

An ISO 9001:2015 Certified Company

# X- Force Digitalization

## Manufacturing Execution System

## Overview

X-Force MES is a comprehensive Manufacturing Execution System designed to manage, monitor, and optimize manufacturing operations across the shop floor. It provides real-time and near real-time visibility into production, inventory, quality, and equipment performance, enabling manufacturers to achieve higher efficiency, consistent product quality, and faster, data-driven decision-making.

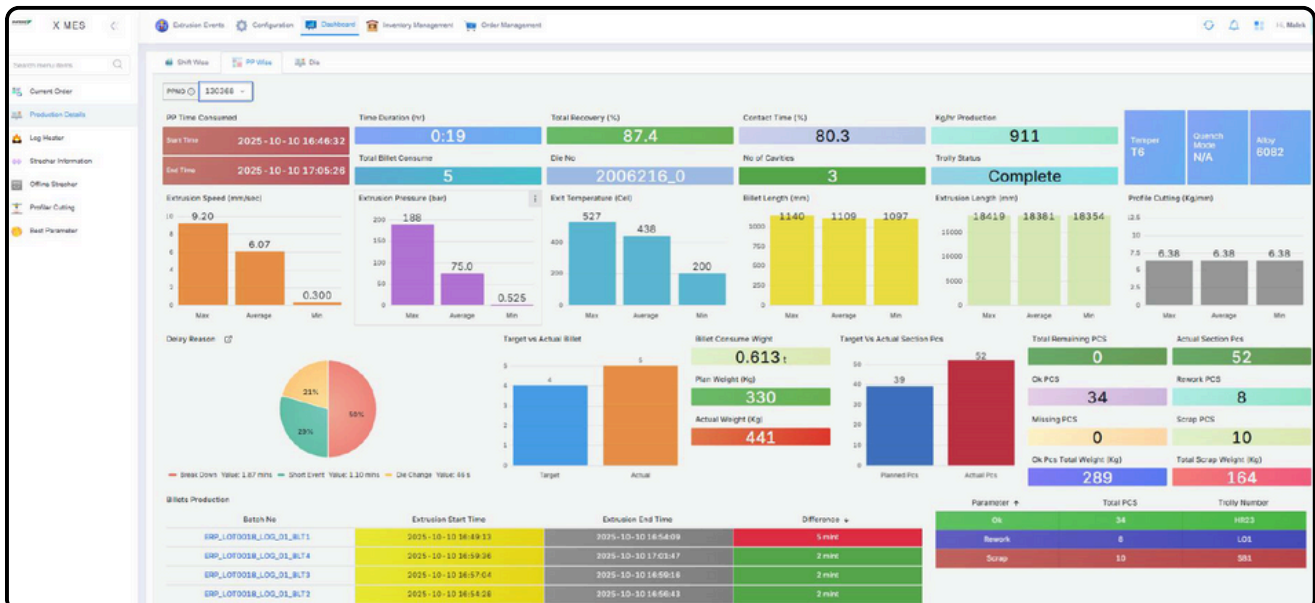
The platform unifies production execution data from raw material receipt through finished goods dispatch into a single operational context. Its scalable and modular architecture supports deployments from individual production lines to enterprise-wide, multi-plant manufacturing environments.



## Core Capabilities

X-Force MES enables manufacturers to standardize operational practices, enforce process discipline, and continuously improve operational performance. Manual and paper-based processes are replaced with structured digital execution, ensuring accuracy, compliance, and full traceability.

The system aligns people, processes, and machines through configurable execution logic and digital workflows, making it suitable for discrete, batch, and repetitive manufacturing operations.



## Production Management

X-Force MES manages the execution of production orders by coordinating equipment, materials, and human resources according to defined manufacturing processes. It ensures operations are executed in the correct sequence and under approved conditions.

### The production execution model supports:

- Operation sequencing and routing
- Bill of Materials (BOM) enforcement
- Material flow control between operations
- Labor authorization and skill validation
- Operation-level data capture requirements

Production orders are executed using reusable master process definitions that automatically scale based on required quantities. Integration with planning and scheduling systems enables short-term production optimization and improved delivery performance.

Operators receive real-time visibility into work orders, priorities, and work instructions, enabling rapid response to deviations and unplanned events.

Production Plan							Search...
Move	PP No	Y	Alloy	Order Qty	Order Cut Length	Section No	Details
⏪	PP/130745		6061	116	2058.00	2055147	ⓘ
⏪	PP/129963		1070A	76	3658.00	2006206	ⓘ
⏪	PP/130603		6005A	39	1964.00	3047481	ⓘ
⏪	PP/129956		1070A	9	2460.00	2000168	ⓘ
⏪	PP/130606		6005A	56	3666.00	3047481	ⓘ
⏪	PP/128388 - R1 - R1 - R1		6060	101	6000.00	2029696	ⓘ
⏪	PP/129955 - R1		1070A	9	2460.00	2000168	ⓘ
⏪	PP/129653 - R1		1070A	48	3660.00	2000168	ⓘ
⏪	PP/130605		6005A	190	1562.00	3047481	ⓘ
⏪	PP/129953 - R1 - R1		1070A	8	2990.00	2000168	ⓘ
⏪	PP/129709 - R1		6061	10	2700.00	3010159	ⓘ
⏪	PP/129577 - R1 - R1		6060	24	4200.00	3034913	ⓘ
⏪	PP/128513 - R1 - R1 - R1 - R1 - R1 - R1 - R1		6062	257	3100.00	2055571	ⓘ
⏪	PP/130604		6005A	56	3461.00	3047481	ⓘ
⏪	PP/130602		6005A	39	1759.00	3047481	ⓘ
⏪	PP/128166 - R1 - R1 - R1		6061	89	2100.00	3055094	ⓘ
⏪	PP/130514 - R1		6061	32	2044.00	3055208	ⓘ
⏪	PP/130515		6062	27	3660.00	2006829	ⓘ
⏪	PP/128165 - R1 - R1		6061	89	2100.00	3055094	ⓘ
⏪	PP/129485 - R1		HE9	14	500.00	2008188	ⓘ
⏪	PP/130037		HE30	27	3660.00	3006914	ⓘ

## Digital Workflow Management

X-Force MES includes a configurable workflow engine to digitize shop-floor activities and human-centric processes. Digital workflows guide operators through task execution, inspections, approvals, and data collection steps.

User interaction is delivered through secure, web-based, and responsive interfaces accessible from desktops, tablets, and mobile devices.

## End-to-End Traceability & Genealogy

X-Force MES automatically builds complete product genealogy by linking materials, operations, equipment, and quality results.

This enables:

- Full material consumption history
- WIP and finished product lineage
- Location-based traceability across production and storage areas

Interactive traceability reports allow users to trace finished products back to raw materials or assess downstream impact of material or process deviations within minutes—supporting audits, investigations, and recalls.

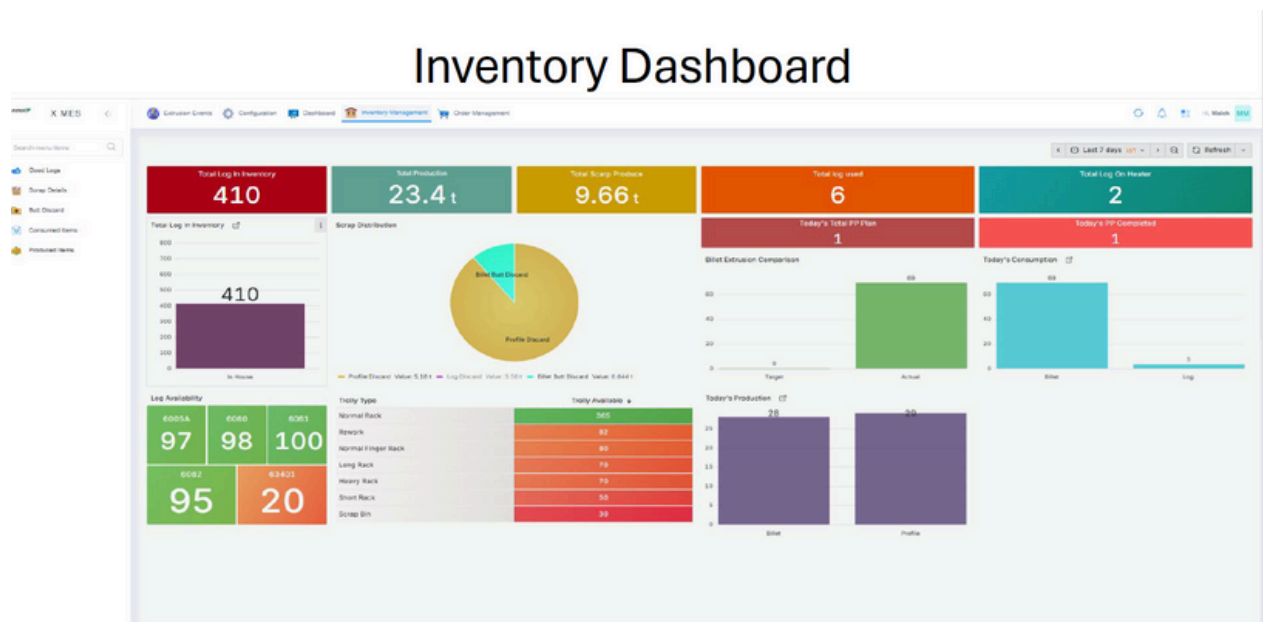
## Inventory & Material Management

X-Force MES provides accurate, real-time visibility of materials across receiving, storage, production, and dispatch stages. It ensures that only approved materials and quantities are consumed during production.

Key capabilities include:

- Raw material, WIP, and finished goods tracking
- Storage location and bin management
- Lot and sub-lot traceability
- Material movement and transfer recording
- Pre-weighing, dispensing, and staging control
- Material status, grade, and release management

Integration with automation systems enables automatic capture of weights, dosages, and consumption values, while barcode and RFID support ensures accuracy for manual and semi-automatic operations.



## Manufacturing Performance Management

X-Force MES captures production events from both operators and connected shop-floor equipment to deliver accurate visibility into asset performance and efficiency metrics, including Overall Equipment Effectiveness (OEE).

By integrating directly with PLCs, DCS, SCADA, and historians, the system captures even short-duration stoppages that are typically missed, enabling detailed downtime analysis and focused continuous-improvement initiatives.



## Quality Management & SPC

Quality is embedded directly into production execution. X-Force MES automates sampling plans and enforces data collection based on defined quality specifications.

Quality capabilities include:

- Automatic generation of sampling requirements
- Manual and automated quality data collection
- Statistical Process Control (SPC) monitoring
- Real-time alerts for specification and control-limit violations
- Deviation handling and CAPA workflow initiation

Standard SPC charts and quality metrics enable early trend detection and preventive action before defects occur.

## Reporting, Analytics & Data Management

X-Force MES organizes operational data into a structured and contextualized data model, enabling efficient reporting, analysis, and enterprise integration.

Key features include:

- Time-stamped production and event data
- Correlation of production, quality, and equipment information
- Drill-down analysis across time, product, batch, and equipment

Pre-configured dashboards provide visibility into production performance, equipment utilization, OEE, downtime, and quality KPIs, while remaining extensible for customer-specific metrics.



## Enterprise & Plant-Level Integration

X-Force MES acts as the execution layer between shop-floor systems and enterprise applications.

It supports integration with:

- ERP, SCM, QMS, LIMS, WMS
- Automation systems and historians
- Cloud and enterprise analytics platforms

Integration capabilities include reliable message handling, store-and-forward mechanisms, master data synchronization, transaction monitoring, and standard APIs—ensuring robust connectivity without impacting core MES functionality.

### Summary

X-Force MES is a powerful Manufacturing Execution System that transforms shop-floor operations with real-time visibility and digital control. It seamlessly connects people, machines, and systems to ensure consistent production execution and quality compliance. By capturing and contextualizing production, material, and performance data, it drives higher OEE and faster decision-making. Scalable and standards-aligned, X-Force MES supports multi-plant operations across process, batch, and discrete industries.