Material Database: Application Walkthrough

This document provides a detailed, page-by-page verification of the Material Database application, explaining the core functions and workflows.

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1. Executive Dashboard (`/`)

The entry point for all users, providing a high-level status of the database.

 Dashboard

Key Functions

- **Database Stats**: Real-time counters for active Materials, Layups, and Test Runs (Top Cards).
- **System Integrity**: Visual indicator of data consistency (green checkmark).
- **Recent Activity**: Chronological log of the last 5 changes made by any user.
- **Quick Actions**: Shortcuts to create new items (if authorized).

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2. Material Management (`/materials`)

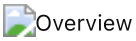
The central repository for raw material data.

2.1 Material List

 Material List

- **Search & Filter**: Filter by Manufacturer, Type (Prepreg, Resin, etc.), or Status.
- **Status Indicators**: Color-coded badges (Draft = Gray, Standard = Green, Obsolete = Red).
- **Navigation**: Click "View" on any row to access the detailed engineering data.
- **Protection**: Delete buttons are strictly removed from this view to prevent accidental data loss.

2.2 Material Detail View

 Overview

Core Functions

1. **Header Actions**:
   - **Edit**: Unlock fields for modification.
   - **Delete**: Opens a protected confirmation dialog (unavailable if material is in use).
2. **Tabs System**:
   - **Overview**: General metadata (Manufacturer, Type).
   - **Properties**: Engineering values.
   - **Variants**: Sub-types (e.g., thickness variations).
   - **Measurements**: Linked lab reports.

Properties Tab


Properties

- **Aggregated Data**: Shows the statistical summary (Mean, Min, Max) of all linked measurements.
- **Grouping**: Properties are grouped by category (Mechanical, Physical, Thermal).

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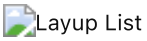
3. Layup Management (`/layups`)

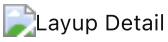
Tool for defining composite stackups.

3.1 Layup List


Layup List

- Displays all defined stackups with their **Total Thickness** and **Weight** estimates.

3.2 Layup Detail (Stack Builder)


Layup Detail

Functions

- **Stack Editor**: Visual representation of the ply stack.
- **Real-time Calculation**: Automatically updates `Theoretical Thickness` as layers are added/removed.
- **Process Definition**: Link a manufacturing process (e.g., Autoclave Cycle) to the layup.

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4. Assembly Management (`/assemblies`)

Manage hierarchical parts containing multiple materials or layups.


Assembly List

- **BOM View**: Tracks which Raw Materials and Layups flow into a final Assembly.

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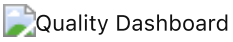
5. Quality & Analysis (`/quality`)

The analytical engine for verifying material performance.


Quality Dashboard

Key Features

1. **Comparison Tool**: Select multiple materials (checkboxes) to compare properties side-by-side.
2. **Substitution Analysis**: Find materials that meet specific property criteria (e.g., `Tg > 120°C`).
3. **Measurement Entry**: Interface for technicians to input raw lab data.

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6. System Configuration (`/settings`)

Restricted area for database administration.

 Settings

Functions

- **Access Control**: Manage user roles and permissions.
- **Master Lists**: Configure drop-down options for Manufacturers, Material Types, and Test Methods.
- **Laboratory Management**: Authorize internal/external labs for specific test methods.