

Screenshot & UI Evidence

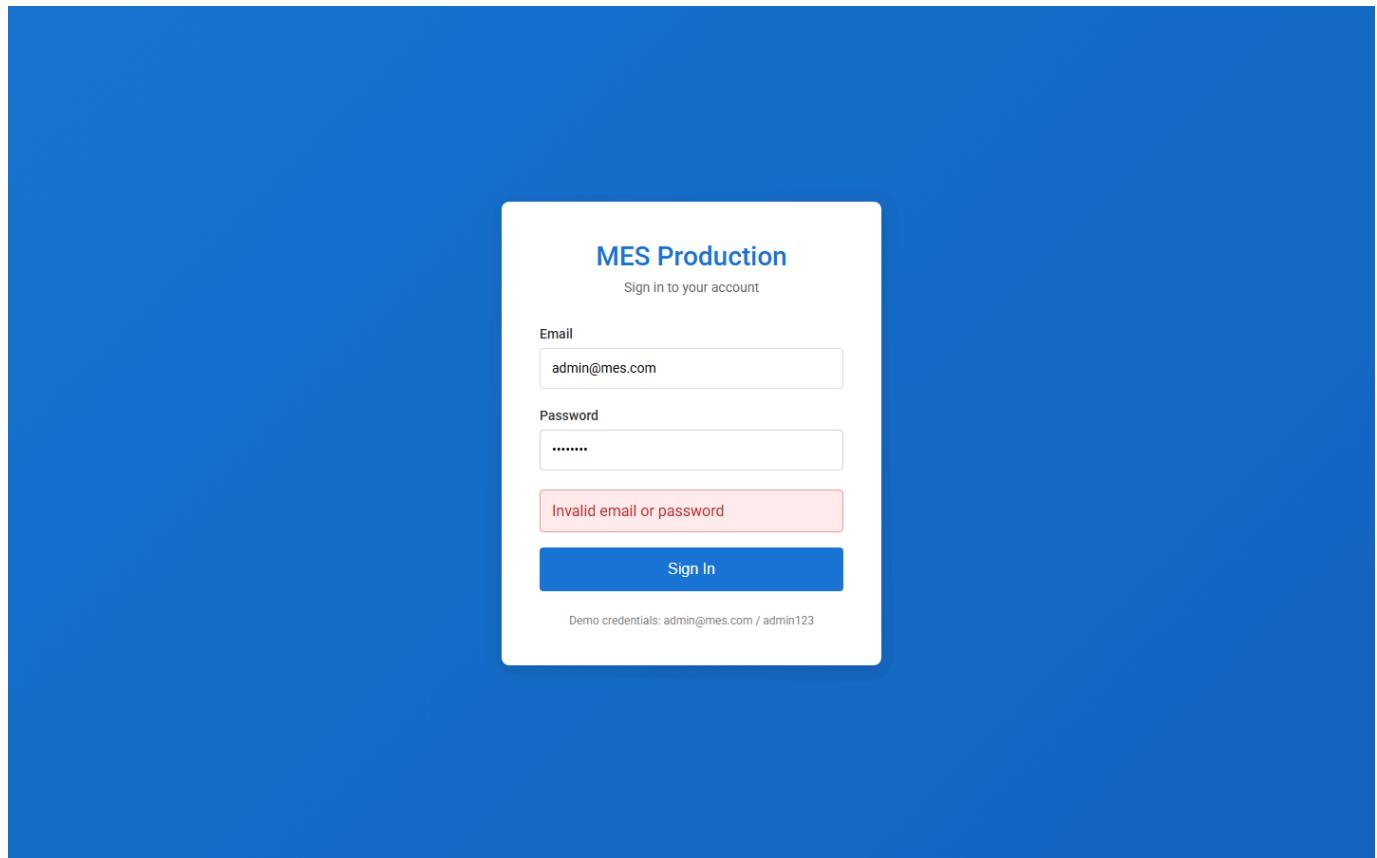
Date: 2026-02-12 | Version: 1.0

Screenshot placeholders are provided for each screen. Replace `./screenshots/<file>.png` with actual captured screenshots from E2E test output (`e2e/output/screenshots/`) or manual captures.

Module: Authentication

Screen: Login Page

- Purpose:** User authentication via email/password
- Business Logic:** JWT token generation, session initialization, redirect to dashboard
- APIs Called:** POST `/api/auth/login`
- Validation:** Email format, password required, invalid credentials error
- Role Access:** Public (unauthenticated)
- Test Coverage:** 9 backend / 13 frontend / 13 E2E



Module: Dashboard

Screen: Dashboard

- Purpose:** Executive summary with KPIs, recent activity, inventory status
- Business Logic:** Aggregated metrics from orders, inventory, production, holds
- APIs Called:** GET `/api/dashboard/summary`
- Validation:** N/A (read-only)
- Role Access:** Authenticated
- Test Coverage:** 6 backend / 19 frontend / 24 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Last updated: Feb 11, 2026, 2:34:55 PM

Inventory Flow

```
graph LR; RM[Raw Materials 18 available] --> WIP[Work in Progress 6 available]; WIP --> IM[Intermediates 8 available]; IM --> FG[Finished Goods 5 available]
```

Operations Status

Partially_confirmed	Not_started	Ready	In_progress	Confirmed	On_hold	Blocked
1	15	7	1	33	1	2

Needs Attention

```
graph LR; AH[8 Active Holds] --> BPA[1 Batches Pending Approval]; BPA --> BI[2 Blocked Inventory]
```

Currently Running

PICKLING In Progress # Pickling

Key Metrics

Orders	Today's Production	Inventory Items	Active Batches
15	9 in progress	0	56
			46

Module: Orders

Screen: Order List

- Purpose:** Paginated list of all customer orders with status filters
- Business Logic:** Server-side pagination, search, status filtering (CREATED/READY/IN_PROGRESS/COMPLETED/CANCELLED)
- APIs Called:** GET /api/orders/paged
- Validation:** Search input sanitization
- Role Access:** Authenticated
- Test Coverage:** 15 backend / 17 frontend / 14 E2E

Order Number	Customer	Product	Quantity	Status	Order Date	Actions
ORD-2026-015	Nordic Steel Trading AB	Steel Billet 100mm	250	BLOCKED	Feb 5, 2026	<button>View</button> <button>Edit</button>
ORD-2026-014	Pacific Metal Works	Cold Rolled Sheet 1mm	90	CANCELLED	Feb 4, 2026	<button>View</button> <button>Edit</button>
ORD-2026-013	Global Manufacturing Ltd	Hot Rolled Coil 4mm	180	COMPLETED	Feb 3, 2026	<button>View</button> <button>Edit</button>
ORD-2026-012	ABC Steel Corporation	Reinforcement Bar 12mm	180	COMPLETED	Feb 2, 2026	<button>View</button> <button>Edit</button>
ORD-2026-011	Oceanic Metals Ltd	Cold Rolled Sheet 2mm	260	IN PROGRESS	Feb 1, 2026	<button>View</button> <button>Edit</button>
ORD-2026-010	African Mining Corp	Steel Billet 100mm	600	CREATED	Jan 31, 2026	<button>View</button> <button>Edit</button>
ORD-2026-009	South American Steel SA	Hot Rolled Coil 3mm	350	CREATED	Jan 30, 2026	<button>View</button> <button>Edit</button>
ORD-2026-008	Asian Electronics Inc	Hot Rolled Coil 2mm	60	ON HOLD	Jan 28, 2026	<button>View</button> <button>Edit</button>
ORD-2026-007	Middle East Metals FZE	Cold Rolled Sheet 1mm	120	CREATED	Jan 25, 2026	<button>View</button> <button>Edit</button>
ORD-2026-006	Nordic Steel Trading AB	Reinforcement Bar 10mm	450	CREATED	Jan 22, 2026	<button>View</button> <button>Edit</button>
ORD-2026-005	European Auto Parts GmbH	Hot Rolled Coil 2mm	75	COMPLETED	Jan 20, 2026	<button>View</button> <button>Edit</button>
ORD-2026-004	Pacific Metal Works	Hot Rolled Coil 2mm	230	CREATED	Jan 18, 2026	<button>View</button> <button>Edit</button>

Screen: Order Detail

- Purpose:** Full order view with line items, operations, and status timeline
- Business Logic:** Display order header, line items with products, operations per line item
- APIs Called:** GET /api/orders/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated
- Test Coverage:** - / 47 frontend / - E2E

The screenshot shows the 'Orders' section of the MES Production application. At the top, there's a navigation bar with links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. A user icon labeled 'AU Admin User' is also present. Below the navigation, a breadcrumb trail shows 'Home > Orders'. The main area is titled 'Production Orders' and includes a search bar and a status filter dropdown set to 'All'. A blue button at the top right says '+ New Order'. The table lists 15 orders with the following details:

Order Number	Customer	Product	Quantity	Status	Order Date	Actions
ORD-2026-015	Nordic Steel Trading AB	Steel Billet 100mm	250	BLOCKED	Feb 5, 2026	<button>View</button> <button>Edit</button>
ORD-2026-014	Pacific Metal Works	Cold Rolled Sheet 1mm	90	CANCELLED	Feb 4, 2026	<button>View</button> <button>Edit</button>
ORD-2026-013	Global Manufacturing Ltd	Hot Rolled Coil 4mm	180	COMPLETED	Feb 3, 2026	<button>View</button> <button>Edit</button>
ORD-2026-012	ABC Steel Corporation	Reinforcement Bar 12mm	180	COMPLETED	Feb 2, 2026	<button>View</button> <button>Edit</button>
ORD-2026-011	Oceanic Metals Ltd	Cold Rolled Sheet 2mm	260	IN PROGRESS	Feb 1, 2026	<button>View</button> <button>Edit</button>
ORD-2026-010	African Mining Corp	Steel Billet 100mm	600	CREATED	Jan 31, 2026	<button>View</button> <button>Edit</button>
ORD-2026-009	South American Steel SA	Hot Rolled Coil 3mm	350	CREATED	Jan 30, 2026	<button>View</button> <button>Edit</button>
ORD-2026-008	Asian Electronics Inc	Hot Rolled Coil 2mm	60	ON HOLD	Jan 28, 2026	<button>View</button> <button>Edit</button>
ORD-2026-007	Middle East Metals FZE	Cold Rolled Sheet 1mm	120	CREATED	Jan 25, 2026	<button>View</button> <button>Edit</button>
ORD-2026-006	Nordic Steel Trading AB	Reinforcement Bar 10mm	450	CREATED	Jan 22, 2026	<button>View</button> <button>Edit</button>
ORD-2026-005	European Auto Parts GmbH	Hot Rolled Coil 2mm	75	COMPLETED	Jan 20, 2026	<button>View</button> <button>Edit</button>
ORD-2026-004	Pacific Metal Works	Hot Rolled Coil 2mm	230	CREATED	Jan 18, 2026	<button>View</button> <button>Edit</button>

Screen: Order Form (Create/Edit)

- Purpose:** Create new order or edit existing with line items
- Business Logic:** Customer selection, line item management, product/quantity entry
- APIs Called:** POST /api/orders , PUT /api/orders/{id} , GET /api/customers/active , GET /api/products/active
- Validation:** Customer required, at least 1 line item, quantity > 0
- Role Access:** Authenticated
- Test Coverage:** - / 34 frontend / 22 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

New Order

Order Information

Customer * Select a customer...

Order Date * 11-02-2026 Order Number Auto-generated if empty Leave empty to auto-generate

Line Items + Add Line Item

Line 1

Product *	Quantity *	Unit	Delivery Date
Select a product...	1		dd-mm-yyyy

Cancel Create Order

Module: Production

Screen: Production Landing

- Purpose:** Entry point for production confirmation - select order/operation
- Business Logic:** Display orders with READY operations, operation selection
- APIs Called:** GET /api/orders/available
- Validation:** N/A (selection only)
- Role Access:** Authenticated
- Test Coverage:** - / 17 frontend / - E2E

The screenshot shows the 'Production Confirmation' page in the MES Production application. At the top, there's a blue header bar with the title 'MES Production' and navigation links for Dashboard, Orders (selected), Manufacturing, Inventory, Quality, and Manage. A user profile 'AU Admin User' is also in the top right. Below the header, a breadcrumb trail shows 'Home > Production'. The main content area has a title 'Production Confirmation' and a 'View History' button. It features two main sections: 'Select Order & Operation' on the left with a dropdown menu labeled 'Order' containing 'Select an Order' and 'Available for Production' on the right, which displays two boxes: 'Orders' (7) and 'Ready Operations' (7).

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Production

Production Confirmation

View History

Select Order & Operation

Order

– Select an Order –

Available for Production

7 Orders

7 Ready Operations

Screen: Production Confirmation

- **Purpose:** Main production workflow - material consumption, parameter entry, batch generation
- **Business Logic:** BOM suggested consumption, process parameter validation, batch number preview, batch split preview, equipment/operator selection, hold check
- **APIs Called:** GET /api/production/operations/{id} , GET /api/bom/operation/{id}/suggested-consumption , POST /api/bom/validate , GET /api/batches/preview-number , POST /api/production/confirm
- **Validation:** BOM consumption validation, parameter min/max ranges, quantity > 0, equipment/operator required
- **Role Access:** Authenticated
- **Test Coverage:** 25 backend / 67 frontend / 14 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Production

Production Confirmation

View History

Select Order & Operation

Order

- Select an Order -

Available for Production

7 Orders

7 Ready Operations

The screenshot shows the MES Production dashboard. At the top, there's a navigation bar with links for Dashboard, Orders (which is currently selected), Manufacturing, Inventory, Quality, and Manage. A user profile 'AU Admin User' is also at the top right. Below the navigation, a breadcrumb trail shows 'Production'. The main area has a title 'Production Confirmation' and a 'View History' button. It's divided into two sections: 'Select Order & Operation' (with a dropdown menu for 'Order') and 'Available for Production' (showing 7 Orders and 7 Ready Operations). The background is light gray.

Screen: Production History

- Purpose:** View past production confirmations with status and details
- Business Logic:** Paginated list of confirmations, status filtering, date range
- APIs Called:** GET /api/production/confirmations
- Validation:** Date range filter
- Role Access:** Authenticated
- Test Coverage:** - / 18 frontend / 11 E2E

MES Production [Dashboard](#) [Orders](#) [Manufacturing](#) [Inventory](#) [Quality](#) [Manage](#) AU Admin User

[Home](#) > [Production](#) > History

Production History

Status: All Statuses Search: Search by operation, batch, notes...

35 TOTAL	35 CONFIRMED	0 PENDING REVIEW	0 REJECTED				
ID	Operation	Output Batch	Produced Qty	Scrap Qty	Duration	Status	Created
35	Pickling	-	90	2	3h 0m	CONFIRMED	-
34	Scrap Charging	-	125	5	4h 0m	CONFIRMED	-
33	Scrap Charging	-	85	2	4h 0m	CONFIRMED	-
32	Cooling & Coiling	-	118	0	1h 30m	CONFIRMED	-
31	Finish Rolling	-	118	2	2h 30m	CONFIRMED	-
30	Rough Rolling	-	120	2	2h 30m	CONFIRMED	-
29	Slab Reheating	-	122	0	3h 0m	CONFIRMED	-
28	Slab Casting	-	122	3	8h 0m	CONFIRMED	-
27	Ladle Refining	-	125	2	3h 0m	CONFIRMED	-
26	EAF Melting	-	127	3	6h 30m	CONFIRMED	-

Module: Inventory

Screen: Inventory List

- Purpose:** Paginated inventory with state/type filters and status cards
- Business Logic:** Server-side pagination, state filtering (AVAILABLE/BLOCKED/SCRAPPED/CONSUMED), type filtering (RM/IM/FG/WIP)
- APIs Called:** GET /api/inventory/paged
- Validation:** State/type filter sanitization
- Role Access:** Authenticated
- Test Coverage:** 34 backend / 35 frontend / 9 E2E

Batch Number	Material ID	Type	Quantity	UoM	State	Location	Actions
B-IM-020	IM-LIQUID	IM	100	T	AVAILABLE	Ladle	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-001	FG-HR-2MM	FG	75	T	AVAILABLE	FG Warehouse 1	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-002	FG-CR-1MM	FG	70	T	AVAILABLE	FG Warehouse 2	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-003	FG-REBAR-10	FG	180	T	AVAILABLE	FG Warehouse 3	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-004	FG-HR-2MM	FG	120	T	AVAILABLE	FG Warehouse 1	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-005	FG-REBAR-10	FG	175	T	PRODUCED	FG Warehouse 3	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-006	FG-CR-1MM	FG	55	T	PRODUCED	FG Warehouse 2	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-008	FG-REBAR-10	FG	150	T	AVAILABLE	FG Warehouse 3	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-RM-021	RM-SCRAP-A	RM	200	T	RESERVED	Scrap Yard A	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-RM-022	RM-SCRAP-B	RM	100	T	RESERVED	Scrap Yard B	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-RM-019	RM-SCRAP-A	RM	100	T	BLOCKED	Quarantine Area	<button>Edit</button> <button>Unblock</button> <button>Delete</button>
B-IM-017	IM-SLAB	IM	45	T	BLOCKED	QC Area	<button>Edit</button> <button>Unblock</button> <button>Delete</button>

Screen: Inventory Detail

- Purpose:** Single inventory item details with state transition actions
- Business Logic:** Display material info, batch link, state actions (block/unblock/scrap)
- APIs Called:** GET /api/inventory/{id} , POST /api/inventory/{id}/block , POST /api/inventory/{id}/unblock , POST /api/inventory/{id}/scrap
- Validation:** State transition validation (server-side)
- Role Access:** Authenticated
- Test Coverage:** - / 24 frontend / - E2E

The screenshot shows the MES Production application's inventory management screen. At the top, there is a navigation bar with links for Dashboard, Orders, Manufacturing, Inventory (selected), Quality, and Manage. A user profile 'AU Admin User' is also visible. Below the navigation is a breadcrumb trail: Home > Inventory. The main title is 'Inventory'. On the right, there are buttons for 'Receive Material' and 'New Inventory'. Below the title is a search bar with dropdowns for 'State' (All States) and 'Type' (All Types), and a search input field 'Search by batch or material...'. The main content area is a table with the following columns: Batch Number, Material ID, Type, Quantity, UoM, State, Location, and Actions. The table lists various items such as IM-LIQUID, FG-HR-2MM, IM-HR-ROUGH, etc., with their respective details and actions like Edit, Block, or Delete.

Batch Number	Material ID	Type	Quantity	UoM	State	Location	Actions
B-IM-020	IM-LIQUID	IM	100	T	AVAILABLE	Ladle	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-001	FG-HR-2MM	FG	75	T	AVAILABLE	FG Warehouse 1	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-IM-019	IM-HR-ROUGH	IM	95	T	AVAILABLE	Hot Mill	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-003	FG-REBAR-10	FG	180	T	AVAILABLE	FG Warehouse 3	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-004	FG-HR-2MM	FG	120	T	AVAILABLE	FG Warehouse 1	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-005	FG-REBAR-10	FG	175	T	PRODUCED	FG Warehouse 3	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-006	FG-CR-1MM	FG	55	T	PRODUCED	FG Warehouse 2	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-008	FG-REBAR-10	FG	150	T	AVAILABLE	FG Warehouse 3	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-FG-007	FG-HR-2MM	FG	25	T	ON HOLD	QC Area	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-RM-022	RM-SCRAP-B	RM	100	T	RESERVED	Scrap Yard B	<button>Edit</button> <button>Block</button> <button>Delete</button>
B-RM-019	RM-SCRAP-A	RM	100	T	BLOCKED	Quarantine Area	<button>Edit</button> <button>Unblock</button> <button>Delete</button>
B-IM-017	IM-SLAB	IM	45	T	BLOCKED	QC Area	<button>Edit</button> <button>Unblock</button> <button>Delete</button>

Screen: Inventory Form (Create/Edit)

- Purpose:** Create or edit inventory records
- Business Logic:** Material selection, quantity entry, location assignment
- APIs Called:** POST /api/inventory , PUT /api/inventory/{id}
- Validation:** Material required, quantity > 0
- Role Access:** Authenticated
- Test Coverage:** - / 12 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Inventory > New

New Inventory

Material Information

Material ID *	Material Name
e.g., MAT-001	Enter material name
Inventory Type *	Location
Select type...	e.g., Warehouse A, Shelf 3

Physical Form

Inventory Form
Select form...

Quantity

Quantity *	Unit of Measure
e.g., 1000	T

Actions

Cancel Create Inventory

Screen: Receive Material

- Purpose:** Goods receipt - create new batch + inventory from incoming material
- Business Logic:** Creates QUALITY_PENDING batch and AVAILABLE inventory
- APIs Called:** POST /api/inventory/receive-material , GET /api/materials/active
- Validation:** Material required, quantity > 0, supplier info
- Role Access:** Authenticated
- Test Coverage:** - / 25 frontend / 12 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Inventory > Receive Material

Receive Raw Material

Create batch and inventory record for incoming raw materials

Material Information

Material * Material Name

Supplier Information

Supplier ID Supplier Batch Number
External batch number from supplier's documentation

Quantity

Quantity * Unit of Measure *
System units: KG, TONS, PCS, M, L

Receipt Details

Received Date Storage Location
Notes

Module: Batches

Screen: Batch List

- Purpose:** Paginated batch list with status filters
- Business Logic:** Server-side pagination, status filtering
(QUALITY_PENDING/AVAILABLE/PRODUCED/CONSUMED/BLOCKED/SCRAPPED)
- APIs Called:** GET /api/batches/paged
- Validation:** Status filter sanitization
- Role Access:** Authenticated
- Test Coverage:** 42 backend / 11 frontend / 16 E2E

Batch Number	Material ID	Quantity	UoM	State	Created	Actions
B-IM-011	IM-PICKLED	85	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-012	IM-CR-STRIP	80	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-013	IM-ANNEALED	75	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-014	IM-ROLLED-BAR	190	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-015	IM-LIQUID	130	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-016	IM-SLAB	125	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-001	FG-HR-2MM	75	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-002	FG-CR-1MM	70	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-003	FG-REBAR-10	180	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-004	FG-HR-2MM	120	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-005	FG-REBAR-10	175	T	PRODUCED		<button>View</button> <button>Approve</button> <button>Reject</button> <button>Edit</button> <button>Delete</button>
B-FG-006	FG-CR-1MM	55	T	PRODUCED		<button>View</button> <button>Approve</button> <button>Reject</button> <button>Edit</button> <button>Delete</button>

Screen: Batch Detail

- Purpose:** Batch details with genealogy tree, approval actions, split/merge
- Business Logic:** Genealogy visualization (parent/child), approval workflow, quantity adjustment
- APIs Called:** GET /api/batches/{id} , GET /api/batches/{id}/genealogy , POST /api/batches/{id}/approve , POST /api/batches/{id}/reject
- Validation:** Approval requires QUALITY_PENDING status
- Role Access:** Authenticated
- Test Coverage:** - / 45 frontend / - E2E

Batch Number	Material ID	Quantity	UoM	State	Created	Actions
B-IM-001	IM-LIQUID	165	T	CONSUMED		<button>View</button>
B-IM-002	IM-SLAB	155	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-003	IM-LIQUID	90	T	CONSUMED		<button>View</button>
B-IM-004	IM-LIQUID	220	T	CONSUMED		<button>View</button>
B-IM-005	IM-BILLET	210	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-006	IM-LIQUID	85	T	CONSUMED		<button>View</button>
B-IM-007	IM-SLAB	82	T	CONSUMED		<button>View</button>
B-IM-008	IM-HR-ROUGH	78	T	CONSUMED		<button>View</button>
B-IM-009	IM-SLAB	30	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-010	IM-BILLET	195	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-011	IM-PICKLED	85	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-012	IM-CR-STRIP	80	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>

Screen: Batch Form (Split/Merge)

- Purpose:** Split batch into smaller units or merge multiple batches
- Business Logic:** Split quantity validation ($\text{sum} = \text{original}$), merge compatibility check
- APIs Called:** POST /api/batches/{id}/split , POST /api/batches/merge
- Validation:** Quantity invariant checks, material type compatibility
- Role Access:** Authenticated
- Test Coverage:** - / 11 frontend / 18 E2E

Batch Traceability						
Batch Number	Material ID	Quantity	UoM	State	Created	Actions
B-IM-012	IM-CR-STRIP	80	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-013	IM-ANNEALED	75	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-014	IM-ROLLED-BAR	190	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-015	IM-LIQUID	130	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-016	IM-SLAB	125	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-001	FG-HR-2MM	75	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-002	FG-CR-1MM	70	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-003	FG-REBAR-10	180	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-FG-004	FG-HR-2MM	120	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-RM-021	RM-SCRAP-A	280	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-IM-018	IM-BILLET	60	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>
B-WIP-006	WIP-ROLL	55	T	AVAILABLE		<button>View</button> <button>Edit</button> <button>Delete</button>

Module: Holds

Screen: Hold List

- Purpose:** Paginated list of active/released holds with entity type filter
- Business Logic:** Server-side pagination, entity type filtering (ORDER/OPERATION/BATCH/INVENTORY/EQUIPMENT)
- APIs Called:** GET /api/holds/paged
- Validation:** Entity type filter sanitization
- Role Access:** Authenticated
- Test Coverage:** 32 backend / 28 frontend / 5 E2E

MES Production		Dashboard	Orders	Manufacturing	Inventory	Quality	Manage	AU Admin User
Home > Holds								
<h2>Hold Management</h2>								
Status: <select>All Statuses</select> Entity Type: <select>All Types</select> Search: <input type="text" value="Search by reason or comments..."/>								
Entity Type	Entity	Reason	Status	Applied By	Applied On	Duration	Actions	
BATCH	B-IM-017	SPEC_DEVIATION	ACTIVE	OP-006	2/1/26, 9:00 AM	245h 35m	<button>Release</button>	
BATCH	B-IM-009	SAFETY_CONCERN	ACTIVE	OP-006	1/29/26, 11:00 AM	315h 35m	<button>Release</button>	
ORDER	ORD-2026-008 - Asian Electronics Inc	CUSTOMER_REQUEST	ACTIVE	admin	1/29/26, 8:00 AM	318h 35m	<button>Release</button>	
EQUIPMENT	PKL-001 - Pickling Line #1	SAFETY_CONCERN	ACTIVE	OP-008	1/28/26, 10:00 AM	340h 35m	<button>Release</button>	
OPERATION	Scrap Charging	MATERIAL_SHORTAGE	ACTIVE	OP-004	1/28/26, 8:00 AM	342h 35m	<button>Release</button>	
INVENTORY	IM-SLAB - Steel Slab (QC Pend)	QUALITY_INVESTIGATION	ACTIVE	OP-007	1/27/26, 2:00 PM	360h 35m	<button>Release</button>	
INVENTORY	RM-SCRAP-A - Steel Scrap (Blocked)	QUALITY_INVESTIGATION	ACTIVE	OP-006	1/26/26, 9:00 AM	389h 35m	<button>Release</button>	
BATCH	B-RM-010	QUALITY_INVESTIGATION	ACTIVE	OP-006	1/25/26, 10:00 AM	412h 35m	<button>Release</button>	
EQUIPMENT	EAF-003 - Electric Arc Furnace #3	SAFETY_CONCERN	RELEASED	OP-008	1/25/26, 8:00 AM	26h 0m	-	
OPERATION	Billet Reheating	EQUIP_BREAKDOWN	RELEASED	OP-008	1/24/26, 8:00 AM	32h 0m	-	
INVENTORY	RM-LIMESTONE - Limestone	CONTAMINATION	RELEASED	OP-006	1/22/26, 9:00 AM	26h 0m	-	
BATCH	B-RM-003	QUALITY_INVESTIGATION	RELEASED	OP-006	1/20/26, 10:00 AM	28h 0m	-	

Screen: Hold Detail

- Purpose:** Hold record details with release action
- Business Logic:** Display hold reason, entity info, release with notes
- APIs Called:** GET /api/holds/{id} , PUT /api/holds/{id}/release
- Validation:** Release requires ACTIVE status
- Role Access:** Authenticated
- Test Coverage:** - / 21 frontend / - E2E

Hold Management							
Actions		List of Holds					
Status:	All Statuses	Entity Type:	All Types	Search:	Search by reason or comments...		
Hold Details							
Entity Type	Entity	Reason	Status	Applied By	Applied On	Duration	Actions
BATCH	B-IM-017	SPEC_DEVIATION	ACTIVE	OP-006	2/1/26, 9:00 AM	245h 43m	<button>Release</button>
BATCH	B-IM-009	SAFETY_CONCERN	ACTIVE	OP-006	1/29/26, 11:00 AM	315h 43m	<button>Release</button>
ORDER	ORD-2026-008 - Asian Electronics Inc	CUSTOMER_REQUEST	ACTIVE	admin	1/29/26, 8:00 AM	318h 43m	<button>Release</button>
EQUIPMENT	PKL-001 - Pickling Line #1	SAFETY_CONCERN	ACTIVE	OP-008	1/28/26, 10:00 AM	340h 43m	<button>Release</button>
OPERATION	Scrap Charging	MATERIAL_SHORTAGE	ACTIVE	OP-004	1/28/26, 8:00 AM	342h 43m	<button>Release</button>
INVENTORY	IM-SLAB - Steel Slab (QC Pend)	QUALITY_INVESTIGATION	ACTIVE	OP-007	1/27/26, 2:00 PM	360h 43m	<button>Release</button>
INVENTORY	RM-SCRAP-A - Steel Scrap (Blocked)	QUALITY_INVESTIGATION	ACTIVE	OP-006	1/26/26, 9:00 AM	389h 43m	<button>Release</button>
BATCH	B-RM-010	QUALITY_INVESTIGATION	ACTIVE	OP-006	1/25/26, 10:00 AM	412h 43m	<button>Release</button>

Screen: Hold Form

- Purpose:** Apply new hold to an entity
- Business Logic:** Entity type/ID selection, reason selection from configured reasons
- APIs Called:** POST /api/holds , GET /api/config/hold-reasons
- Validation:** Entity type, entity ID, reason required
- Role Access:** Authenticated
- Test Coverage:** - / 9 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Holds > New

Apply Hold

Entity Type * Order

Entity ID * 1

Hold Reason * -- Select Reason --

Comments E2E test hold application

⚠ Applying a hold will block the selected entity from being used in production operations until released.

Cancel Apply Hold

The screenshot shows a modal dialog titled "Apply Hold". It contains several input fields: "Entity Type" set to "Order", "Entity ID" set to "1", and a dropdown for "Hold Reason" with the option "Select Reason". There is also a "Comments" text area containing the text "E2E test hold application". Below the form is a yellow warning box with the text "⚠ Applying a hold will block the selected entity from being used in production operations until released." At the bottom are two buttons: "Cancel" and a red "Apply Hold" button.

Module: Equipment

Screen: Equipment List

- Purpose:** Paginated equipment with status summary cards
- Business Logic:** Server-side pagination, status filtering (AVAILABLE/IN_USE/MAINTENANCE/ON_HOLD)
- APIs Called:** GET /api/equipment/paged
- Validation:** Status filter sanitization
- Role Access:** Authenticated
- Test Coverage:** 23 backend / 28 frontend / 9 E2E

Code	Name	Type	Category	Capacity	Location	Status	Actions
BAF-001	Batch Annealing Furnace #1	BATCH	-	60 T	Annealing Bay	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
BRM-001	Bar Rolling Mill #1	CONTINUOUS	-	40 T/hr	Bar Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
CCM-001	Continuous Caster #1	CONTINUOUS	-	50 T/hr	Casting Area	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
CCM-002	Continuous Caster #2	CONTINUOUS	-	45 T/hr	Casting Area	IN USE	<button>Edit</button> <button>Delete</button> <i>In use</i>
COAT-001	Galvanizing Line #1	CONTINUOUS	-	30 T/hr	Coating Bay	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
CRM-001	Cold Rolling Mill #1	CONTINUOUS	-	20 T/hr	Cold Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
EAF-001	Electric Arc Furnace #1	BATCH	-	120 T	Melting Shop	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
EAF-002	Electric Arc Furnace #2	BATCH	-	100 T	Melting Shop	IN USE	<button>Edit</button> <button>Delete</button> <i>In use</i>
EAF-003	Electric Arc Furnace #3	BATCH	-	80 T	Melting Shop	MAINTENANCE	<button>Edit</button> <button>End Maintenance</button> <button>Hold</button> <button>Delete</button>
HSM-001	Hot Strip Mill #1	CONTINUOUS	-	30 T/hr	Hot Rolling Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
HSM-002	Hot Strip Mill #2	CONTINUOUS	-	35 T/hr	Hot Rolling Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
LF-001	Ladle Furnace #1	BATCH	-	120 T	Melting Shop	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>

Screen: Equipment Detail

- Purpose:** Equipment details with maintenance/hold actions
- Business Logic:** Status transitions (start/end maintenance, hold/release)
- APIs Called:** GET /api/equipment/{id} , POST /api/equipment/{id}/maintenance/start , POST /api/equipment/{id}/maintenance/end
- Validation:** Status transition rules (server-side)
- Role Access:** Authenticated
- Test Coverage:** - / 19 frontend / - E2E

Code	Name	Type	Category	Capacity	Location	Status	Actions
BAF-001	Batch Annealing Furnace #1	BATCH	-	60 T	Annealing Bay	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
BRM-001	Bar Rolling Mill #1	CONTINUOUS	-	40 T/hr	Bar Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
CCM-001	Continuous Caster #1	CONTINUOUS	-	50 T/hr	Casting Area	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
CCM-002	Continuous Caster #2	CONTINUOUS	-	45 T/hr	Casting Area	IN USE	<button>Edit</button> <button>Delete</button> <i>In use</i>
COAT-001	Galvanizing Line #1	CONTINUOUS	-	30 T/hr	Coating Bay	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
CRM-001	Cold Rolling Mill #1	CONTINUOUS	-	20 T/hr	Cold Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
EAF-001	Electric Arc Furnace #1	BATCH	-	120 T	Melting Shop	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
EAF-002	Electric Arc Furnace #2	BATCH	-	100 T	Melting Shop	IN USE	<button>Edit</button> <button>Delete</button> <i>In use</i>
EAF-003	Electric Arc Furnace #3	BATCH	-	80 T	Melting Shop	MAINTENANCE	<button>Edit</button> <button>End Maintenance</button> <button>Hold</button> <button>Delete</button>
HSM-001	Hot Strip Mill #1	CONTINUOUS	-	30 T/hr	Hot Rolling Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
HSM-002	Hot Strip Mill #2	CONTINUOUS	-	35 T/hr	Hot Rolling Mill	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>
LF-001	Ladle Furnace #1	BATCH	-	120 T	Melting Shop	AVAILABLE	<button>Edit</button> <button>Maintenance</button> <button>Hold</button> <button>Delete</button>

Screen: Equipment Form (Create/Edit)

- Purpose:** Create or edit equipment records
- Business Logic:** Equipment code, name, type, location entry
- APIs Called:** POST /api/equipment , PUT /api/equipment/{id}
- Validation:** Code and name required, unique code
- Role Access:** Authenticated
- Test Coverage:** - / 12 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Equipment > New

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment**
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

- ...

Back to Dashboard

New Equipment

Equipment Information

Equipment Code *	Equipment Name *
e.g., EQ-001	Enter equipment name

Equipment Type *	Location
Select type...	e.g., Building A, Floor 2

Capacity

Capacity	Capacity Unit
e.g., 5000	e.g., KG, MT, PCS

Buttons: Cancel, Create Equipment

Module: Operations

Screen: Operation List

- Purpose:** Paginated operations with status/type filters
- Business Logic:** Server-side pagination, status/type filtering
- APIs Called:** GET /api/operations/paged
- Validation:** Filter sanitization
- Role Access:** Authenticated
- Test Coverage:** 29 backend / 24 frontend / 13 E2E

MES Production									
Operations		Manufacturing							
Dashboard		Orders		Manufacturing		Inventory		Quality	
AU	Admin User								
Status:	All Statuses	Type:	All Types	Search:	Search by name, code, order...				
Code	Name	Type	Order	Process	Seq	Target Qty	Confirmed Qty	Status	Actions
MELT-CHRG	Scrap Charging	FURNACE	12	Rebar Production	1	180	-	CONFIRMED	
PKL	Pickling	PICKLING	11	Cold Rolled Sheet Production	1	180	-	IN_PROGRESS	<button>Pause</button> <button>Block</button>
MELT-CHRG	Scrap Charging	FURNACE	8	Hot Rolled Coil Production	1	60	-	ON_HOLD	<button>Block</button>
MELT-CHRG	Scrap Charging	FURNACE	13	Hot Rolled Coil Production	1	120	-	CONFIRMED	
MELT-CHRG	Scrap Charging	FURNACE	10	Billet Production	1	400	-	BLOCKED	<button>Unblock</button>
MELT-CHRG	Scrap Charging	FURNACE	11	Hot Rolled Coil Production	1	80	-	CONFIRMED	
MELT-CHRG	Scrap Charging	FURNACE	5	Hot Rolled Coil Production	1	75	-	CONFIRMED	
MELT-CHRG	Scrap Charging	FURNACE	4	Rebar Production	1	80	-	NOT_STARTED	<button>Block</button>
MELT-CHRG	Scrap Charging	FURNACE	6	Rebar Production	1	300	-	READY	<button>Block</button>
PKL	Pickling	PICKLING	7	Cold Rolled Sheet Production	1	120	-	READY	<button>Block</button>
MELT-CHRG	Scrap Charging	FURNACE	3	Rebar Production	1	200	-	CONFIRMED	
MELT-CHRG	Scrap Charging	FURNACE	1	Hot Rolled Coil Production	1	150	-	CONFIRMED	

Screen: Operation Detail

- Purpose:** Operation details with status, linked order, process info
- Business Logic:** Display operation metadata, confirm/reject actions
- APIs Called:** GET /api/operations/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated
- Test Coverage:** - / 22 frontend / - E2E

MES Production																	
Dashboard		Orders		Manufacturing		Inventory		Quality									
Operations																	
Status: All Statuses Type: All Types Search: Search by name, code, order...																	
Code	Name	Type	Order	Process	Seq	Target Qty	Confirmed Qty	Status	Actions								
MELT-CHRG	Scrap Charging	FURNACE	12	Rebar Production	1	180	-	CONFIRMED									
PKL	Pickling	PICKLING	11	Cold Rolled Sheet Production	1	180	-	IN_PROGRESS	Pause Block								
MELT-CHRG	Scrap Charging	FURNACE	8	Hot Rolled Coil Production	1	60	-	ON_HOLD	Block								
MELT-CHRG	Scrap Charging	FURNACE	13	Hot Rolled Coil Production	1	120	-	CONFIRMED									
MELT-CHRG	Scrap Charging	FURNACE	10	Billet Production	1	400	-	BLOCKED	Unblock								
MELT-CHRG	Scrap Charging	FURNACE	11	Hot Rolled Coil Production	1	80	-	CONFIRMED									
MELT-CHRG	Scrap Charging	FURNACE	5	Hot Rolled Coil Production	1	75	-	CONFIRMED									
MELT-CHRG	Scrap Charging	FURNACE	4	Rebar Production	1	80	-	NOT_STARTED	Block								
MELT-CHRG	Scrap Charging	FURNACE	6	Rebar Production	1	300	-	READY	Block								
PKL	Pickling	PICKLING	7	Cold Rolled Sheet Production	1	120	-	READY	Block								
MELT-CHRG	Scrap Charging	FURNACE	3	Rebar Production	1	200	-	CONFIRMED									
MELT-CHRG	Scrap Charging	FURNACE	1	Hot Rolled Coil Production	1	150	-	CONFIRMED									

Module: Customers (Admin)

Screen: Customer List

- Purpose:** Paginated customer master data
- Business Logic:** Server-side pagination, search, ACTIVE/INACTIVE filter
- APIs Called:** GET /api/customers/paged
- Validation:** Search sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 15 backend / 14 frontend / 5 E2E

ADMINISTRATION

MASTER DATA

- Customers** (selected)
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

Customers

Status: Search:

Code	Name	Contact	Email	Phone	City	Status	Actions
CUST-001	ABC Steel Corporation	John Smith	john.smith@abcsteel.com	+1-555-0101	Pittsburgh	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-010	African Mining Corp	Kwame Mensah	kwame@afminecorp.com	+27-11-5551	Johannesburg	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-005	Asian Electronics Inc	Yuki Tanaka	y.tanaka@asianelec.jp	+81-3-55050	Tokyo	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-006	BuildRight Construction	Tom Bradley	tom.b@buildright.com	+1-555-0106	Chicago	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-012	Canadian Steel Works	Pierre Dubois	pierre@cansteelworks.ca	+1-514-5553	Montreal	INACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-004	European Auto Parts GmbH	Hans Mueller	h.mueller@euroauto.eu	+49-30-5504	Munich	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-002	Global Manufacturing Ltd	Sarah Johnson	sarah.j@globalmanuf.com	+1-555-0102	Detroit	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-008	Middle East Metals FZE	Ahmed Al-Rashid	ahmed@memetals.ae	+971-4-5508	Dubai	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-007	Nordic Steel Trading AB	Erik Lindqvist	erik@nordicsteel.se	+46-8-55070	Stockholm	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-011	Oceanic Metals Ltd	Bruce Wilson	bruce@oceanicmetals.au	+61-2-55520	Sydney	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-003	Pacific Metal Works	Michael Chen	m.chen@pacificmetal.com	+1-555-0103	Los Angeles	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
CUST-009	South American Steel SA	Carlos Rodriguez	carlos@sasteel.com	+54-11-5550	Buenos Aires	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

+ New Customer

Screen: Customer Detail

- Purpose:** Customer record details
- Business Logic:** Display customer info, edit/delete actions
- APIs Called:** GET /api/customers/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 14 frontend / - E2E

The screenshot shows the MES Production software interface. The top navigation bar includes links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. The Manage link is underlined, indicating the current section. Below the navigation is a breadcrumb trail: Home > Manage > Customers. On the left, there's a sidebar titled 'ADMINISTRATION' with sections for Master Data (Customers, Products, Materials), Production (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), and Configuration (Hold Reasons, Delay Reasons). A 'Back to Dashboard' button is at the bottom of the sidebar. The main content area is titled 'Customers' and features a search bar with dropdowns for 'Status' and 'Search by code, name, email...' and a 'New Customer' button. A table lists customer details: Code, Name, Contact, Email, Phone, City, Status, and Actions (Edit, Delete). The data in the table is as follows:

Code	Name	Contact	Email	Phone	City	Status	Actions
CUST-001	ABC Steel Corporation	John Smith	john.smith@abcsteel.com	+1-555-0101	Pittsburgh	ACTIVE	<button>Edit</button> <button>Delete</button>
CUST-010	African Mining Corp	Kwame Mensah	kwame@afminecorp.com	+27-11-5551	Johannesburg	ACTIVE	<button>Edit</button> <button>Delete</button>
CUST-005	Asian Electronics Inc	Yuki Tanaka	y.tanaka@asianelec.jp	+81-3-55050	Tokyo	ACTIVE	<button>Edit</button> <button>Delete</button>
CUST-006	BuildRight Construction	Tom Bradley	tom.b@buildright.com	+1-555-0106	Chicago	ACTIVE	<button>Edit</button> <button>Delete</button>
CUST-012	Canadian Steel Works	Pierre Dubois	pierre@cansteelworks.ca	+1-514-5553	Montreal	INACTIVE	<button>Edit</button> <button>Delete</button>
CUST-004	European Auto Parts GmbH	Hans Mueller	h.mueller@euroauto.eu	+49-30-5504	Munich	ACTIVE	<button>Edit</button> <button>Delete</button>
CUST-002	Global Manufacturing Ltd	Sarah Johnson	sarah.j@globalmanuf.com	+1-555-0102	Detroit	ACTIVE	<button>Edit</button> <button>Delete</button>

Screen: Customer Form (Create/Edit)

- Purpose:** Create or edit customer records
- Business Logic:** Customer code, name, contact, address entry
- APIs Called:** POST /api/customers , PUT /api/customers/{id}
- Validation:** Code and name required, unique code
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 13 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Customers > New

ADMINISTRATION

MASTER DATA

- Customers** (selected)
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

New Customer

Basic Information

Customer Code *	Customer Name *
e.g., CUST-001	Enter customer name

Contact Person

Primary contact name	Tax ID
----------------------	--------

Contact Information

Email	Phone
email@example.com	+1 234 567 8900

Address

Street address, building, etc.

City

City	Country

Buttons:

Cancel Create Customer

Module: Materials (Admin)

Screen: Material List

- Purpose:** Paginated material master data with type filter
- Business Logic:** Server-side pagination, type filtering (RM/IM/FG/WIP)
- APIs Called:** GET /api/materials/paged
- Validation:** Type filter sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 19 backend / 15 frontend / 5 E2E

Materials

Code	Name	Type	Unit	Description	Status	Actions
RM-AL-WIRE	Aluminum Wire	RAW MATERIAL	Kilogram (KG)	Aluminum deoxidizer wire 9.5...	ACTIVE	Edit Delete
IM-ANNEALED	Annealed CR Strip	INTERMEDIATE	T	Batch-annealed cold rolled st...	ACTIVE	Edit Delete
FG-CR-1MM	CR Sheet 1mm	FINISHED GOODS	T	Cold rolled sheet, 1mm thick...	ACTIVE	Edit Delete
RM-COAL	Coal / Coke	RAW MATERIAL	T	Met-grade coke for energy an...	ACTIVE	Edit Delete
IM-CR-STRIP	Cold Rolled Strip	INTERMEDIATE	T	Cold-reduced steel strip	ACTIVE	Edit Delete
RM-FEMN	Ferroalloy - FeMn	RAW MATERIAL	Kilogram (KG)	Ferromanganese 78% for stre...	ACTIVE	Edit Delete
RM-FESI	Ferroalloy - FeSi	RAW MATERIAL	Kilogram (KG)	Ferrosilicon 75% for deoxidat...	ACTIVE	Edit Delete
RM-FEV	Ferroalloy - FeV	RAW MATERIAL	Kilogram (KG)	Ferrovanadium 80% for high...	ACTIVE	Edit Delete
RM-GRAFITE	Graphite Electrodes	RAW MATERIAL	Each (EA)	UHP graphite electrodes 600...	ACTIVE	Edit Delete
FG-HR-2MM	HR Coil 2mm	FINISHED GOODS	T	Hot rolled coil, 2mm thickness	ACTIVE	Edit Delete
IM-HR-ROUGH	HR Coil Rough	INTERMEDIATE	T	Rough-rolled hot strip	ACTIVE	Edit Delete
RM-HCL	Hydrochloric Acid	RAW MATERIAL	Liter (L)	HCl 18% for pickling line	ACTIVE	Edit Delete

Screen: Material Detail

- Purpose:** Material record details
- Business Logic:** Display material info, type badge, UOM
- APIs Called:** GET /api/materials/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 14 frontend / - E2E

The screenshot shows the MES Production software interface. The top navigation bar includes links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. The Manage link is underlined, indicating it is the active section. Below the navigation is a breadcrumb trail: Home > Manage > Materials. On the left, there is a vertical sidebar titled "ADMINISTRATION" with sections for Master Data (Customers, Products, Materials), Production (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), and Configuration (Hold Reasons, Delay Reasons). A "Back to Dashboard" link is also present. The main content area is titled "Materials" and contains a search bar with dropdowns for Status and Type, and a "Search by code or name..." input field. A blue button labeled "+ New Material" is located in the top right corner of the search area. The main table lists various materials with columns for Code, Name, Type, Unit, Description, Status, and Actions (Edit, Delete).

Code	Name	Type	Unit	Description	Status	Actions
RM-AL-WIRE	Aluminum Wire	RAW MATERIAL	Kilogram (KG)	Aluminum deoxidizer wir...	ACTIVE	<button>Edit</button> <button>Delete</button>
IM-ANNEALED	Annealed CR Strip	INTERMEDIATE	T	Batch-annealed cold rolle...	ACTIVE	<button>Edit</button> <button>Delete</button>
FG-CR-1MM	CR Sheet 1mm	FINISHED GOODS	T	Cold rolled sheet, 1mm t...	ACTIVE	<button>Edit</button> <button>Delete</button>
RM-COAL	Coal / Coke	RAW MATERIAL	T	Met-grade coke for energ...	ACTIVE	<button>Edit</button> <button>Delete</button>
IM-CR-STRIP	Cold Rolled Strip	INTERMEDIATE	T	Cold-reduced steel strip	ACTIVE	<button>Edit</button> <button>Delete</button>
RM-FEMN	Ferroalloy - FeMn	RAW MATERIAL	Kilogram (KG)	Ferromanganese 78% for...	ACTIVE	<button>Edit</button> <button>Delete</button>
RM-FESI	Ferroalloy - FeSi	RAW MATERIAL	Kilogram (KG)	Ferrosilicon 75% for deox...	ACTIVE	<button>Edit</button> <button>Delete</button>
RM-FEV	Ferroalloy - FeV	RAW MATERIAL	Kilogram	Ferrovanadium 80% for hi	ACTIVE	<button>Edit</button> <button>Delete</button>

Screen: Material Form (Create/Edit)

- Purpose:** Create or edit material records
- Business Logic:** Material code, name, type (RM/IM/FG/WIP), UOM entry
- APIs Called:** POST /api/materials , PUT /api/materials/{id}
- Validation:** Code, name, type, UOM required; unique code
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 21 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Materials > New

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials**

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

- ...

Back to Dashboard

New Material

Material Information

Material Code * e.g., MAT-001

Material Name * Enter material name

Material Type * Raw Material

Unit of Measure * Select a unit...

Description
Optional description of the material

+ Extended Properties Optional

Create Material

The screenshot displays the 'New Material' creation interface. On the left, a vertical sidebar lists various administrative and production modules. The 'Materials' option under 'MASTER DATA' is currently selected. The main content area is titled 'New Material' and contains a form for entering material information. The form includes fields for 'Material Code' (with placeholder 'e.g., MAT-001'), 'Material Name' (placeholder 'Enter material name'), 'Material Type' (selected as 'Raw Material'), 'Unit of Measure' (placeholder 'Select a unit...'), and a 'Description' field (placeholder 'Optional description of the material'). Below the form is a section for 'Extended Properties' with an 'Optional' link. At the bottom right of the form are 'Cancel' and 'Create Material' buttons.

Module: Products (Admin)

Screen: Product List

- Purpose:** Paginated product master data with category filter
- Business Logic:** Server-side pagination, category filtering
- APIs Called:** GET /api/products/paged
- Validation:** Filter sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 15 backend / 12 frontend / 5 E2E

Products

SKU	Name	Unit	Description	Status	Actions
CR-SHEET-1MM	Cold Rolled Sheet 1mm	T	Cold rolled sheet, 1mm x 1250mm	ACTIVE	Edit Delete
CR-SHEET-2MM	Cold Rolled Sheet 2mm	T	Cold rolled sheet, 2mm x 1250mm	ACTIVE	Edit Delete
HR-COIL-2MM	Hot Rolled Coil 2mm	T	Hot rolled coil, 2mm x 1250mm width	ACTIVE	Edit Delete
HR-COIL-3MM	Hot Rolled Coil 3mm	T	Hot rolled coil, 3mm x 1500mm width	ACTIVE	Edit Delete
HR-COIL-4MM	Hot Rolled Coil 4mm	T	Hot rolled coil, 4mm x 1500mm width	ACTIVE	Edit Delete
REBAR-10MM	Reinforcement Bar 10mm	T	TMT rebar, 10mm, Fe500D grade	ACTIVE	Edit Delete
REBAR-12MM	Reinforcement Bar 12mm	T	TMT rebar, 12mm, Fe500D grade	ACTIVE	Edit Delete
STEEL-BILLET-100	Steel Billet 100mm	T	Steel billet 100x100mm square	ACTIVE	Edit Delete

Showing 1 - 8 of 8

Items per page: 20

Screen: Product Detail

- Purpose:** Product record details
- Business Logic:** Display product info, SKU, category
- APIs Called:** GET /api/products/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 10 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

Home > Manage > Products

ADMINISTRATION

- MASTER DATA
 - Customers**
 - Products**
 - Materials
- PRODUCTION
 - Processes
 - Routing
 - Operation Templates
 - Equipment
 - Operators
 - Bill of Materials
- CONFIGURATION
 - Hold Reasons
 - Delay Reasons

[Back to Dashboard](#)

Products

+ New Product

SKU	Name	Unit	Description	Status	Actions
CR-SHEET-1MM	Cold Rolled Sheet 1mm	T	Cold rolled sheet, 1mm x 1250mm	ACTIVE	Edit Delete
CR-SHEET-2MM	Cold Rolled Sheet 2mm	T	Cold rolled sheet, 2mm x 1250mm	ACTIVE	Edit Delete
HR-COIL-2MM	Hot Rolled Coil 2mm	T	Hot rolled coil, 2mm x 1250mm width	ACTIVE	Edit Delete
HR-COIL-3MM	Hot Rolled Coil 3mm	T	Hot rolled coil, 3mm x 1500mm width	ACTIVE	Edit Delete
HR-COIL-4MM	Hot Rolled Coil 4mm	T	Hot rolled coil, 4mm x 1500mm width	ACTIVE	Edit Delete
REBAR-10MM	Reinforcement Bar 10mm	T	TMT rebar, 10mm, Fe500D grade	ACTIVE	Edit Delete
REBAR-12MM	Reinforcement Bar 12mm	T	TMT rebar, 12mm, Fe500D grade	ACTIVE	Edit Delete
STEEL-BILLET-100	Steel Billet 100mm	T	Steel billet 100x100mm square	ACTIVE	Edit Delete

Screen: Product Form (Create/Edit)

- Purpose:** Create or edit product records
- Business Logic:** Product SKU, name, category entry
- APIs Called:** POST /api/products , PUT /api/products/{id}
- Validation:** SKU and name required, unique SKU
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 25 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Products > New

ADMINISTRATION

MASTER DATA

- Customers
- Products**
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

- ...

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New Product

Product Information

Product SKU * e.g., SKU-001, PROD-A1

Product Name * Enter product name

Unit of Measure *

Select a unit...

Description

Optional description of the product

+ Extended Properties Optional

Cancel Create Product

Module: BOM (Admin)

Screen: BOM Product List

- Purpose:** List products that have BOM definitions
- Business Logic:** Product list with BOM tree links, version info
- APIs Called:** GET /api/bom/products
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 29 backend / 36 frontend / 11 E2E

Bill of Materials

+ New BOM

Product	Version	Total Nodes	Max Level	Action
CR-SHEET-1MM	V1	14	6	View Tree + Add Node
CR-SHEET-2MM	V1	11	6	View Tree + Add Node
HR-COIL-2MM	V1	14	5	View Tree + Add Node
HR-COIL-3MM	V1	11	5	View Tree + Add Node
HR-COIL-4MM	V1	10	5	View Tree + Add Node
REBAR-10MM	V1	10	5	View Tree + Add Node
REBAR-12MM	V1	10	5	View Tree + Add Node
STEEL-BILLET-100	V1	8	3	View Tree + Add Node

Screen: BOM Tree View

- Purpose:** Hierarchical tree visualization of BOM structure
- Business Logic:** Expandable tree nodes, material quantities, yield percentages
- APIs Called:** GET /api/bom/{sku}/tree , GET /api/bom/{sku}/tree/version/{v}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 46 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Bill of Materials > CR SHEET 1MM

ADMINISTRATION

- MASTER DATA
 - Customers
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- PRODUCTION
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- CONFIGURATION
 - Hold Reasons
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 - Batch Number
 - Batch Size
 - Quantity Types
- SYSTEM

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BOM Tree: CR-SHEET-1MM

Version: V1 | Nodes: 14 | Depth: 6 | Status: ACTIVE

[Edit BOM Settings](#) [Expand All](#) [Collapse All](#) [+ Add Node](#)

BOM Flow

The BOM Flow diagram illustrates the material flow from raw materials to the final product. The flow starts with RM-SCRAP-A and RM-IRON-ORE at the top, which feed into IM-HR-ROUGH. IM-HR-ROUGH then splits into IM-PICKLED and IM-CR-STRIP. IM-PICKLED leads to IM-ANNEALED, which finally results in FG-CR-1MM. Other materials shown include RM-COATING, RM-ROLL-LUB, RM-HCL, RM-ESI, RM-LIMESTONE, RM-COAL, RM-AL-WIRE, and RM-IRON-ORE.

Node	Description	Quantity	Yield	Level	Status	Actions
FG-CR-1MM	Finished CR Sheet 1mm	1 T	(Yield: 0.97)	L1	ACTIVE	+ Child Move Edit Delete
IM-ANNEALED	Annealed CR Strip	1.03 T	(Yield: 0.97)	L2	ACTIVE	+ Child Move Edit Delete
RM-COATING	Surface Coating Oil	0.015 L		L2	ACTIVE	+ Child Move Edit Delete

Screen: BOM Node Form (Create/Edit)

- Purpose:** Create or edit individual BOM nodes
- Business Logic:** Material selection, quantity, yield factor, parent assignment
- APIs Called:** POST /api/bom/node , PUT /api/bom/node/{id}
- Validation:** Material, quantity, yield required; circular reference check
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 39 frontend - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Bill of Materials > CR SHEET 1MM

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators

Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

Add BOM Node

Product: CR-SHEET-1MM

Material Information

Select Material
- Select from Master Data -
Or enter manually below

Material ID * e.g., RM-IRON-001

Material Name * e.g., Iron Ore

Quantity & Unit

Quantity Required * 1

Unit * KG

Yield Loss Ratio 1
1.0 = no loss, 1.05 = 5% extra needed

Hierarchy & Version

Sequence Level * 1
1 = Root level, 2+ = Sub-levels

BOM Version V1

Cancel Create Node

Product: CR-SHEET-1MM

Module: Operators (Admin)

Screen: Operator List

- Purpose:** Paginated operator master data
- Business Logic:** Server-side pagination, status filter
- APIs Called:** GET /api/operators/paged
- Validation:** Search sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 11 backend / 13 frontend / 10 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Operators

Operators

+ New Operator

Code	Name	Department	Shift	Status	Actions
OP-001	John Smith	Melting	Day	ACTIVE	Edit Delete
OP-002	Mike Wilson	Melting	Night	ACTIVE	Edit Delete
OP-003	Sarah Brown	Casting	Day	ACTIVE	Edit Delete
OP-004	David Lee	Hot Rolling	Day	ACTIVE	Edit Delete
OP-005	Emily Chen	Cold Rolling	Day	ACTIVE	Edit Delete
OP-006	Robert Garcia	Quality	Day	ACTIVE	Edit Delete
OP-007	Jennifer Martinez	Quality	Night	ACTIVE	Edit Delete
OP-008	William Johnson	Maintenance	Day	ACTIVE	Edit Delete
OP-009	David Park	Finishing	Day	ACTIVE	Edit Delete
OP-010	Maria Santos	Coating	Night	ACTIVE	Edit Delete
OP-011	Ahmed Hassan	Melting	Night	ACTIVE	Edit Delete
OP-012	Lisa Chen	Quality	Day	INACTIVE	Edit Delete

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

Screen: Operator Detail

- Purpose:** Operator record details
- Business Logic:** Display operator info, department, hire date
- APIs Called:** GET /api/operators/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 14 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

Home > Manage > Operators

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators**

BILL OF MATERIALS

CONFIGURATION

- Hold Reasons
- Delay Reasons

Back to Dashboard

Operators

+ New Operator

Status: Search:

Code	Name	Department	Shift	Status	Actions
OP-001	John Smith	Melting	Day	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-002	Mike Wilson	Melting	Night	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-003	Sarah Brown	Casting	Day	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-004	David Lee	Hot Rolling	Day	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-005	Emily Chen	Cold Rolling	Day	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-006	Robert Garcia	Quality	Day	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-007	Jennifer Martinez	Quality	Night	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
OP-008	William Johnson	Maintenance	Day	ACTIVE	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Screen: Operator Form (Create/Edit)

- Purpose:** Create or edit operator records
- Business Logic:** Operator code, name, department entry
- APIs Called:** POST /api/operators , PUT /api/operators/{id}
- Validation:** Code and name required, unique code
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 18 frontend / - E2E

The screenshot shows the MES Production application interface. The top navigation bar includes links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. A user profile 'AU Admin User' is visible on the right. The main content area has a left sidebar titled 'ADMINISTRATION' with sections for MASTER DATA (Customers, Products, Materials), PRODUCTION (Processes, Routing, Operation Templates, Equipment, Operators - highlighted in blue), and CONFIGURATION (Hold Reasons, Delay Reasons, Process Parameters, Batch Number, Batch Size, Quantity Types). The breadcrumb navigation shows the path: Home > Manage > Operators > New. The central panel is titled 'New Operator' and contains a 'Operator Information' form. It includes fields for 'Operator Code *' (e.g., OP-001) and 'Name *' (Enter operator name). Below these are fields for 'Department' (e.g., Production, Quality) and 'Shift' (e.g., Morning, Night, A-Shift). At the bottom right of the form are 'Cancel' and 'Create Operator' buttons.

Module: Processes (Admin)

Screen: Process List

- Purpose:** Paginated process definitions
- Business Logic:** Server-side pagination, status filter
- APIs Called:** GET /api/processes/paged
- Validation:** Status filter sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 27 backend / 21 frontend / 26 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Dashboard

Production Dashboard

Last updated: Feb 11, 2026, 2:38:41 PM

Inventory Flow

```
graph LR; RM[Raw Materials 18 available] --> WIP[Work in Progress 6 available]; WIP --> IM[Intermediates 8 available]; IM --> FG[Finished Goods 5 available]
```

Operations Status

1 Partially_confirmed	15 Not_started	7 Ready	1 In_progress	33 Confirmed	1 On_hold	2 Blocked
-----------------------	----------------	---------	---------------	--------------	-----------	-----------

Needs Attention

```
graph LR; AH[8 Active Holds] --> BPA[1 Batches Pending Approval]; BPA --> BI[2 Blocked Inventory]
```

Currently Running

PICKLING In Progress
Pickling

Key Metrics

Orders 15	9 in progress	Today's Production 0	Inventory Items 56	Active Batches 46
-----------	---------------	----------------------	--------------------	-------------------

Screen: Process Detail

- Purpose:** Process definition details with linked routings
- Business Logic:** Display process info, linked routing list
- APIs Called:** GET /api/processes/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 22 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? ▾

Orders > Order #1

ORD-2026-001

ABC Steel Corporation

IN PROGRESS Edit Order

Order Summary

Order Date	Jan 10, 2026
Line Items	2
Total Operations	8
Progress	5/8

1 ready to start

63%

5 Completed 0 In Progress 1 Ready 2 Pending

Process Flow Visualization



Screen: Process Form (Create/Edit)

- Purpose:** Create or edit process definitions
- Business Logic:** Process name, description entry
- APIs Called:** POST /api/processes , PUT /api/processes/{id}
- Validation:** Name required
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 24 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Processes > New

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes**
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

- ...

← Back to Dashboard

New Process

Process Information

Process Name *

Status

DRAFT

Cancel Create Process

Screen: Quality Pending

- Purpose:** Queue of batches pending quality approval
- Business Logic:** List QUALITY_PENDING batches for approval/rejection
- APIs Called:** GET /api/batches/pending-approval
- Validation:** N/A (read-only)
- Role Access:** Authenticated
- Test Coverage:** - / 3 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Dashboard

Production Dashboard

Last updated: Feb 11, 2026, 2:35:57 PM

Inventory Flow

```
graph LR; RM[Raw Materials 18 available] --> WIP[Work in Progress 6 available]; WIP --> IM[Intermediates 8 available]; IM --> FG[Finished Goods 5 available]
```

Operations Status

Category	Status	Count
Partially confirmed	1	1
Not started	15	15
Ready	7	7
In progress	1	1
Confirmed	33	33
On hold	1	1
Blocked	2	2

Needs Attention

```
graph LR; AH[8 Active Holds] --> BPA[1 Batches Pending Approval]; BPA --> BI[2 Blocked Inventory]
```

Currently Running

Process	Status	Count
PICKLING	In Progress	1
# Pickling		1

Key Metrics

Metric	Value
Orders	15
9 in progress	
Today's Production	0
Inventory Items	56
Active Batches	46

Module: Routing (Admin)

Screen: Routing List

- Purpose:** Paginated routing definitions
- Business Logic:** Server-side pagination, status filter (ACTIVE/INACTIVE/ON_HOLD)
- APIs Called:** GET /api/routing/paged
- Validation:** Status filter sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 35 backend / 40 frontend / 14 E2E

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing**
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

ROUTING MANAGEMENT

Status: All Statuses Type: All Types Search: Search by name or process... Clear + New Routing

ID	ROUTING NAME	PROCESS	TYPE	STATUS	STEPS	CREATED	ACTIONS
4	Billet Standard Route	Billet Production	Sequential	ACTIVE	4		
2	CR Sheet Standard Route	Cold Rolled Sheet Production	Sequential	ACTIVE	3		
1	HR Coil Standard Route	Hot Rolled Coil Production	Sequential	ACTIVE	8		
3	Rebar Standard Route	Rebar Production	Sequential	ACTIVE	7		

Showing 1 - 4 of 4 Items per page: 20

Screen: Routing Detail

- Purpose:** Routing details with ordered steps
- Business Logic:** Display routing info, step sequence, activation controls
- APIs Called:** GET /api/routing/{id} , GET /api/routing/{id}/steps
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 25 frontend / - E2E

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing**
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons

[Back to Dashboard](#)

Routing Management

[+ New Routing](#)

ID	ROUTING NAME	PROCESS	TYPE	STATUS	STEPS	CREATED	ACTIONS
4	Billet Standard Route	Billet Production	Sequential	ACTIVE	4		
2	CR Sheet Standard Route	Cold Rolled Sheet Production	Sequential	ACTIVE	3		
1	HR Coil Standard Route	Hot Rolled Coil Production	Sequential	ACTIVE	8		
3	Rebar Standard Route	Rebar Production	Sequential	ACTIVE	7		

Showing 1 - 4 of 4

Items per page: 20

Screen: Routing Form (Create/Edit)

- Purpose:** Create or edit routing with step management
- Business Logic:** Routing name, process link, step CRUD, reordering
- APIs Called:** POST /api/routing , PUT /api/routing/{id} , POST /api/routing/{id}/steps , POST /api/routing/{id}/reorder
- Validation:** Name required, process required, step sequence validation
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 53 frontend / 22 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

AU Admin User

Home > Manage > Routing > New

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing**
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

Create Routing

Routing Details

Routing Name *
Enter routing name

Process *
Select a process

Routing Type *
Sequential

Routing Steps

+ Add Step

No steps defined. Add steps to define the operation sequence.

Cancel Create Routing

Module: Operation Templates (Admin)

Screen: Operation Template List

- Purpose:** Paginated reusable operation blueprints
- Business Logic:** Server-side list, search
- APIs Called:** GET /api/operation-templates
- Validation:** Search sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 12 backend / 4 frontend / 19 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage

Home > Manage > Operation Templates

Operation Templates

+ New Template

Code	Name	Operation Type	Quantity Type	Est. Duration	Status	Actions
BAR-ROLL	Bar Rolling	ROLLING	Continuous	60 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
ANN	Batch Annealing	HEAT TREATMENT	Batch	480 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
CAST-BILL	Billet Casting	CASTER	Continuous	180 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
BAR-RHT	Billet Reheating	FURNACE	Batch	90 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
CRM	Cold Rolling	ROLLING	Continuous	120 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
ROLL-COOL	Cooling & Coiling	COOLING	Continuous	30 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
MELT-EAF	EAF Melting	FURNACE	Batch	180 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
ROLL-FIN	Finish Rolling	ROLLING	Continuous	45 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
GALV	Galvanizing	COATING	Continuous	120 min	INACTIVE	<button>Activate</button> <button>Edit</button> <button>Delete</button>
MELT-LF	Ladle Refining	FURNACE	Batch	90 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
PACK	Packaging	FINISHING	Discrete	45 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>
PKL	Pickling	PICKLING	Continuous	90 min	ACTIVE	<button>Deactivate</button> <button>Edit</button> <button>Delete</button>

Back to Dashboard

Screen: Operation Template Detail

- Purpose:** Template details with usage info
- Business Logic:** Display template info, linked routing steps
- APIs Called:** GET /api/operation-templates/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 19 frontend / - E2E

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates**
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

Operation Templates

Status: Operation Type: Search:

Code	Name	Operation Type	Quantity Type	Est. Duration	Status	Actions
MELT-EAF	EAF Melting	FURNACE	Batch	180 min	ACTIVE	<input type="button" value="Deactivate"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/>
MELT-LF	Ladle Refining	FURNACE	Batch	90 min	ACTIVE	<input type="button" value="Deactivate"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/>
MELT-CHRG	Scrap Charging	FURNACE	Batch	60 min	ACTIVE	<input type="button" value="Deactivate"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/>

Showing 1 - 3 of 3

Items per page:

Module: Configuration (Admin)

Screen: Hold Reasons Config

- Purpose:** Configure hold reasons available for hold apply
- Business Logic:** CRUD for hold reason codes/descriptions
- APIs Called:** GET /api/config/hold-reasons/paged , POST /api/config/hold-reasons , PUT /api/config/hold-reasons/{id}
- Validation:** Code and description required, unique code
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 40 frontend / 34 E2E (shared config tests)

The screenshot shows the MES Production software interface. The top navigation bar includes links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. A user icon for 'Admin User' is also present. The left sidebar, titled 'ADMINISTRATION', contains sections for Master Data (Customers, Products, Materials), Production (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), Configuration (Hold Reasons, Delay Reasons, Process Parameters, Batch Number, Batch Size, Quantity Types), and System. The 'Hold Reasons' section is currently selected. The main content area is titled 'Hold Reasons' and displays a table of reasons. The table columns are: Code, Description, Applicable To, Status, and Actions. The 'Applicable To' column uses color-coded buttons to indicate applicable entities: BATCH, INVENTORY, ORDER, ORDER_LINE, OPERATION, EQUIPMENT, and EQUIPMENT. The 'Status' column shows 'ACTIVE' for all rows. The 'Actions' column provides 'Edit' and 'Delete' buttons for each row. The table lists ten hold reasons:

Code	Description	Applicable To	Status	Actions
CONTAMINATION	Contamination Suspected	BATCH INVENTORY	ACTIVE	Edit Delete
CUSTOMER_REQUEST	Customer Request	ORDER ORDER_LINE	ACTIVE	Edit Delete
EQUIP_BREAKDOWN	Equipment Breakdown	OPERATION EQUIPMENT	ACTIVE	Edit Delete
MATERIAL_SHORTAGE	Material Shortage	OPERATION ORDER_LINE	ACTIVE	Edit Delete
OPERATOR_UNAVAIL	Operator Unavailability	OPERATION	ACTIVE	Edit Delete
OTHER	Other	OPERATION ORDER_LINE BATCH INVENTORY EQUIPMENT	ACTIVE	Edit Delete
QUALITY_INVESTIGATION	Quality Investigation	OPERATION BATCH INVENTORY	ACTIVE	Edit Delete
REGULATORY_HOLD	Regulatory Hold	BATCH INVENTORY	ACTIVE	Edit Delete
SAFETY_CONCERN	Safety Concern	OPERATION BATCH EQUIPMENT	ACTIVE	Edit Delete
SPEC_DEVIATION	Specification Deviation	BATCH INVENTORY	ACTIVE	Edit Delete

Below the table, a message says 'Showing 1 - 10 of 10'. At the bottom right, there are buttons for navigating through the pages and a dropdown for 'Items per page' set to 20.

Screen: Delay Reasons Config

- Purpose:** Configure delay reasons for production confirmations
- Business Logic:** CRUD for delay reason codes/descriptions
- APIs Called:** GET /api/config/delay-reasons/paged , POST /api/config/delay-reasons , PUT /api/config/delay-reasons/{id}
- Validation:** Code and description required, unique code
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 32 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Configuration > Delay Reasons

Delay Reasons

+ New Delay Reason

Code	Description	Status	Actions
CALIBRATION	Equipment Calibration	ACTIVE	Edit Delete
EQUIP_BREAKDOWN	Equipment Breakdown	ACTIVE	Edit Delete
MAINTENANCE	Scheduled Maintenance	ACTIVE	Edit Delete
MATERIAL_SHORTAGE	Material Shortage	ACTIVE	Edit Delete
OPERATOR_UNAVAIL	Operator Unavailable	ACTIVE	Edit Delete
OTHER	Other	ACTIVE	Edit Delete
POWER_OUTAGE	Power Outage	ACTIVE	Edit Delete
QUALITY_ISSUE	Quality Issue	ACTIVE	Edit Delete
SCHEDULING	Scheduling Conflict	ACTIVE	Edit Delete
TOOL_CHANGE	Tool/Die Change	ACTIVE	Edit Delete

Showing 1 - 10 of 10

Items per page: 20

Back to Dashboard

Screen: Process Parameters Config

- Purpose:** Configure process parameter min/max/default values per process
- Business Logic:** Parameter name, type, range, required flag
- APIs Called:** GET /api/config/process-parameters/paged , POST /api/config/process-parameters , PUT /api/config/process-parameters/{id}
- Validation:** Name, type required; max \geq min
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 29 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Configuration > Process Params

Process Parameters Config

+ New Process Parameter

Operation Type	Product SKU	Parameter Name	Type	Unit	Min	Max	Required	Status	Actions
CASTER	REBAR-10MM	Billet Size	DECIMAL	mm	100	150	Yes	ACTIVE	Edit Delete
CASTER	REBAR-10MM	Casting Speed	DECIMAL	m/min	2	5	Yes	ACTIVE	Edit Delete
CASTER	CR-SHEET-1MM	Casting Speed	DECIMAL	m/min	0.8	2	Yes	ACTIVE	Edit Delete
CASTER	CR-SHEET-1MM	Mold Temperature	DECIMAL	°C	200	380	Yes	ACTIVE	Edit Delete
CASTER	HR-COIL-2MM	Slab Width	DECIMAL	mm	1000	1600	Yes	ACTIVE	Edit Delete
CASTER	HR-COIL-2MM	Mold Temperature	DECIMAL	°C	200	400	Yes	ACTIVE	Edit Delete
CASTER	HR-COIL-2MM	Casting Speed	DECIMAL	m/min	0.8	2.5	Yes	ACTIVE	Edit Delete
COOLING	REBAR-10MM	Tempering Temperature	DECIMAL	°C	400	650	Yes	ACTIVE	Edit Delete
COOLING	REBAR-10MM	Quench Temperature	DECIMAL	°C	200	500	Yes	ACTIVE	Edit Delete
FURNACE	REBAR-10MM	Temperature	DECIMAL	°C	1550	1800	Yes	ACTIVE	Edit Delete
FURNACE	CR-SHEET-1MM	Temperature	DECIMAL	°C	1500	1750	Yes	ACTIVE	Edit Delete
FURNACE	CR-SHEET-1MM	Holding Time	DECIMAL	min	30	150	Yes	ACTIVE	Edit Delete

Back to Dashboard

Screen: Batch Number Config

- Purpose:** Configure batch number generation patterns
- Business Logic:** Prefix, date format, sequence, separator, reset options per operation type
- APIs Called:** GET /api/batch-number-config/paged , POST /api/batch-number-config , PUT /api/batch-number-config/{id}
- Validation:** Prefix required, format validation
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 43 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Configuration > Batch Number

Batch Number Config

+ New Batch Number Config

Name	Operation Type	Product	Prefix	Date Format	Sequence	Reset	Priority	Status	Preview	Actions
Casting Billet	CASTING	STEEL-BILLET-100	BLT	yyyyMMdd	3	DAILY	5	ACTIVE	<button>Preview</button>	<button>Edit</button> <button>Delete</button>
Rebar 10mm	-	REBAR-10MM	RB10	yyyyMMdd	4	DAILY	5	ACTIVE	<button>Preview</button>	<button>Edit</button> <button>Delete</button>
Rebar 12mm	-	REBAR-12MM	RB12	yyyyMMdd	4	DAILY	5	ACTIVE	<button>Preview</button>	<button>Edit</button> <button>Delete</button>
HR Coil 2mm	-	HR-COIL-2MM	HRC2	yyyyMMdd	4	DAILY	5	ACTIVE	<button>Preview</button>	<button>Edit</button> <button>Delete</button>
CR Sheet 1mm	-	CR-SHEET-1MM	CRS1	yyyyMMdd	4	DAILY	5	ACTIVE	<button>Preview</button>	<button>Edit</button> <button>Delete</button>
Melting	MELTING	-	MELT	yyyyMMdd	3	DAILY	10	ACTIVE	<button>Preview</button>	

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

Back to Dashboard

Screen: Quantity Type Config

- Purpose:** Configure quantity types and decimal precision
- Business Logic:** Type code, fractional allowance, decimal places
- APIs Called:** GET /api/config/quantity-type/paged , POST /api/config/quantity-type , PUT /api/config/quantity-type/{id}
- Validation:** Code required, decimal places ≥ 0
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 36 frontend / - E2E

The screenshot shows the MES Production software interface. The top navigation bar includes links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. A user icon for 'Admin User' is also present. The main content area is titled 'Quantity Type Config'. On the left, a sidebar titled 'ADMINISTRATION' contains sections for MASTER DATA (Customers, Products, Materials), PRODUCTION (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), and CONFIGURATION (Hold Reasons, Delay Reasons, Process Parameters, Batch Number, Batch Size, Quantity Types). The 'Quantity Types' section is currently selected. A search bar at the top right allows filtering by status and searching for names or materials. Below the search bar, a message states 'No quantity type configs found.' A blue button labeled 'Create First Quantity Type Config' is visible. At the bottom left of the sidebar, there is a link to 'Back to Dashboard'.

Screen: Batch Size Config

- **Purpose:** Configure min/max/standard batch sizes per operation type
- **Business Logic:** Operation type, size constraints, unit
- **APIs Called:** GET /api/batch-size-config/paged, POST /api/batch-size-config, PUT /api/batch-size-config/{id}
- **Validation:** Min <= standard <= max, unit required
- **Role Access:** Authenticated (Admin layout)
- **Test Coverage:** - / 39 frontend / - E2E

The screenshot shows the MES Production software interface. At the top, there is a navigation bar with links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. The Manage link is underlined, indicating it is the active section. On the far right of the top bar, there is a user profile icon labeled "AU Admin User".

The main content area has a left sidebar titled "ADMINISTRATION" containing several sections: "MASTER DATA" (Customers, Products, Materials), "PRODUCTION" (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), "CONFIGURATION" (Hold Reasons, Delay Reasons, Process Parameters, Batch Number, **Batch Size**, Quantity Types), and "SYSTEM". Below the sidebar, the breadcrumb navigation shows: Home > Manage > Configuration > Batch Size.

The main title "Batch Size Configuration" is displayed prominently at the top of the main content area. Below it is a search bar with dropdowns for "Status" (set to "All") and "Search" (with placeholder "Search..."). A button labeled "+ New Configuration" is located in the top right corner of this header area.

The central content area displays a message: "No configurations found".

Module: Reports

Screen: Reports Landing

- **Purpose:** Navigation hub for all report types
- **Business Logic:** Card links to each report type
- **APIs Called:** N/A
- **Validation:** N/A
- **Role Access:** Authenticated
- **Test Coverage:** - / 4 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? ▾

Reports

Reports & Analytics

Production Summary
Total produced, scrap, yield %, avg cycle time
Yield: **0.0%**

Quality & Scrap
Scrap analysis by product and operation type
Total Scrap: **0**

Inventory Balance
Inventory by type (RM/WIP/FG) and state
Items: **0**

Order Fulfillment
Completion rate, in-progress, overdue orders
Completion: **20%**

Operations & Holds
Cycle times, hold analysis by entity type
Active Holds: **8**

Executive Dashboard
One-screen overview of all KPIs

Screen: Executive Dashboard

- Purpose:** High-level analytics with charts and KPIs
- Business Logic:** Aggregated metrics, trend charts, status breakdowns
- APIs Called:** GET /api/analytics/executive-dashboard
- Validation:** Date range filter
- Role Access:** Authenticated
- Test Coverage:** - / 13 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? Back to Reports

Executive Dashboard

Comprehensive overview of production, orders, inventory, and holds

Production Performance

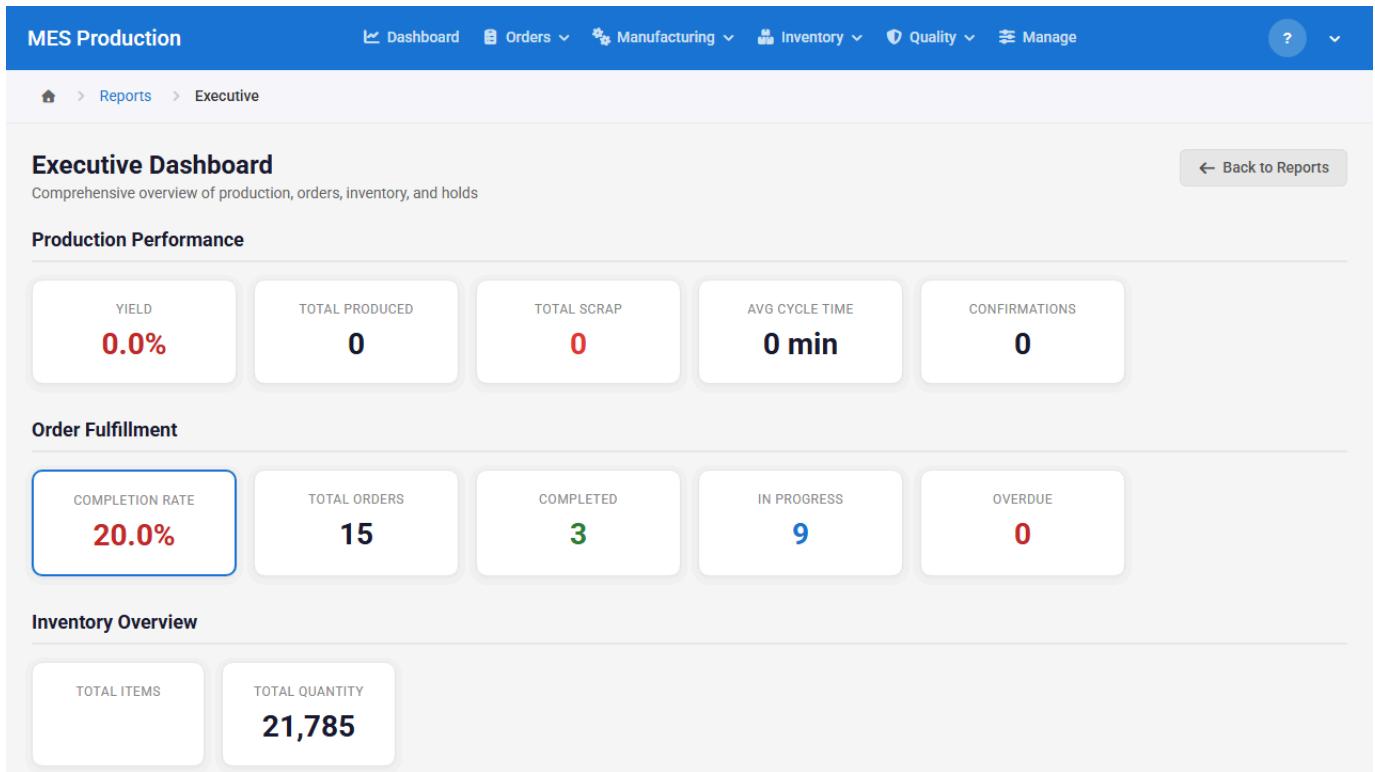
YIELD 0.0%	TOTAL PRODUCED 0	TOTAL SCRAP 0	Avg CYCLE TIME 0 min	CONFIRMATIONS 0
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Order Fulfillment

COMPLETION RATE 20.0%	TOTAL ORDERS 15	COMPLETED 3	IN PROGRESS 9	OVERDUE 0
---------------------------------	---------------------------	-----------------------	-------------------------	---------------------

Inventory Overview

TOTAL ITEMS	TOTAL QUANTITY 21,785
-------------	---------------------------------



Screen: Production Summary Report

- Purpose:** Production output metrics and trends
- Business Logic:** Production volume, scrap rates, efficiency metrics
- APIs Called:** GET /api/reports/production-summary
- Validation:** Date range filter
- Role Access:** Authenticated
- Test Coverage:** - / 8 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? ▾

Home > Reports > Production

Production Summary

What was produced, where, and how efficiently?

From: 12-01-2026 To: 11-02-2026

TOTAL PRODUCED: 0 TOTAL SCRAP: 0 YIELD %: 0.0% AVG CYCLE TIME: 0 min CONFIRMATIONS: 0

The dashboard features a top navigation bar with links to Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. Below this is a breadcrumb trail: Home > Reports > Production. The main section is titled 'Production Summary' with the subtitle 'What was produced, where, and how efficiently?'. It includes a date range filter from '12-01-2026' to '11-02-2026'. Below the filter are five summary cards: 'TOTAL PRODUCED' (0), 'TOTAL SCRAP' (0), 'YIELD %' (0.0%), 'AVG CYCLE TIME' (0 min), and 'CONFIRMATIONS' (0). A large, light-gray rectangular area below these cards likely represents a chart or a placeholder for data visualization.

Screen: Scrap Analysis Report

- **Purpose:** Scrap/waste analysis by operation and material
- **Business Logic:** Scrap rates, top scrap reasons, material waste
- **APIs Called:** GET /api/analytics/scrap-analysis
- **Validation:** Date range filter
- **Role Access:** Authenticated
- **Test Coverage:** - / 7 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? ▾

Home > Reports > Scrap

Scrap Analysis

Where is scrap occurring and what are the trends?

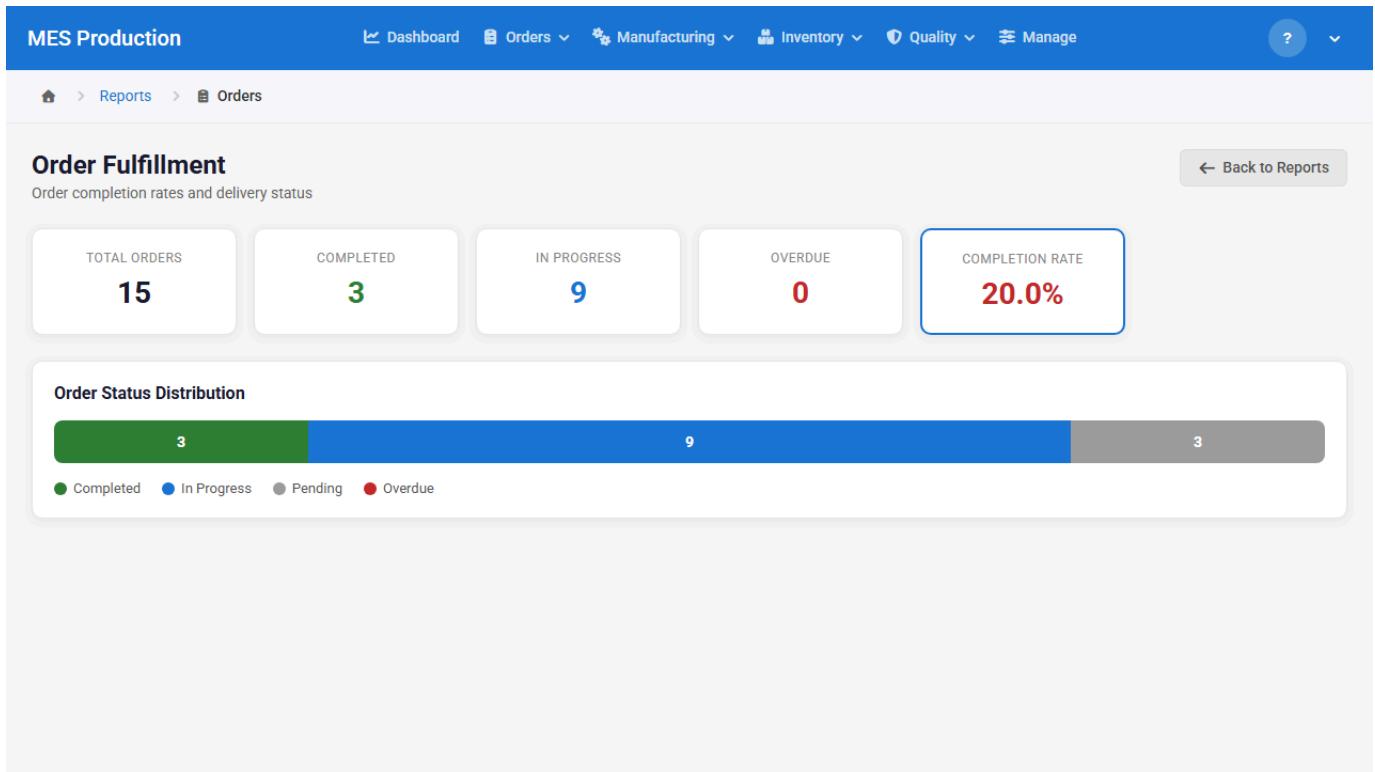
From: 12-01-2026 To: 11-02-2026

TOTAL SCRAP: 0 PRODUCTS Affected: 0 OPERATIONS Affected: 0

No scrap data found for the selected date range.

Screen: Order Fulfillment Report

- **Purpose:** Order completion tracking and delivery metrics
- **Business Logic:** Fulfillment rates, on-time delivery, backlog
- **APIs Called:** GET /api/reports/order-fulfillment
- **Validation:** Date range filter
- **Role Access:** Authenticated
- **Test Coverage:** - / 6 frontend / - E2E



Screen: Inventory Balance Report

- **Purpose:** Inventory stock levels by material type and state
- **Business Logic:** Stock summaries, aging, state distribution
- **APIs Called:** GET /api/reports/inventory-balance
- **Validation:** Type filter
- **Role Access:** Authenticated
- **Test Coverage:** - / 11 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? ▾

Home > Reports > Inventory

Inventory Balance

Current inventory levels by type and state

← Back to Reports

TOTAL ITEMS	TOTAL QUANTITY	MATERIAL TYPES	ACTIVE STATES
21,785	4	7	

By Inventory Type

Type	Item Count	Total Quantity
RM Raw Material	23	18,305
IM Intermediate	19	2,210
FG Finished Goods	8	850
WIP Work in Progress	6	420

By Inventory State

State	Item Count	Total Quantity
AVAILABLE	37	19,820
CONSUMED	5	635
PRODUCED	5	565
RESERVED	2	300
ON_HOLD	4	295
BLOCKED	2	145
SCRAPPED	1	25

Screen: Operations Report

- Purpose:** Operation cycle times and efficiency analysis
- Business Logic:** Average cycle times, bottleneck identification
- APIs Called:** GET /api/analytics/operations
- Validation:** Date range filter
- Role Access:** Authenticated
- Test Coverage:** - / 7 frontend / 24 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage ? ▾

Reports Operations

Operations & Holds

Cycle times and hold analysis by entity type

From: 12-01-2026 To: 11-02-2026

No cycle time data for the selected date range.

ACTIVE HOLDS 8 RELEASED HOLDS 4

Entity Type	Active	Released	Total
BATCH	3	1	4
INVENTORY	2	1	3

Reason	Count
QUALITY_INVESTIGATION	4
SAFETY_CONCERN	3

Module: Users (Admin)

Screen: User List

- Purpose:** Paginated user management
- Business Logic:** Server-side pagination, role filter
- APIs Called:** GET /api/users/paged
- Validation:** Role filter sanitization
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** 19 backend / 13 frontend / 14 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Users

User Management

+ Add User

Status: All Search: Search by name or email...

ID	Name	Email	Employee ID	Status	Created	Actions
1	Admin User	admin@mes.com	EMP-001	ACTIVE		<button>View</button> <button>Edit</button> <button>Deactivate</button>

Showing 1 - 1 of 1

Items per page: 20

ADMINISTRATION

MASTER DATA

- Customers
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

- ...

← Back to Dashboard

Screen: User Detail

- Purpose:** User account details
- Business Logic:** Display user info, role, last login
- APIs Called:** GET /api/users/{id}
- Validation:** N/A (read-only)
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 13 frontend / - E2E

The screenshot shows the MES Production software interface. The top navigation bar includes links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. The Manage link is underlined, indicating the current section. Below the navigation is a breadcrumb trail: Home > Manage > Users > User #1. On the left, a dark sidebar titled 'ADMINISTRATION' contains sections for Master Data (Customers, Products, Materials), Production (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), and Configuration (Hold Reasons, Delay Reasons). A 'Back to Dashboard' button is at the bottom of the sidebar. The main content area is titled 'User Details' for 'User #1'. It shows the user is an 'Admin User' and is 'ACTIVE'. The 'ACCOUNT INFORMATION' section includes fields for User ID (1), Email (admin@mes.com), and Employee ID (EMP-001). The 'TIMESTAMPS' section shows Created On, Updated On, and Last Login (Never). There are 'Edit' and 'Deactivate' buttons at the top right of the details panel.

Screen: User Form (Create/Edit)

- Purpose:** Create or edit user accounts
- Business Logic:** Username, email, role, password management
- APIs Called:** POST /api/users , PUT /api/users/{id}
- Validation:** Username, email required; email format; unique email
- Role Access:** Authenticated (Admin layout)
- Test Coverage:** - / 13 frontend / - E2E

The screenshot shows the MES Production software interface. At the top, there is a blue header bar with the title "MES Production" and navigation links for "Dashboard", "Orders", "Manufacturing", "Inventory", "Quality", and "Manage". On the far right, it shows a user profile "AU Admin User". Below the header, the main content area has a left sidebar titled "ADMINISTRATION" with sections for "MASTER DATA" (Customers, Products, Materials), "PRODUCTION" (Processes, Routing, Operation Templates, Equipment, Operators, Bill of Materials), "CONFIGURATION" (Hold Reasons, Delay Reasons, Process Parameters, Batch Number, Batch Size, Quantity Types), and "SYSTEM" (Back to Dashboard). The main content area is titled "Create User" and contains two sections: "Account Information" (Email * [user@example.com], Password * [Minimum 6 characters]), and "Profile Information" (Name * [Full name], Employee ID [e.g., EMP001]). At the bottom right of the form are "Cancel" and "Create User" buttons.

Module: Audit Trail (Admin)

Screen: Audit List

- **Purpose:** Paginated audit trail with entity/action/date filters
- **Business Logic:** Server-side pagination, entity type filter, action filter, date range, user filter
- **APIs Called:** GET /api/audit/paged , GET /api/audit/entity-types , GET /api/audit/action-types
- **Validation:** Date range, entity type, action type filters
- **Role Access:** Authenticated (Admin layout)
- **Test Coverage:** 17 backend / 25 frontend / 29 E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Audit Trail

Audit Trail

5 changes today

Action	Entity	ID	Field	Change	User	Timestamp
STATUS_CHANGE	BATCH	43	status	QUALITY_PENDING → AVAILABLE	admin@mes.com	11/02/2026, 12:14:01
STATUS_CHANGE	BATCH	34	status	PRODUCED → AVAILABLE	admin@mes.com	11/02/2026, 11:37:35
STATUS_CHANGE	BATCH	33	status	PRODUCED → AVAILABLE	admin@mes.com	11/02/2026, 11:18:30
STATUS_CHANGE	BATCH	30	status	PRODUCED → AVAILABLE	admin@mes.com	11/02/2026, 10:50:28
STATUS_CHANGE	BATCH	27	status	QUALITY_PENDING → AVAILABLE	admin@mes.com	11/02/2026, 10:06:53
CREATE	PRODUCTION CONFIRMATION	35	-	Created confirmation for pickling 90T	OP-005	08/02/2026, 09:00:00
PRODUCE	PRODUCTION CONFIRMATION	35	-	Confirmed: Order 11 Pickling 90T	OP-005	08/02/2026, 09:00:00
UPDATE	ORDER	11	-	Updated expected completion date	admin	08/02/2026, 08:00:00
STATUS_CHANGE	EQUIPMENT	8	-	HSM-001 status check - operational	OP-008	08/02/2026, 07:00:00
CONSUME	INVENTORY	22	-	Consumed 85T pickled strip for cold rolling	OP-005	08/02/2026, 06:30:00
CREATE	WORK	-	-	-	-	08/02/2026,

Back to Dashboard

Module: Profile

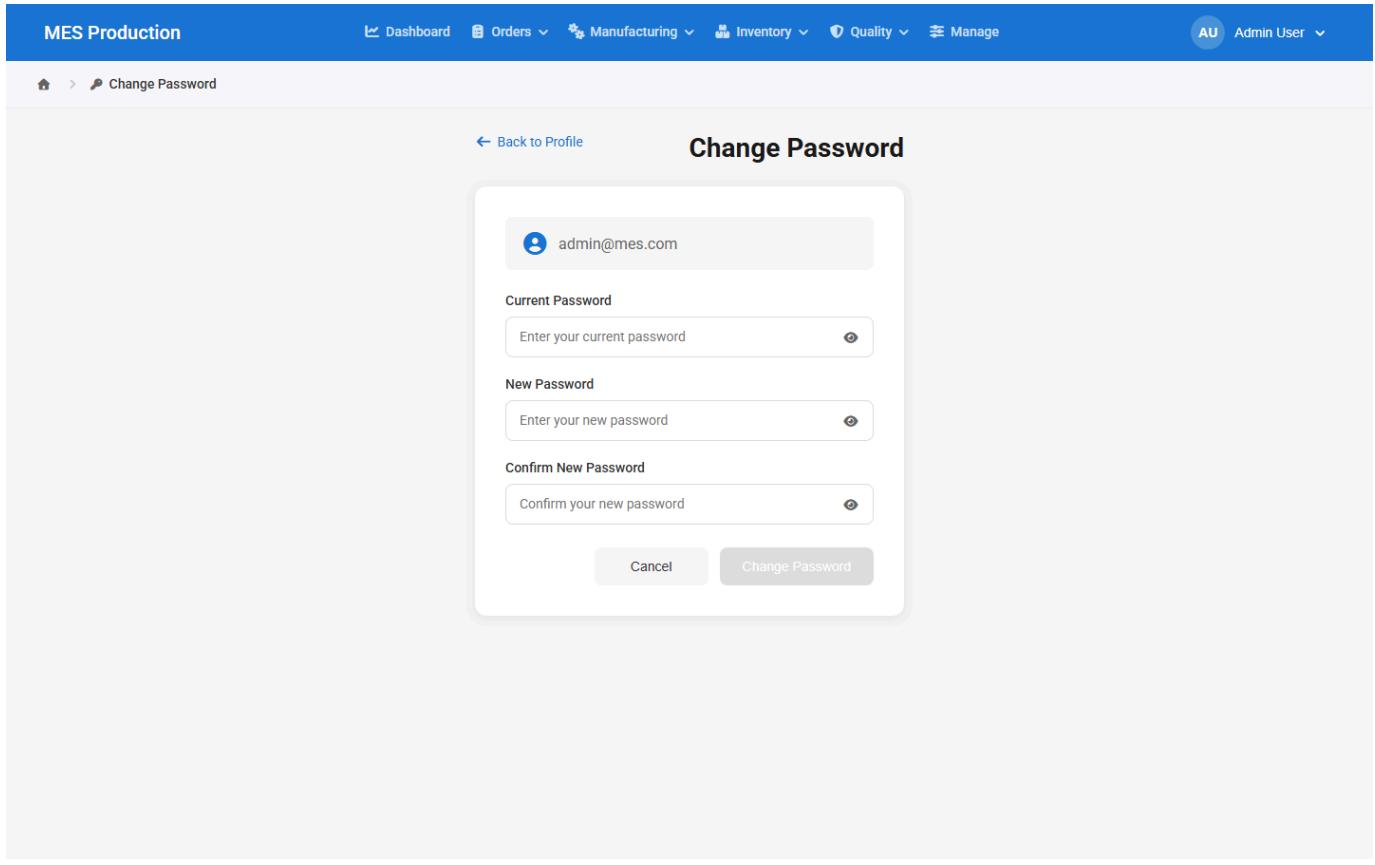
Screen: User Profile

- Purpose:** Display current user profile information
- Business Logic:** Show user details, role, account info
- APIs Called:** GET /api/auth/me
- Validation:** N/A (read-only)
- Role Access:** Authenticated
- Test Coverage:** - / 9 frontend / - E2E

The screenshot shows the 'My Profile' page of the MES Production application. At the top, there's a blue header bar with the title 'MES Production' and navigation links for Dashboard, Orders, Manufacturing, Inventory, Quality, and Manage. On the right of the header is a user profile icon labeled 'AU Admin User'. Below the header, the main content area has a light gray background. At the top left of this area, there's a breadcrumb trail: a house icon followed by a right arrow, then a person icon followed by the text 'Profile'. The main title 'My Profile' is centered at the top of the content area. Below the title is a large blue rounded rectangle containing a circular profile picture with the letters 'AU' in white, and the text 'Admin User' below it, with a small 'USER' badge underneath. To the left of this blue box, there are three data fields: 'EMAIL' with the value 'admin@mes.com', 'FULL NAME' with the value 'Admin User', and 'ROLE' with the value 'User'. At the bottom right of the content area is a blue button with a key icon and the text 'Change Password'.

Screen: Change Password

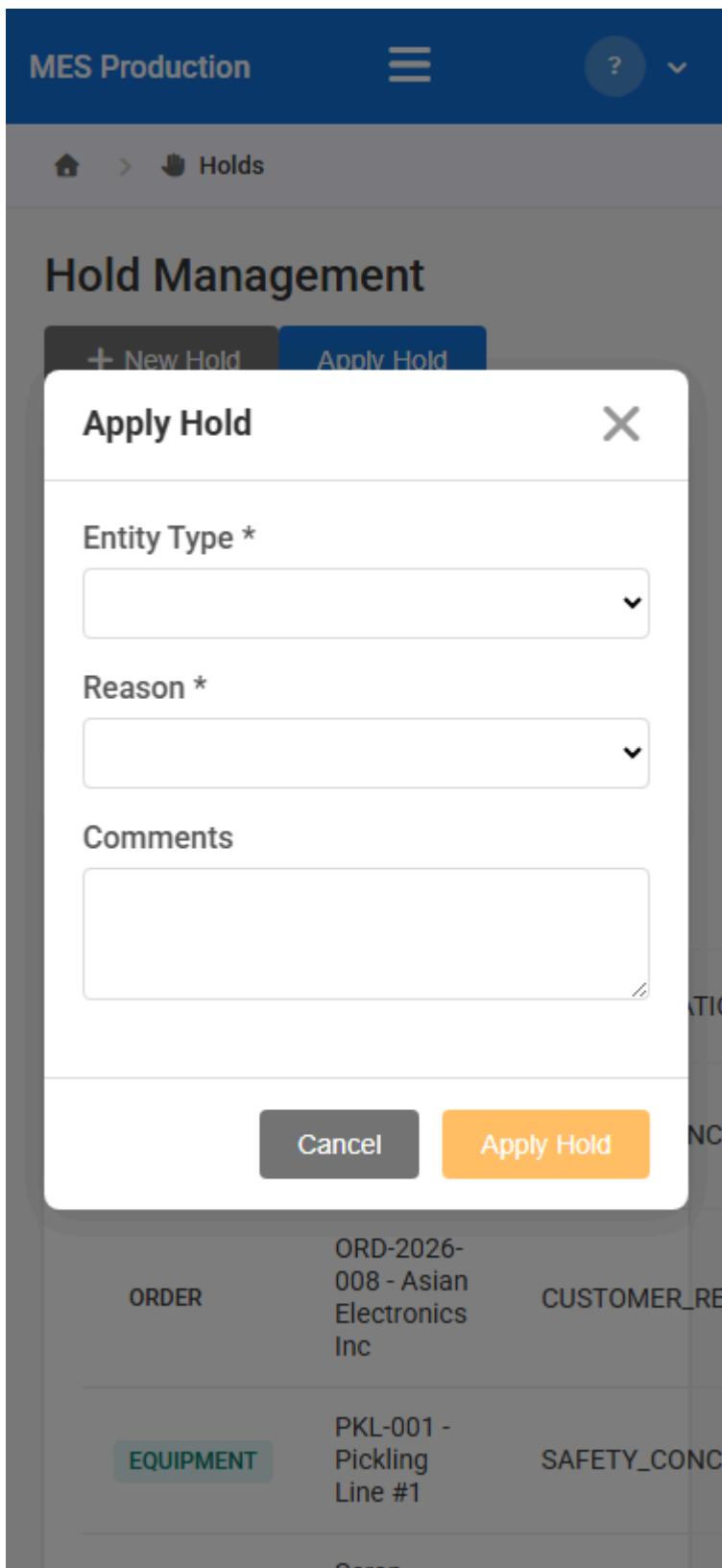
- **Purpose:** Change current user password
- **Business Logic:** Current password verification, new password entry, confirmation
- **APIs Called:** POST /api/users/change-password
- **Validation:** Current password required, new password required, confirmation match
- **Role Access:** Authenticated
- **Test Coverage:** - / 21 frontend / 7 E2E



Shared Components

Component: Material Selection Modal

- **Purpose:** Reusable material/batch picker for production confirmation
- **Business Logic:** Search by batch number/material, type filter, bulk selection, quantity validation
- **APIs Called:** GET /api/batches/available
- **Validation:** Quantity <= available, min = 0
- **Role Access:** Authenticated (used within production confirm)
- **Test Coverage:** - / 21 frontend / 1 E2E



Component: Apply Hold Modal

- Purpose:** Quick hold application from any entity context
- Business Logic:** Load hold reasons, entity info display, reason selection, auto-close on success
- APIs Called:** POST /api/holds , GET /api/config/hold-reasons
- Validation:** Reason required
- Role Access:** Authenticated

- **Test Coverage:** - / 23 frontend / 1 E2E

The screenshot shows a web-based application interface for 'MES Production'. At the top, there's a navigation bar with links for Dashboard, Orders, Manufacturing, Inventory, Quality (which is currently selected), and Manage. On the far right, there's a user profile icon labeled 'AU Admin User'. Below the navigation, a breadcrumb trail indicates the current location: Home > Holds > New. The main content area is titled 'Apply Hold'. It contains four input fields: 'Entity Type *' (dropdown menu with 'Select Entity Type'), 'Entity ID *' (text input field with placeholder 'Enter entity ID'), 'Hold Reason *' (dropdown menu with 'Select Reason'), and 'Comments' (text area with placeholder 'Optional comments...'). Below these fields is a yellow warning box containing the text: '⚠ Applying a hold will block the selected entity from being used in production operations until released.' At the bottom of the dialog are two buttons: 'Cancel' (gray) and 'Apply Hold' (red).

Component: Pagination

- **Purpose:** Reusable pagination controls for all list pages
- **Business Logic:** Page navigation, page size selector (10/20/50/100), total count display
- **APIs Called:** N/A (emits events to parent)
- **Validation:** Page bounds checking
- **Role Access:** N/A (shared component)
- **Test Coverage:** Included in parent component tests

Order Number	Customer	Product	Quantity	Status	Order Date	Actions
ORD-2026-015	Nordic Steel Trading AB	Steel Billet 100mm	250	BLOCKED	Feb 5, 2026	<button>View</button> <button>Edit</button>
ORD-2026-014	Pacific Metal Works	Cold Rolled Sheet 1mm	90	CANCELLED	Feb 4, 2026	<button>View</button> <button>Edit</button>
ORD-2026-013	Global Manufacturing Ltd	Hot Rolled Coil 4mm	180	COMPLETED	Feb 3, 2026	<button>View</button> <button>Edit</button>
ORD-2026-012	ABC Steel Corporation	Reinforcement Bar 12mm	180	COMPLETED	Feb 2, 2026	<button>View</button> <button>Edit</button>
ORD-2026-011	Oceanic Metals Ltd	Cold Rolled Sheet 2mm	260	IN PROGRESS	Feb 1, 2026	<button>View</button> <button>Edit</button>
ORD-2026-010	African Mining Corp	Steel Billet 100mm	600	CREATED	Jan 31, 2026	<button>View</button> <button>Edit</button>
ORD-2026-009	South American Steel SA	Hot Rolled Coil 3mm	350	CREATED	Jan 30, 2026	<button>View</button> <button>Edit</button>
ORD-2026-008	Asian Electronics Inc	Hot Rolled Coil 2mm	60	ON HOLD	Jan 28, 2026	<button>View</button> <button>Edit</button>
ORD-2026-007	Middle East Metals FZE	Cold Rolled Sheet 1mm	120	CREATED	Jan 25, 2026	<button>View</button> <button>Edit</button>
ORD-2026-006	Nordic Steel Trading AB	Reinforcement Bar 10mm	450	CREATED	Jan 22, 2026	<button>View</button> <button>Edit</button>
ORD-2026-005	European Auto Parts GmbH	Hot Rolled Coil 2mm	75	COMPLETED	Jan 20, 2026	<button>View</button> <button>Edit</button>
ORD-2026-004	Pacific Metal Works	Hot Rolled Coil 2mm	230	CREATED	Jan 18, 2026	<button>View</button> <button>Edit</button>

Component: Header

- Purpose:** Application header with navigation and user menu
- Business Logic:** Route links, mobile menu toggle, user dropdown (profile, logout)
- APIs Called:** N/A
- Validation:** N/A
- Role Access:** Authenticated
- Test Coverage:** - / 8 frontend / - E2E

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Dashboard

Production Dashboard

Last updated: Feb 11, 2026, 2:34:55 PM

Inventory Flow

```
graph LR; RM[Raw Materials 18 available] --> WIP[Work in Progress 6 available]; WIP --> IM[Intermediates 8 available]; IM --> FG[Finished Goods 5 available]
```

Operations Status

Category	Status	Count
Partially confirmed	1	1
Not started	15	15
Ready	7	7
In progress	1	1
Confirmed	33	33
On hold	1	1
Blocked	2	2

Needs Attention

```
graph LR; AH[8 Active Holds] --> BPA[1 Batches Pending Approval]; BPA --> BI[2 Blocked Inventory]
```

Currently Running

PICKLING In Progress
Pickling

Key Metrics

Metric	Value
Orders	15
Today's Production	0
Inventory Items	56
Active Batches	46

Component: Admin Layout

- Purpose:** Admin section layout with sidebar navigation
- Business Logic:** Sidebar menu items, breadcrumbs, content area
- APIs Called:** N/A
- Validation:** N/A
- Role Access:** Authenticated (Admin routes)
- Test Coverage:** - / - frontend / 11 E2E (sidebar tests)

MES Production

Dashboard Orders Manufacturing Inventory Quality Manage AU Admin User

Home > Manage > Customers

ADMINISTRATION

MASTER DATA

- Customers**
- Products
- Materials

PRODUCTION

- Processes
- Routing
- Operation Templates
- Equipment
- Operators
- Bill of Materials

CONFIGURATION

- Hold Reasons
- Delay Reasons
- Process Parameters
- Batch Number
- Batch Size
- Quantity Types

SYSTEM

- ...

[Back to Dashboard](#)

Customers

+ New Customer

Status:	Code	Name	Contact	Email	Phone	City	Status	Actions
ACTIVE	CUST-001	ABC Steel Corporation	John Smith	john.smith@abcsteel.com	+1-555-0101	Pittsburgh	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-010	African Mining Corp	Kwame Mensah	kwame@afminecorp.com	+27-11-5551	Johannesburg	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-005	Asian Electronics Inc	Yuki Tanaka	y.tanaka@asianelec.jp	+81-3-55050	Tokyo	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-006	BuildRight Construction	Tom Bradley	tom.b@buildright.com	+1-555-0106	Chicago	ACTIVE	<button>Edit</button> <button>Delete</button>
INACTIVE	CUST-012	Canadian Steel Works	Pierre Dubois	pierre@cansteelworks.ca	+1-514-5553	Montreal	INACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-004	European Auto Parts GmbH	Hans Mueller	h.mueller@euroauto.eu	+49-30-5504	Munich	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-002	Global Manufacturing Ltd	Sarah Johnson	sarah.j@globalmanuf.com	+1-555-0102	Detroit	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-008	Middle East Metals FZE	Ahmed Al-Rashid	ahmed@memetals.ae	+971-4-5508	Dubai	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-007	Nordic Steel Trading AB	Erik Lindqvist	erik@nordicsteel.se	+46-8-55070	Stockholm	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-011	Oceanic Metals Ltd	Bruce Wilson	bruce@oceanicmetals.au	+61-2-55520	Sydney	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-003	Pacific Metal Works	Michael Chen	m.chen@pacificmetal.com	+1-555-0103	Los Angeles	ACTIVE	<button>Edit</button> <button>Delete</button>
ACTIVE	CUST-009	South American Steel SA	Carlos Rodriguez	carlos@sasteel.com	+54-11-5550	Buenos Aires	ACTIVE	<button>Edit</button> <button>Delete</button>