Supplier shall connect the entire system (or applicable parts of the system) using all actual equipment, download the application programs into the system and simulate the final mill site installation. The test system shall be the same as the delivered one.

Before FAT Purchaser will provide testing samples to the quality system Supplier.

The Supplier shall propose a test plan and schedule for the system. This plan should address the following issues:

- Test coverage
- Methods of simulating foreign systems
- Performance verification

Supplier shall reserve necessary testing tools, multimeters etc. for testing.

Purchaser shall witness and take part in the test of the entire system simulating the final mill site installation.

Factory acceptance test (FAT) shall take place at Supplier's factory or in place mutually agreed during the project.

### **5.2 Content of FAT**

The checking points in this chapter are as examples. More detailed checking list will be prepared by quality system supplier.

#### **5.2.1 Quality Control System**

FAT shall divided in two section:

1. Hardware inspection of the manufactured automation equipment:
  - QCS CPU cabinet, monitors, printers
  - Media converters
  - Network active devices
  - Scanner frames
  - Measuring heads
  - Part labelling
  - Spare parts
2. Application FAT for verifying the functional operation of the scanner and sensors
  - Positioning and feedback

- Sensor maintenance pages
- Synchronization
- Work station functions
- Operator user interface
- Alarm handling and displays
- Maintenance displays
- Diagnostic information from the scanners
- Information Management tools
- Data collection and trends

### **5.2.2 Web Break System**

FAT shall divided in two section;

1. Hardware inspection of the manufactured automation equipment:
  - WBS system cabinet, monitors
  - Media converters
  - Network active devices
  - Cameras
  - Lights
  - Junction boxes
  - Part labelling
  - Spare parts
2. Application FAT for verifying the functional operation of the cameras and programs
  - Selection of real time displays, single/quad pictures
  - Breaks and other events available
  - On event selection page the system displays automatically thumbnail images from each camera position
  - Event analysis page includes easy to use image control functions
  - Preview image can tagged for each camera
  - Video clips can be edited
  - Digital zooming without limits on all cameras
  - ROI (Region of interest) can be set up for each camera
  - Break simulation
  - Data collection

### **5.2.3 Web Inspection System**

FAT shall divided in two section;

1. Hardware inspection of the manufactured automation equipment:
  - WIS system cabinet, monitors
  - Media converters
  - Network active devices
  - Camera frames
  - Measuring heads (Cameras)
  - Lights
  - Junction boxes
  - WIS markers
  - Part labelling
  - Spare parts
2. Application FAT for verifying the functional operation of the cameras and markers
  - Defect map page can be accessed
  - Defect map reel history can be accessed
  - Web edges detection with full width sample
  - Defect grayscale images (size and sharpness)
  - Each camera shows defect on defect map
  - Alternating light profiles (e.g. transmission/reflection) not affecting each other
  - Marker makes code marks and/or defect marks
  - light beacon and siren output
  - I/O configuration (I/O + Tacho)
  - Defect clases
  - Data collection and trends

### **5.2.4 Condition Monitoring System (CMS)**

FAT shall divided in two section;

1. Hardware inspection of the manufactured automation equipment:
  - CMS system cabinet, monitors
  - Media converters
  - Network active devices
  - Vibration sensors
  - Junction boxes

- Part labelling
- Spare parts

2. Application FAT for verifying the functional operation of the sensors:

- I/O configuration
- Acceleration sensors
- Triggering sensors
- Velocity RMS sensors
- Dynamic pressure sensors
- Wireless vibrations sensors and modules

### **5.3 Recording of testing**

All testing is to be recorded according to the supplier own quality control system. This to be agreed first with purchaser.

### **5.4 Fault and Change management**

Faults, required modifications or additions shall recorded.

## **6 ACCEPTANCE**

At the completion of FAT the acceptance forms will be filled in and signed. The check lists will become appendices of the acceptance forms.