Da Vinci Smart Manufacturing

BRD S03.02 System Config Furnace Configuration

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1. Furnace Configuration

1.1. Introduction

The Furnace Configuration Module is designed to allow super admins to manage and configure furnace details in the system. The module provides functionality to view, add, edit, and deactivate furnaces. It also enables users to configure furnace-specific parameters, such as electrode details, refining steps, and more. The module is essential for maintaining accurate furnace data and ensuring proper alignment with plant configurations.

2. Objectives

The primary objective is to develop a user-friendly module that offers the following functionalities:

- **View and Manage Furnaces:** Users can view a list of furnaces with details like Furnace Number, Shop Number, Power Delivery, Electrode Type, and Status (Active/Inactive). Super Admins can add, edit, activate, deactivate, and manage furnace details.
- **Furnace Details View:** Users can view detailed information about furnaces, including Basic Information, Electrodes, Parameters, and Refining Steps in a non-editable format.
  Electrodes and Parameters tabs also provide a log download feature.
- **Add Furnace:** Allows users to add a new furnace with four tabs: Basic Information, Electrodes, Parameters, and Refining Steps. Each tab becomes enabled sequentially after saving the previous tab's data.
- **Edit Furnace:** Users can edit existing furnace details including tap holes, products, electrodes, parameters, and refining steps. Editing maintains the integrity of effective dates and logs for changes.
- **Deactivate Furnace:** Super Admins can deactivate furnaces, changing their status from "Active" to "Inactive."

3. View Furnace List

The Furnace List screen provides users with a comprehensive view of all furnaces in the system. It includes key details and functionalities for each furnace entry, along with options to manage furnaces. Below is a detailed breakdown of this feature:

3.1. Header Section

The header must always be visible and contains the following:

- **Title**: "Furnace Configuration"
- **Stats Section:** Total count of Active | Inactive
- **Search Bar**: Tooltip text: Search by Furnace ID
- **Filters** -
  - Status -
    - Multiselect Dropdown:
    - Values: Active / Inactive
  - Electrode Type -
    - Multiselect Dropdown:
    - All Electrode types
  - Workshop -
    - Multiselect Dropdown:
    - All workshops configured in Plant
  - Clear Filter - This will clear all the applied filters
  - All Filter drop downs should be sorted alphabetically / numerically
  - Filter options will not reset unless the user navigates to a different menu or module. This means any filters applied will persist as long as the user remains within the same menu option, ensuring continuity until a module change occurs.

- **Action Buttons in Header:**
  - **Add Furnace:** Button to create a new Furnace.

3.2. Furnace List

The furnace list is presented in a tabular format, displaying relevant furnace details for quick reference and action.

Table Default Sorting : Latest modified first

The data table will have the following columns:

- Furnace ID:
  - User Input unique identifier
  - Sorting: Yes
  - Frozen - Yes
  - Hyperlink - Yes
- Workshop:
  - The workshop associated with the furmace
  - Sorting: Yes
  - Frozen: No
- Power Delivery:
  - The type of Power delivery associated with the furnace
  - Sorting: Yes
  - Frozen - No
- Electrode Type:
  - Electrode type associated with the furnace
  - Sorting: Yes
  - Frozen - No
- Cost Center:
  - Cost center associated with the furnace
  - Sorting: Yes
  - Frozen – No
- Created At:
  - Date record was created
  - Sorting: Yes
  - Frozen: No
- Created By
  - User ID | First Name Last Name of user who cretaed the record
  - Sorting: Yes
  - Frozen: No
- Modified At
  - Last record modified Date and time
  - Sorting: Yes
  - Frozen – No
- Modified By

  - User ID | First Name Last Name of user who last modified the record
  - Sorting: Yes
  - Frozen – No
- Status:
  - Indicates if the furnace is Active or Inactive.
  - Sorting: Yes
  - Frozen – No

Note: Horizontal scroll is required to be able to navigate through all columns and visualize all data but always respecting the frozen columns.

- **Action Buttons:** Depending on the status, system allows users perform following actions
  - Inactive (Mandatory Electrode Parameter details are not filled)
    - View - Opens the View Furnace Details screen, where all specific data related to that furnace can be viewed in a non-editable format.
    - Add Details - Allows modification of the furnace's configuration. This includes updating details like parameters, electrodes, or refining steps.
  - Inactive (Mandatory Electrode Parameter details are filled)
    - View - Opens the View Furnace Details screen, where all specific data related to that furnace can be viewed in a non-editable format.
    - Edit - Allows modification of the furnace's configuration. This includes updating details like parameters, electrodes, or refining steps.
    - Activate – Clicking this opens a confirmation message that reads, upon confirmation activates the furnace.
      - Do you want to Activate this Furnace?
  - Active
    - View - Opens the View Furnace Details screen, where all specific data related to that furnace can be viewed in a non-editable format.
    - Edit - Allows modification of the furnace's configuration. This includes updating details like parameters, electrodes, or refining steps.
    - Deactivate– Clicking this opens a confirmation message that reads, upon confirmation deactivates the furnace.
      - Do you want to deactivate this Furnace?
- **Pagination Controls**: Navigation buttons to browse through multiple pages of records, if applicable (for more than 10 records).
- Rows Per page : Default 10, Dropdown values: 10, 20, 30, 40, 50

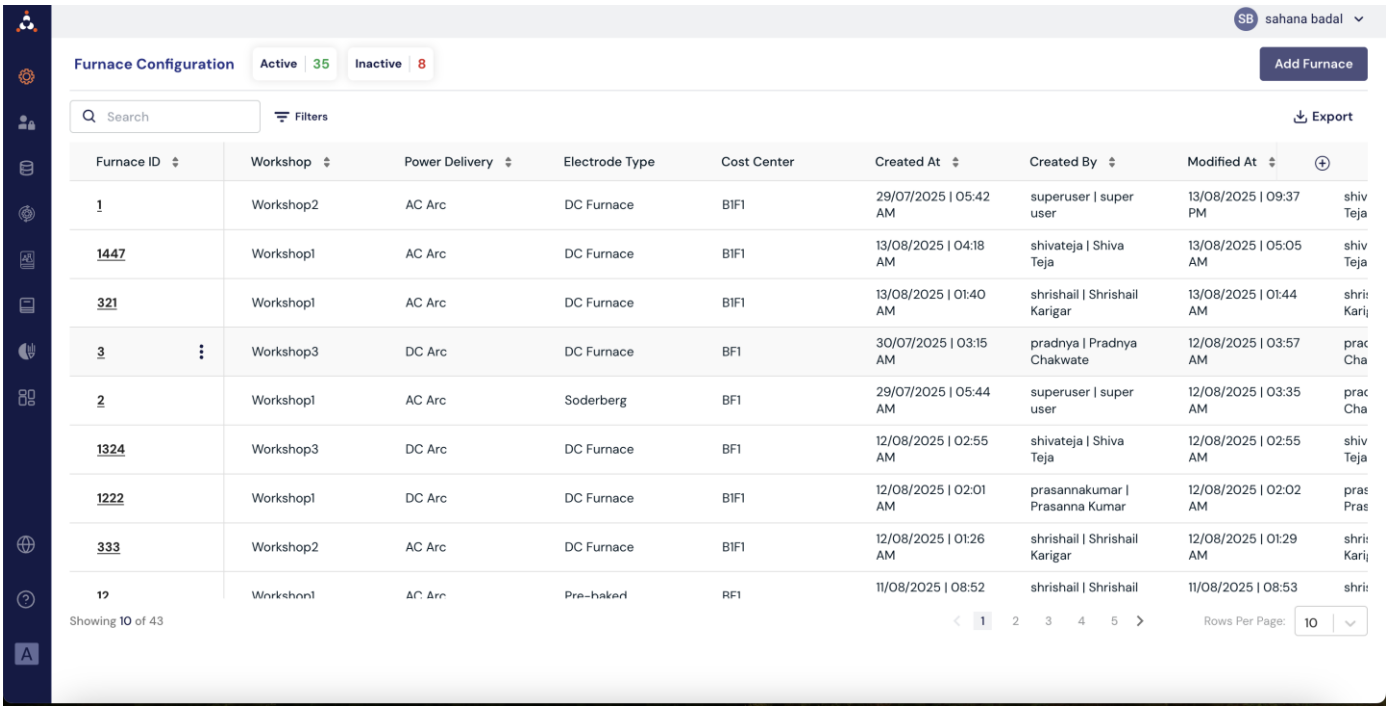
Export Function: The export function must extract ALL the information of the list of records shown based on the combined results of filter selection, sort and search criteria

Furnace ID	Workshop	Power Delivery	Electrode Type	Created At	Created by	Modified At	Modified by	Status
58	Workshop 1	AC Arc		19/05/2025 | 02:46 AM	UserID | First name + Last name			Inactive

34	Workshop 1	AC Arc	DC Furnace	19/05/2025 | 02:46 AM	UserID | First name + Last name	19/05/2025 | 02:46 AM	UserID | First name + Last name	Active
3	Workshop 3	DC Arc	DC Furnace	19/05/2025 | 02:46 AM	UserID | First name + Last name	19/05/2025 | 02:46 AM	UserID | First name + Last name	Inactive
2	Workshop 1	AC Arc	Soderberg	19/05/2025 | 02:46 AM	UserID | First name + Last name	19/05/2025 | 02:46 AM	UserID | First name + Last name	Active
1	Workshop 1	AC Arc	DC Furnace	19/05/2025 | 02:46 AM	UserID | First name + Last name	19/05/2025 | 02:46 AM	UserID | First name + Last name	Active

Exported File Name: FurnaceConfiguration_DD-MM-YYYY

Customize Columns: Users can enable or disable all columns based on their preference. Only the enabled columns will be visible in the list. Columns marked as 'frozen' will be enabled by default and cannot be modified.



4. Add Furnace

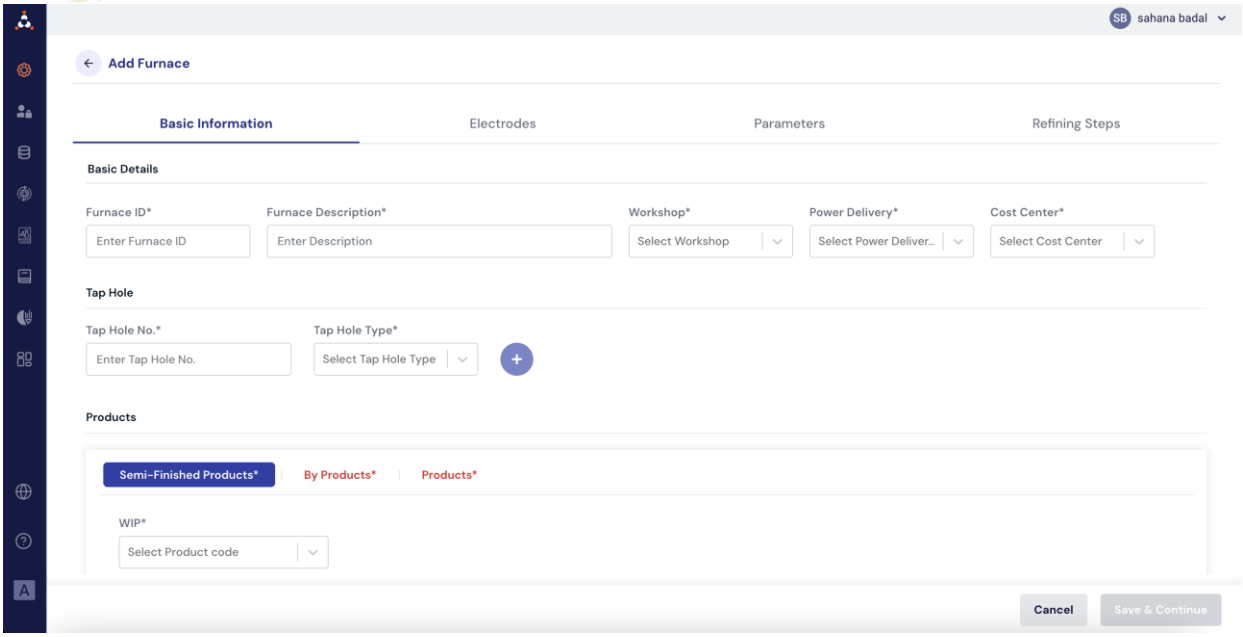
Header: Add Furnace| Close Icon

There are 4 tabs, the first being

4.1. Basic Information

4.1.1. Basic Details

- **Furnace ID***:
  - A mandatory text input field where the user can enter the unique identification number for the furnace.
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – unique identifier, Numeric only – Interger, Min 1, Max 4, No space allowed, Restricts user from entering 0 in the beginning
- **Furnace Description***:
  - A mandatory text field to describe the furnace, providing more context about its specifications or purpose.
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Alphanumeric only, Min 10, Max 100, space allowed
- **Workshop***:
  - User selects the Workshop from a single select dropdown
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All workshops configured in Plant configuration screen
  - Validation - No
- **Power Center***:
  - User selects the Power Center from a single select dropdown
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All power centers configured in the backend (AC arc, DC arc, Induction)
  - Validation - No
- **Cost Delivery*:**
  - User selects the Cost Delivery from a single select dropdown
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All Cost centers configured in the backend (B1F1, BF1, BF2
  - Validation – No



4.1.2. Tap Hole

Multiple Tap Holes can be added. Each Taphole will have the following details

- **Tap Hole No.***:
  - A field to input the tap hole number associated with the furnace.
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – unique identifier, Numeric only – Interger, Min 1, Max 4, No space allowed, Restricts user from entering 0 in the beginning
- **Tap Hole Type*:**
  - User selects from a single select dropdown
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All Tap Hole types configured in the backend (Batch, Continuous)
  - Validation - No
- **Add Button**
  - The **Add** button stays **disabled** until both **Tap Hole No.** and **Tap Hole Type** are entered.
  - Once both fields are filled, the **Add** button becomes active.
  - Clicking **Add** creates a **pill** showing the Tap Hole.
  - Each **pill** can be:
    - **Edited** – only the **Tap Hole No.** can be changed.
    - **Deleted** – removes the pill.

- **Tap Hole Type** cannot be changed after adding.
- Duplicate entries are not allowed — a message will appear if the same Tap Hole No. already exist.

4.1.3. Products

The **Products** section contains **three mandatory tabs**:

1. **Semi-Finished Products**
2. **By Products**
3. **Products**

Each tab contains:

- A **mandatory multiselect dropdown** for selecting product codes.
- The dropdown supports **search** and **multi-selection**.
- Selected items appear as **pills**, with an **(×)** icon to remove them

Common Behavior Across All Tabs

- The **dropdown** is labeled with the product type (e.g., **WIP**, **Molten**, **Products***).
- All three tabs are **mandatory** — user must select **at least one product per tab** to complete the mandatory check.
- Selected product(s) display below the dropdown as **removable pills**.
- A **searchable dropdown** lets users find product codes by typing.
- The dropdown displays:
  - Product code
  - Product name
- Duplicate selections are prevented within each tab.
- Removed product pills are added back immediately to the list.

Tab: Semi-Finished Products

- Contains two mandatory dropdowns:
  - **WIP*** - Lists all materials under the Material type “WIP”
  - **Molten*** - Lists all materials under the Material type “Molten”
- Both fields must have at least one product selected.

Tab: By Products

- Contains one mandatory dropdown:
  - **By Products*** (as labeled) - Lists all materials under the Material type “By Products”

Tab: Products

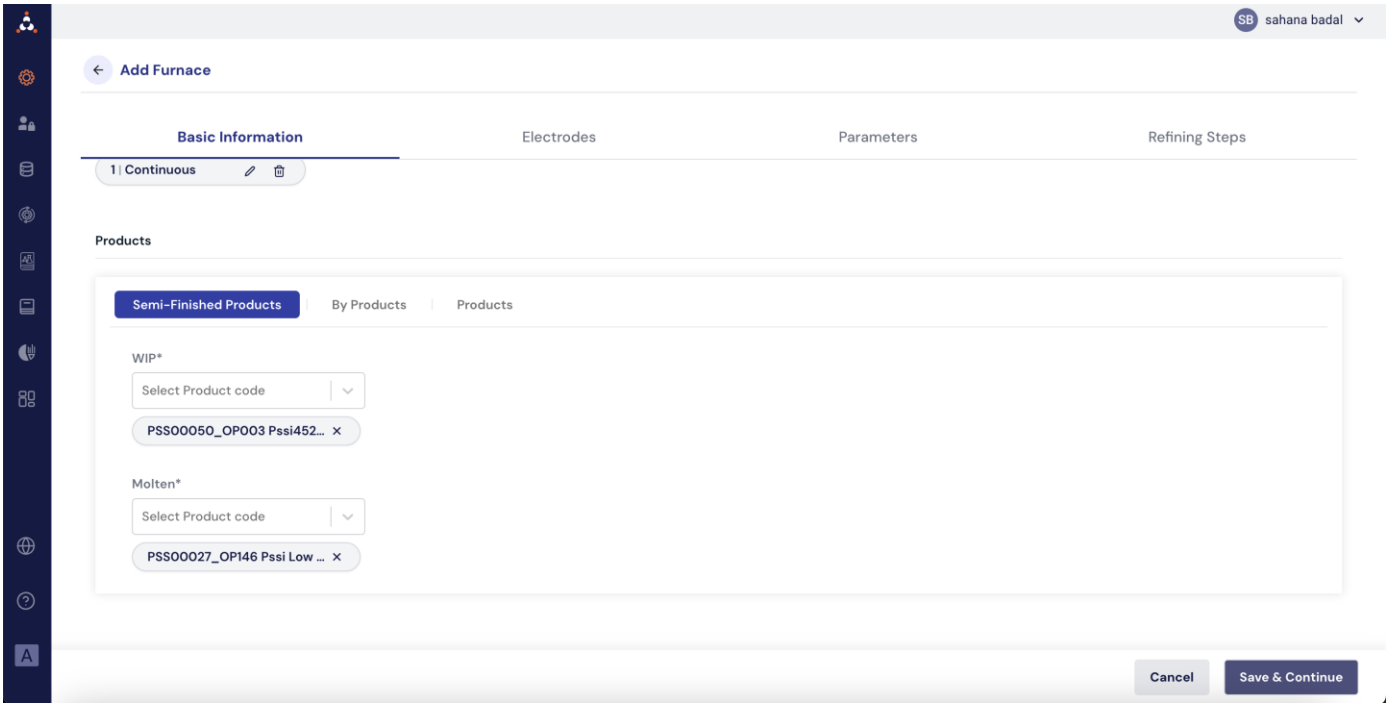
- Contains one mandatory dropdown:
  - **Products*** (as labeled) - Lists all materials under the Material type “Products”

4.1.4. Action Buttons

- **Save & Continue**: Saves the records and navigates to the next tab

- The **Save & Continue** button is disabled until, all mandatory fields in the section are filled.

- **Cancel**: Cancels the current operation and returns to the list screen



4.2. Electrodes

The "Electrodes" tab captures details of electrodes for a furnace. The number of electrodes selected dynamically determines how many electrode input blocks appear below the main configuration.

4.2.1. Electrode Details

- **Electrode Type***:
  - User selects from a single select dropdown
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown, Values: DC Furnace, Pre-Baked, Soderberg
  - Validation – No
- **No of Electrodes***:
  - User can enter Value or use the counter + -
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input/Counter

- Validation - Numeric only – Integer, Min 1 Max 5, No space allowed

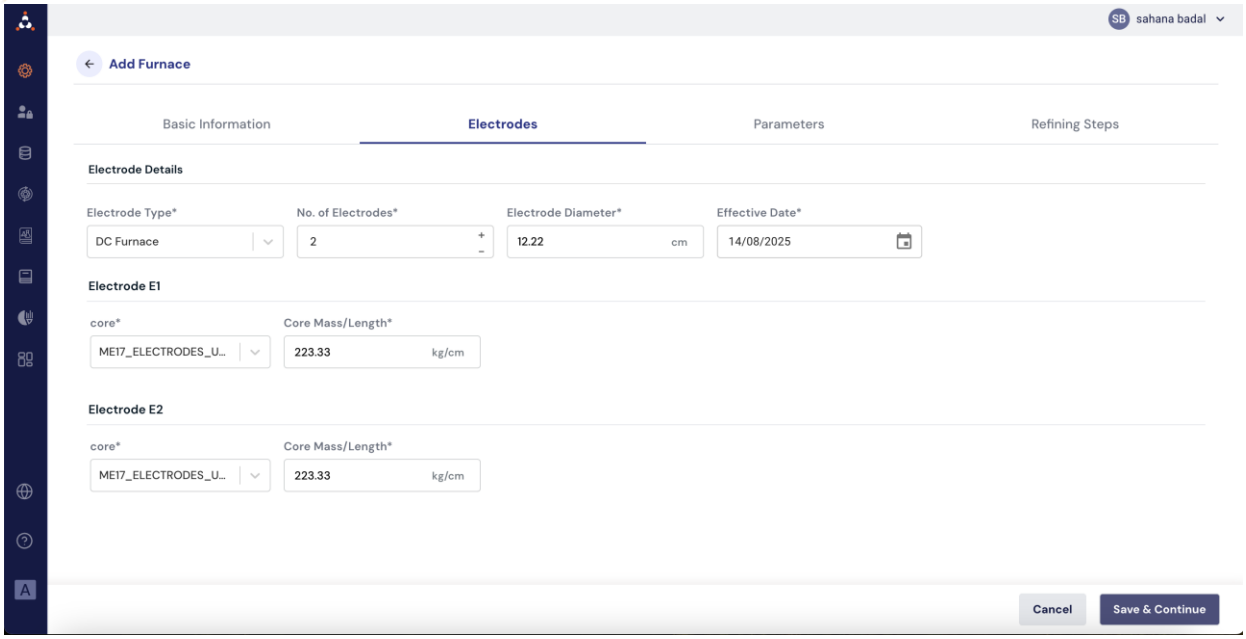
- **Electrode Diameter***:
  - A field to input Electrode Diameter
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 5 integers + decimal point + 2 decimals, No space allowed
- **Effective Date***:
  - Calendar picker to select date
  - Mandatory - Yes
  - Default value - Current Date
  - Field Type – Date picker
  - Validation – None

4.2.2. Electrode Entry Blocks

- Depending on the selection of Electrode Type, the form will dynamically update to show the relevant sections and fields for each type.
- For each electrode (based on "No. of Electrodes"), a block labeled **Electrode E1, E2, etc.** is rendered.
- Fields for Each Electrode Type
  - DC Furnace :
    - Core:
      - Select from a list.
      - Mandatory - Yes
      - Default value - No
      - Field Type - Single Select Dropdown, Values: Configured in the backend. Displays ID and Name
      - Validation – No
    - Core Mass/Length:
      - Mandatory - Yes
      - Default value - No
      - Field Type – User Input
      - Validation – Numeric only - Double, Min 0, 8 integers + decimal point + 2 decimals, no space allowed
      - Units depend on unit system selected by the plant
  - Pre-Baked :
    - Core:
      - Select from a list.
      - Mandatory - Yes
      - Default value - No
      - Field Type - Single Select Dropdown, Values: Configured in the backend. Displays ID and Name
      - Validation – No
    - Core Mass/Length:
      - Mandatory - Yes
      - Default value - No

        - Field Type – User Input
        - Validation – Numeric only - Double, Min 0, 8 integers + decimal point + 2 decimals, no space allowed
        - Units depend on unit system selected by the plant
    - Soderberg :
        - Paste:
            - Select from a list.
            - Mandatory - Yes
            - Default value - No
            - Field Type - Single Select Dropdown, Values: Configured in the backend. Displays ID and Name
            - Validation – No
        - Paste Mass/Length:
            - Mandatory - Yes
            - Default value - No
            - Field Type – User Input
            - Validation – Numeric only - Double, Min 0, 8 integers + decimal point + 2 decimals, no space allowed
            - Units depend on unit system selected by the plant
        - Core:
            - Select from a list.
            - Mandatory - Yes
            - Default value - No
            - Field Type - Single Select Dropdown, Values: Configured in the backend. Displays ID and Name
            - Validation – No
        - Core Mass/Length:
            - Mandatory - Yes
            - Default value - No
            - Field Type – User Input
            - Validation – Numeric only - Double, Min 0, 8 integers + decimal point + 2 decimals, No space allowed
            - Units depend on unit system selected by the plant

- Electrode entry blocks are **added or removed** based on the number selected in **No. of Electrodes**.
- **Electrode IDs** (E1, E2, etc.) auto-adjust their labels dynamically as count is changed.
- Fields maintain their values when:
    - Incrementing the number of electrodes (previous entries are preserved).
    - Decrementing deletes the bottom-most blocks with confirmation (optional).



4.2.3. Action Buttons

- **Save & Continue**: Saves the records and navigates to the next tab
  - The **Save & Continue** button is disabled until, all mandatory fields in the section are filled.

- **Cancel**: Cancels the current operation and returns to the list screen

4.3. Parameters

The Parameters Tab allows users to input key operational parameters for the furnace, such as energy losses, efficiency targets, and design capacity. These parameters are crucial for optimizing furnace performance and cost management. Users can set these parameters with an effective date, which can be in the past, present, or future.

- **Effective Date***:
  - Calendar picker to select date
  - Mandatory - Yes
  - Default value - Current Date
  - Field Type – Date picker
  - Validation – None
- **Energy Losses*:**
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 5 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Joule Losses Coefficient*:**
  - User Input

- Mandatory - Yes
- Default value - No
- Field Type – User Input
- Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 5 decimals, No space allowed
- Units depend on unit system selected by the plant

- **Default EPI Index***
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Corrected Reactance Coefficient ***
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 5 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Design MW***
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Fixed Cost (Per Day)***
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Energy Efficiency***
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Cost Budget***

- User Input
- Mandatory - Yes
- Default value - No
- Field Type – User Input
- Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
- Units depend on unit system selected by the plant

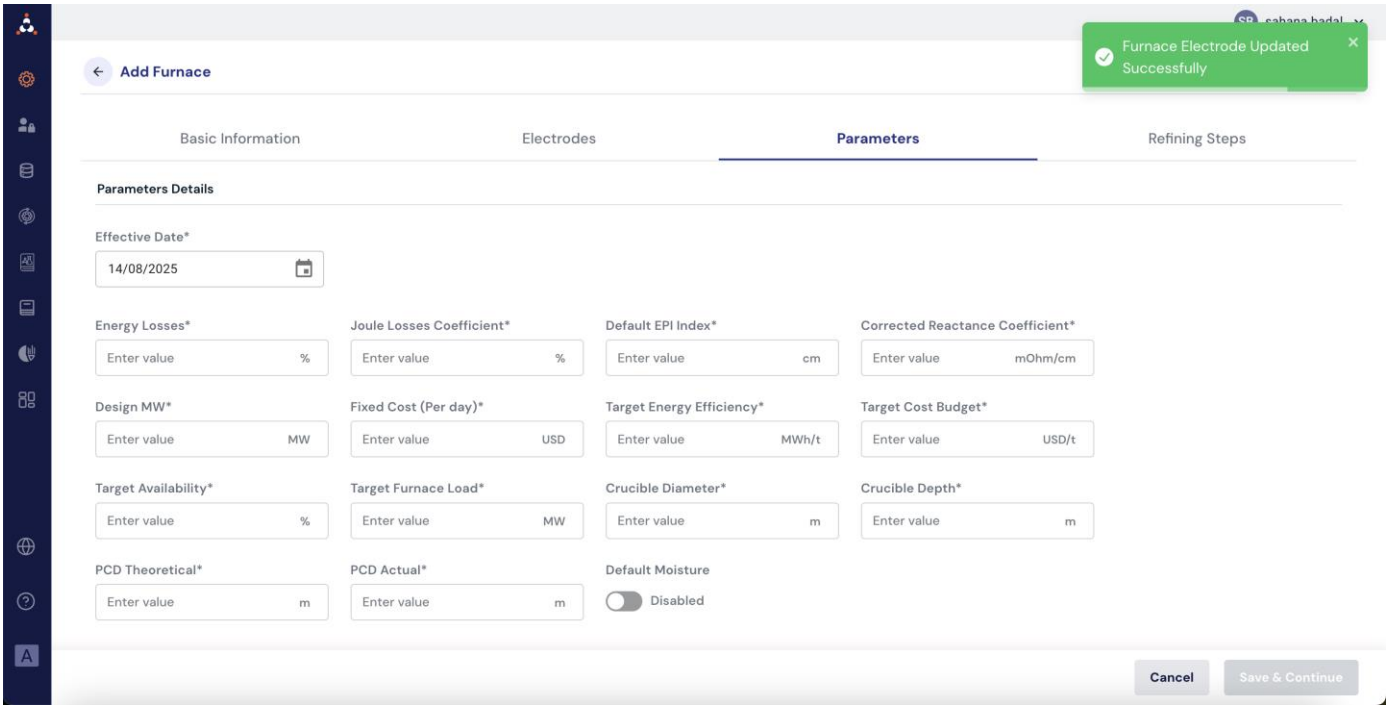
- **Target Availability***
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Furnace Load**
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Crucible Diameter**
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Crucible Depth**
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **PCD Actual**
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant

- **PCD Theoretical**
  - User Input
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Default Moisture**
  - Mandatory - Yes
  - Default value - No
  - Field Type – Toggle
  - Validation – None

4.3.1. Action Buttons

- **Save & Continue**: Saves the records and navigates to the next tab
  - The **Save & Continue** button is disabled until, all mandatory fields in the section are filled.

- **Cancel**: Cancels the current operation and returns to the list screen



NOTE: Once user enters all first three tabs information, furnace will get activated automatically.

4.4. Refining Steps

The Refining Steps functionality allows users to define, add, and reorder steps that outline the refining process for the furnace. These steps are essential for managing the furnace operation but

are not mandatory for activating the furnace. They provide flexibility in setting control parameters at different stages of the refining process.

4.4.1. Add Refining Steps

Users can add multiple steps by clicking on the Add Refining Step button. Each refining step requires a set of basic details and control parameters. Fields marked with (*) are mandatory.

- Step Name* :
  - A unique identifier for the refining step
  - Single Select dropdown
  - Default Value – None
  - Mandatory – Yes
  - Validation – None
  - Values
    - Cast
    - De-Slag
    - Fill
    - Purge
    - Refine
    - Settle
    - Transfer
    - Wait
- Control Parameter *:
  - Multiple Control parameters can be added. At least one control parameter is mandatory for any step. The specific parameter being controlled during the refining process are
    - Air Flow (Nm^3/h)
    - Air Pressure (Bar)
    - Air Volume(Nm^3)
    - Inject Pressure(Bar)
    - N Flow (Nm^3/h)
    - N_2 Pressure (Bar)
    - O_2 Flow (Nm^3/h)
    - O_2 Pressure (Bar)
    - O_2 Volume (Nm^3)
    - Temp (°C)
    - Temp(Before Casting) (°C)
    - Temp(End of Tapping) (°C)
    - Time (mins)
  - Control Parameter Value:
    - Each control parameter has a user input value
    - Mandatory – yes
    - Default Value – None
    - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
    - The added parameters are shown in a table.
    - User can:
      - Edit existing parameter entries (value, mandatory toggle)

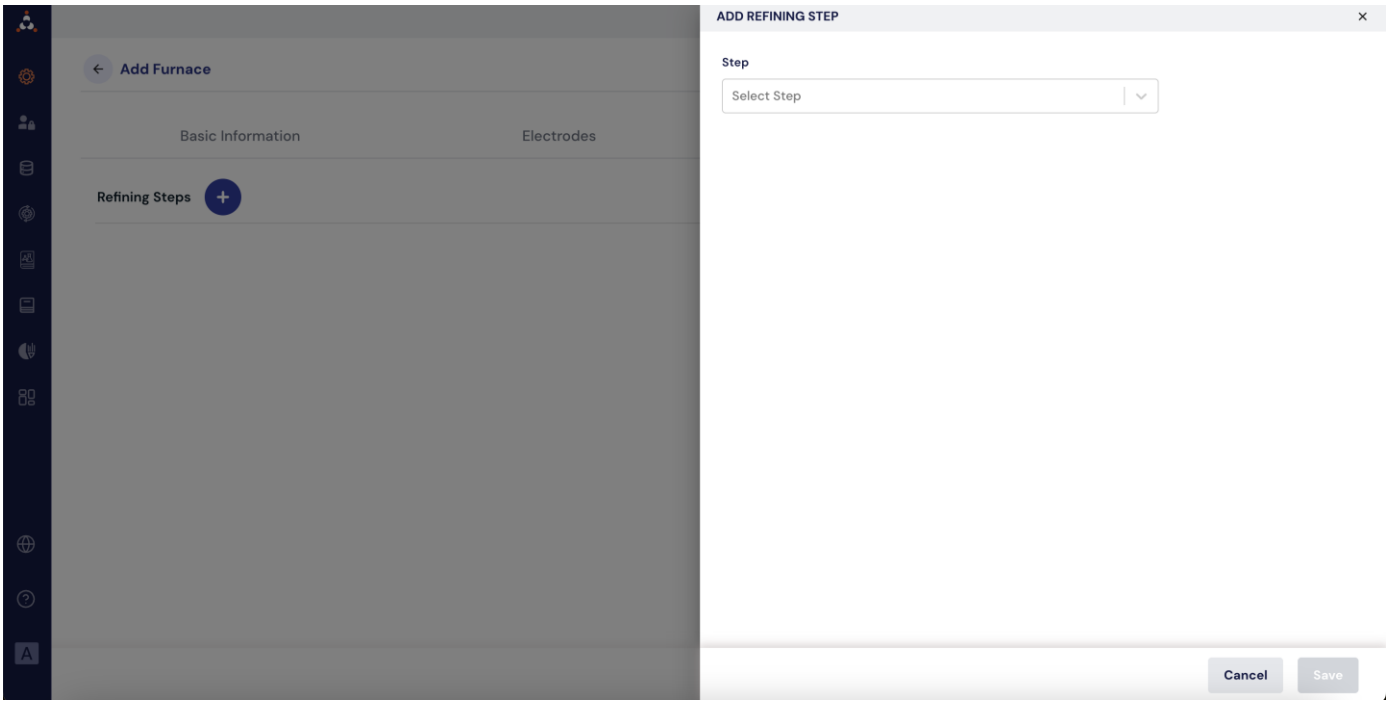
- Delete a parameter
- Add new parameters (same as in Add flow)

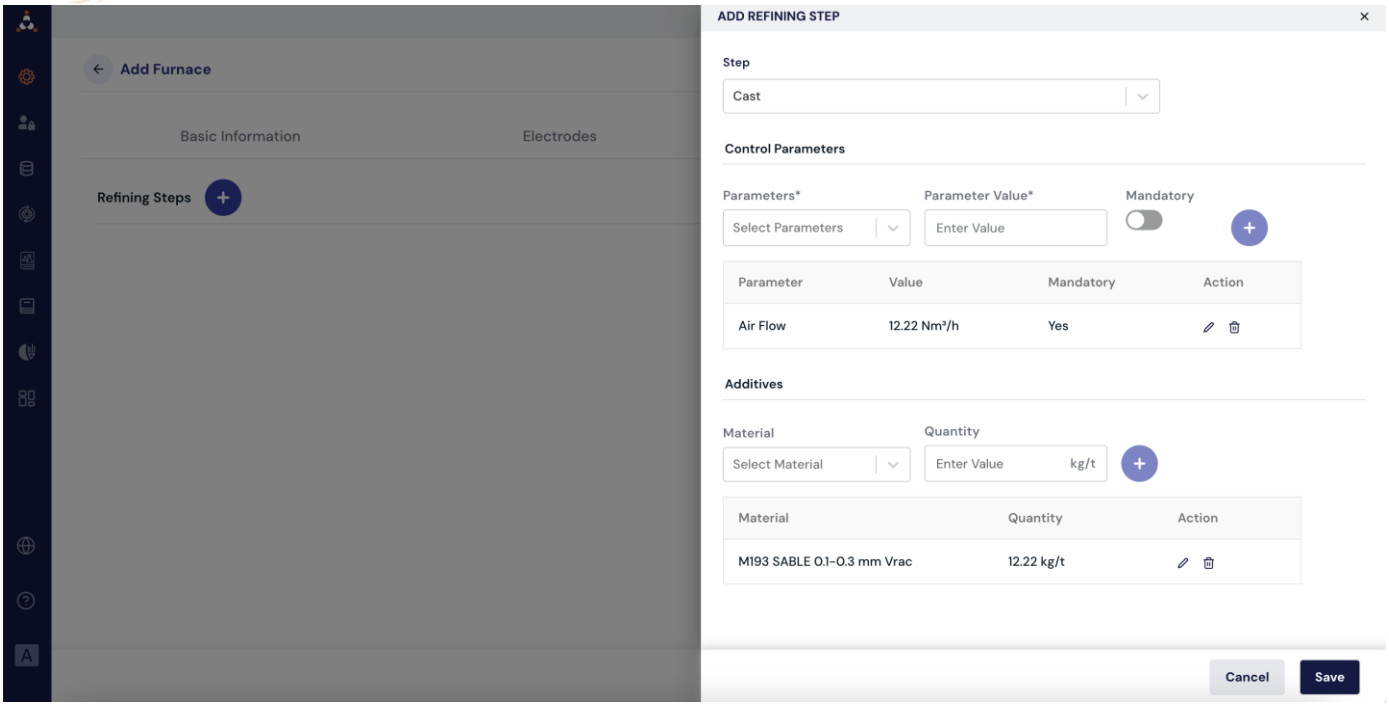
- Mandatory toggle – Each parameter can be marked as a mandatory field using the toggle button. The fields marked as mandatory will require values to be provided under Production → Refining Steps before the tap can be finalized.

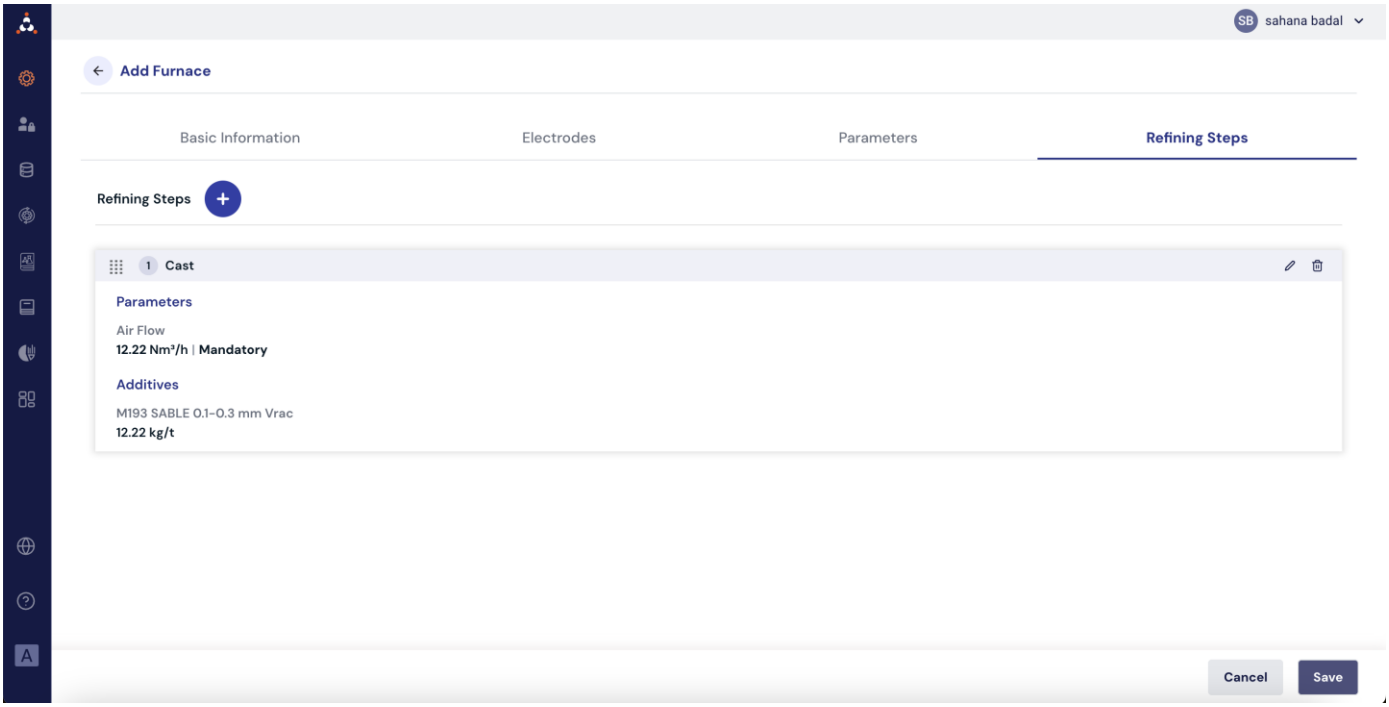
- Additives:
  - Multiple Additives can be added. They are not mandatory for any step. Each Additive has two fields
    - Material – A dropdown list of Products to select from
    - Quantity (kg/t) –
      - User input
      - Mandatory – No
      - Default Value – None
      - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
- Action Buttons
  - **Save**: Saves the records and adds to the refining steps list
  - **Cancel**: Cancels the current operation and returns to the list screen

4.4.2. Action Buttons

- **Save**: Saves the details and navigates to the list page
- **Cancel**: Cancels the current operation and returns to the list screen







5. Edit Furnace

When editing an active furnace, users can navigate through the four tabs in any order to make necessary modifications to the furnace's configuration. Each tab handles a different aspect of the furnace setup, and changes need to be saved after each tab for them to take effect. Below is an overview of the four tabs and their editable sections:

Header: Back Icon | Edit "Furnace ID"

5.1. Basic Information

5.1.1. Basic Details

- **Furnace ID***:
  - Non Editable and pre-populated with existing value.
  - Default value - No
- **Furnace Description***:
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Alphanumeric only, Min 10, Max 100, space allowed
- **Workshop***:
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All workshops configured in Plant configuration screen
  - Validation - No
- **Power Center***:
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All power centers configured in the backend (AC arc, DC arc, Induction)
  - Validation - No
- **Cost Delivery*:**
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - No
  - Field Type - Single Select Dropdown Values: All Cost centers configured in the backend (B1F1, BF1, BF2
  - Validation - No

5.1.2. Tap Hole

Tap Hole added can be edited, and new ones can be added. Existing Tap Holes appear as pills

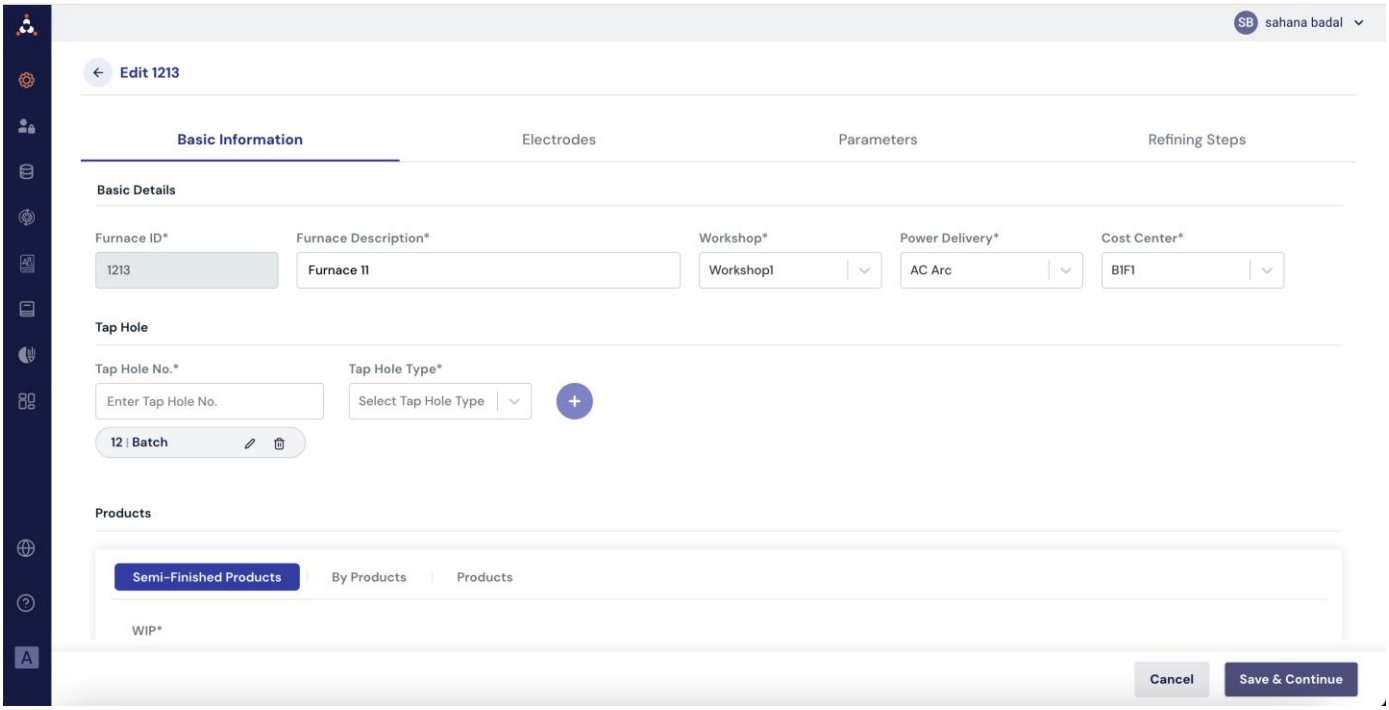
  - Each **pill** can be:
    - **Edited** – only the **Tap Hole No.** can be changed.
    - **Deleted** – removes the pill.
  - **Tap Hole Type** cannot be changed after adding.

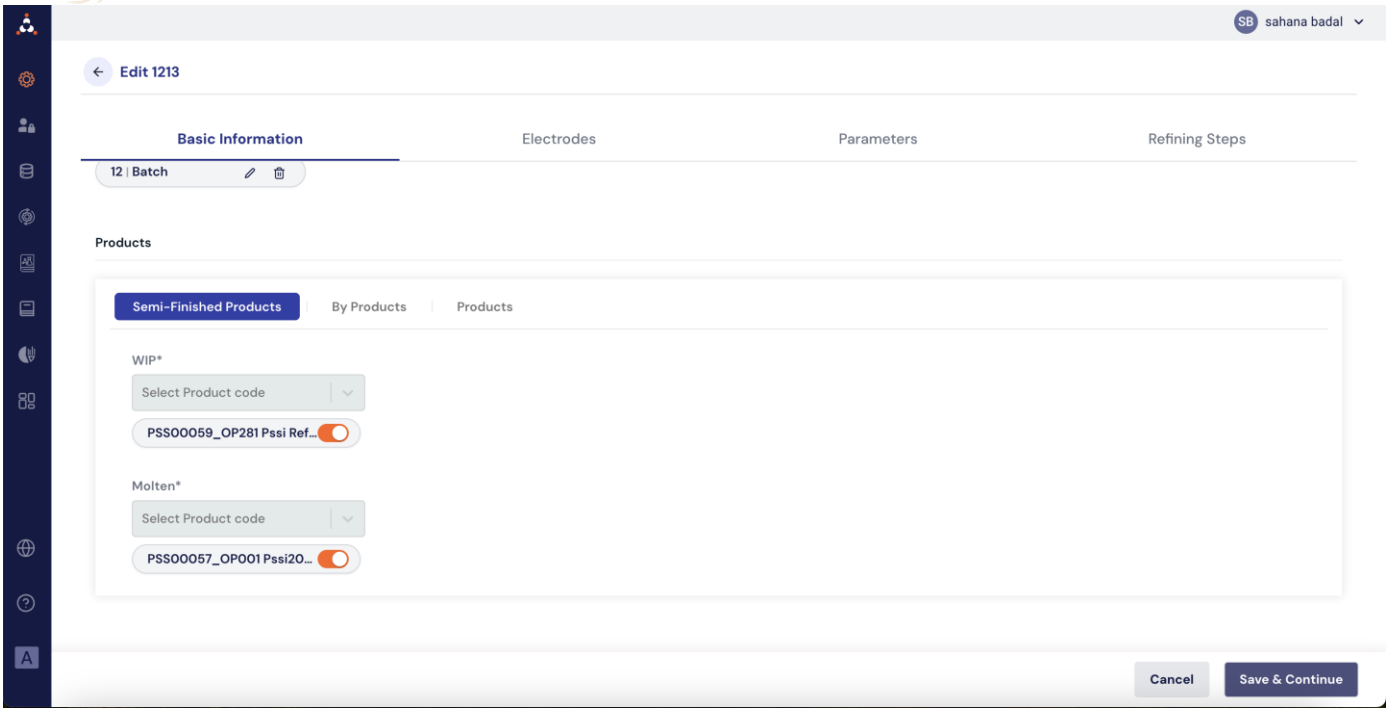
5.1.3. Products

- Products already mapped are shown as pills under each tab,
- These can be deactivated by clicking on the toggle button.
- Further products can be mapped under each tab from the multiselect dropdown

5.1.4. Action Buttons

- **Save & Continue**: Saves the records and navigates to the next tab
    - The **Save & Continue** button is disabled until, all mandatory fields in the section are filled.
- **Cancel**: Cancels the current operation and returns to the list screen





5.2. Electrodes

5.2.1. Electrode Details

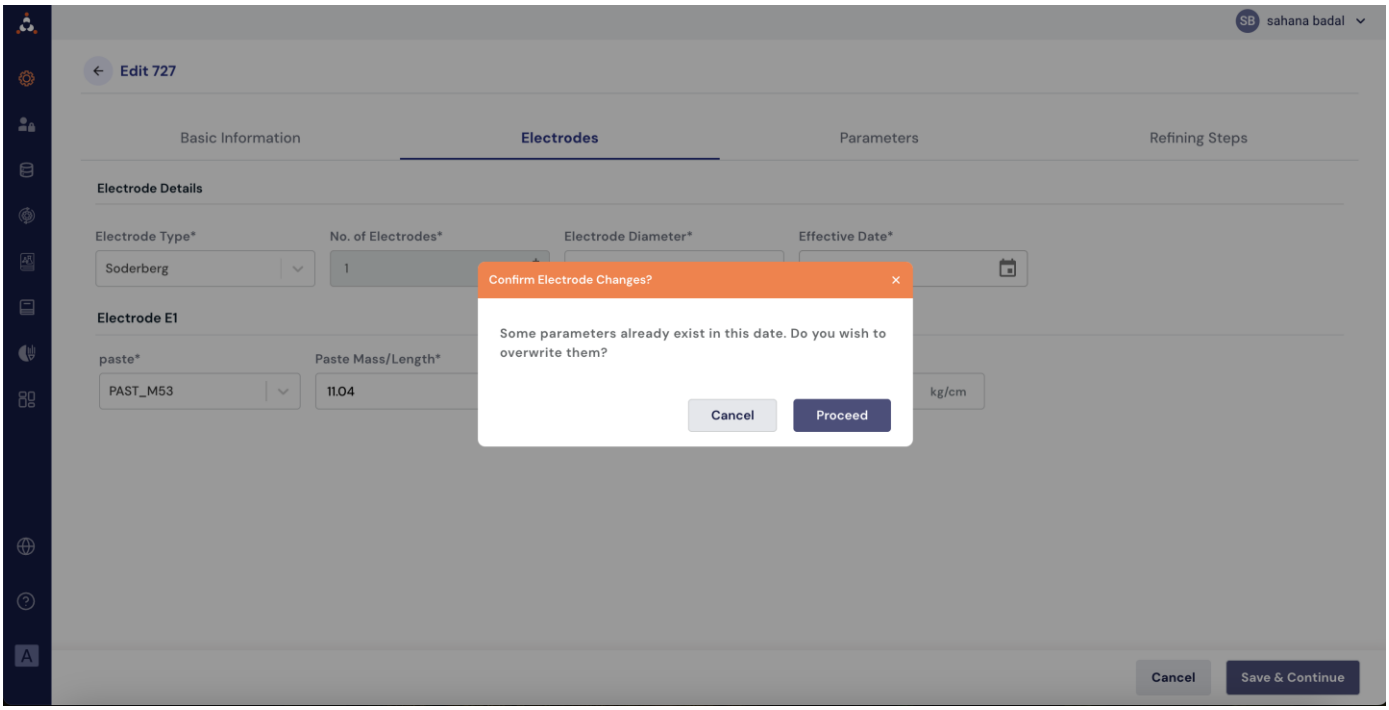
- **Electrode Type***:
  - Non Editable and pre-populated with existing value.
  - Mandatory - Yes
- **No of Electrodes***:
  - Non Editable and pre-populated with existing value.
  - Mandatory - Yes
- **Electrode Diameter***:
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 5 integers + decimal point + 2 decimals, No space allowed
- **Effective Date***:
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - Current Date

- Field Type – Date picker
- Validation – None

When viewed in edit mode, only the current values of electrode fields will be displayed. If a recently updated value is older than the current value, it will be saved. However, these values will not be displayed in edit mode but can be viewed by downloading the Excel history.

Only one set of electrode records can exist for a given effective date. In Edit mode, if a record with the same effective date already exists in the system, the user will receive a warning and be asked if they want to proceed and overwrite the existing details.

Historical and future data can be viewed by downloading the Excel file using the download option.



5.2.2. Electrode Entry Blocks

- Depending on the selection of Electrode Type selected during add furnace, the form will show the relevant sections and fields for each type.
- Since No of electrodes in non-editable, For each electrode (based on “No. of Electrodes”), a block labeled **Electrode E1, E2, etc.** is already rendered.
- Fields based on the Electrode Type will be displayed and are editable.

5.2.3. Action Buttons

- **Save & Continue**: Saves the records and navigates to the next tab

- The **Save & Continue** button is disabled until, all mandatory fields in the section are filled.

- **Cancel**: Cancels the current operation and returns to the list screen

5.3. Parameters

- **Effective Date***:
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - Current Date
  - Field Type – Date picker
  - Validation – None
- **Energy Losses*:**
  - Editable and pre-populated with existing value.
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 5 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Joule Losses Coefficient*:**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 5 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Default EPI Index***
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Corrected Reactance Coefficient ***
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 5 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Design MW***

- Editable and pre-populated with existing value
- Mandatory - Yes
- Default value - No
- Field Type – User Input
- Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
- Units depend on unit system selected by the plant

- **Fixed Cost (Per Day)***
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Energy Efficiency***
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Cost Budget***
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Availability***
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Target Furnace Load**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant

- **Crucible Diameter**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Crucible Depth**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **PCD Actual**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **PCD Theoretical**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – User Input
  - Validation – Numeric only - Double, Min 0, Max 8 integers + decimal point + 2 decimals, No space allowed
  - Units depend on unit system selected by the plant
- **Default Moisture**
  - Editable and pre-populated with existing value
  - Mandatory - Yes
  - Default value - No
  - Field Type – Toggle
  - Validation – None

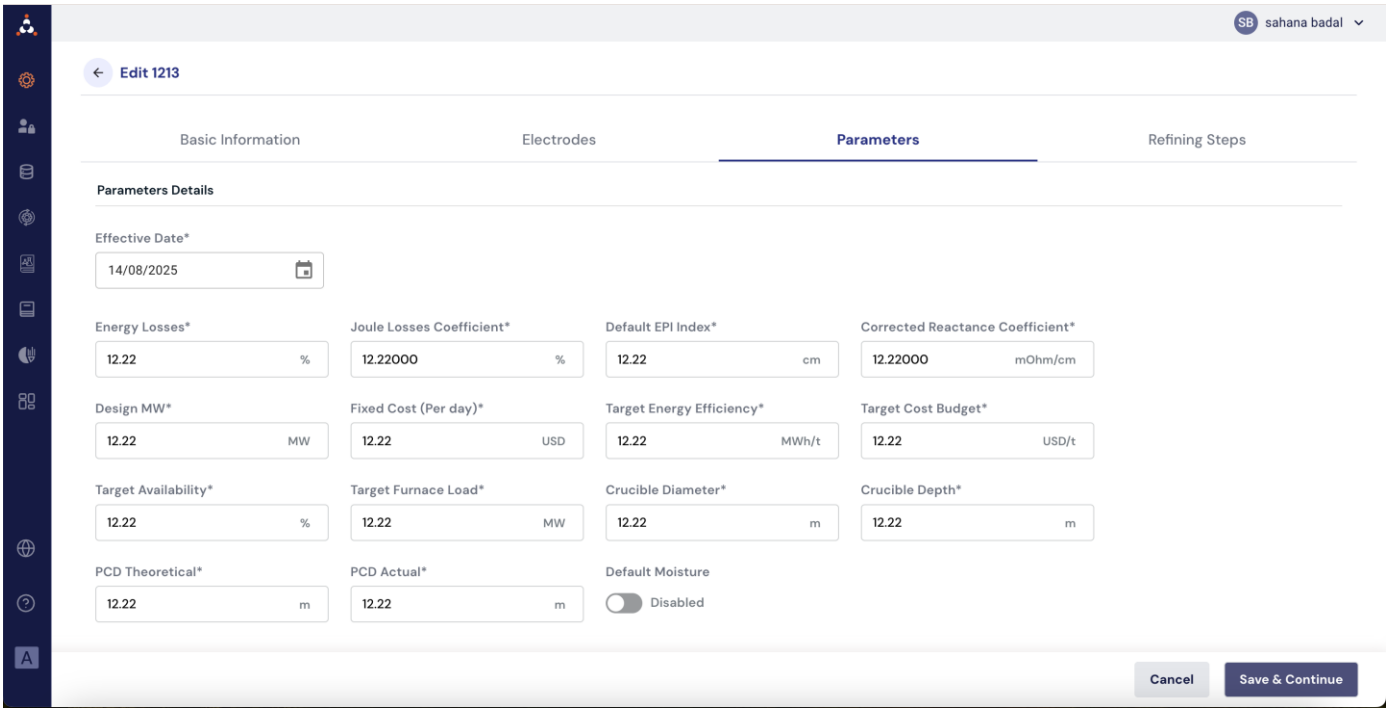
When viewed in edit mode, only the current values of parameter fields will be displayed. If a recently updated value is older than the current value, it will be saved. However, these values will not be displayed in edit mode but can be viewed by downloading the Excel history.

Only one set of records can exist for a given effective date. In Edit mode, if a record with the same effective date already exists in the system, the user will receive a warning and be asked if they want to proceed and overwrite the existing details.

Historical and future data can be viewed by downloading the Excel file using the download option.

5.3.1. Action Buttons

- **Save & Continue**: Saves the records and navigates to the next tab
    - The **Save & Continue** button is disabled until, all mandatory fields in the section are filled.
- **Cancel**: Cancels the current operation and returns to the list screen

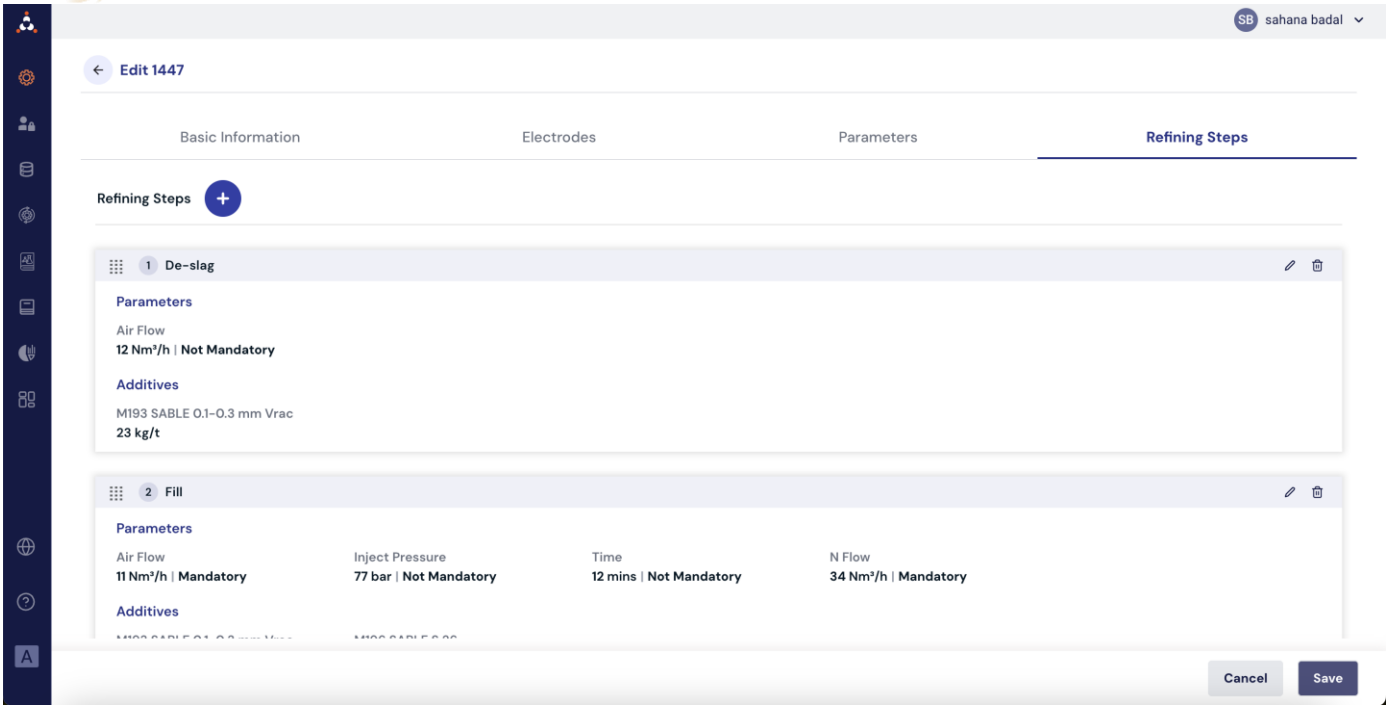


5.4. Refining Steps

Users can perform the following actions in the edit mode

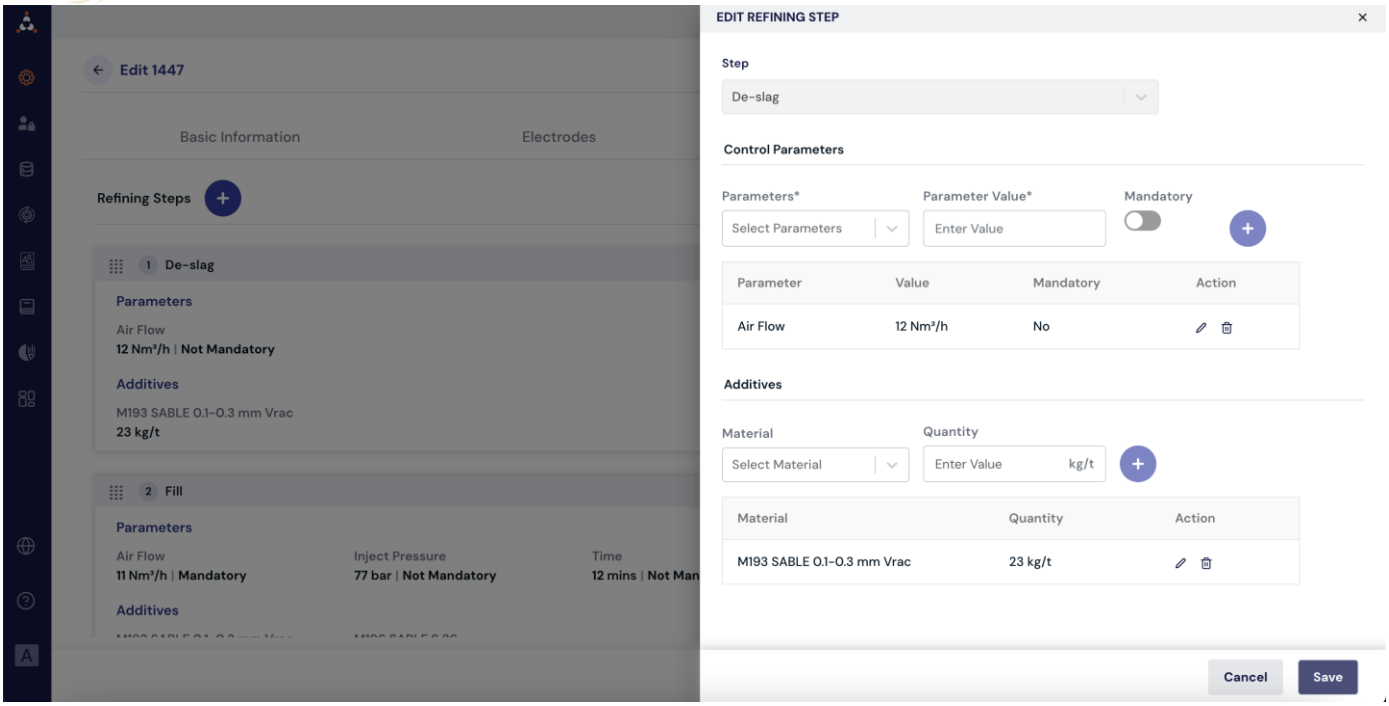
5.4.1. Add Refining Steps

More refining steps can be added by clicking the “+” icon, this opens a slider popup where user can select the step to be added.



5.4.1. Edit Refining Steps

- A refining step can be edited by clicking the **edit icon** associated with it.
- This action will open a **slider popup** pre-filled with existing values.
- **Step Name**
  - The Step Name is non-editable and cannot be changed.
- **Parameters**
  - New parameters can be added.
  - Existing parameters can be edited:
  - User can change their value.
  - User can toggle the Mandatory field on or off.
  - Parameters can also be deleted, but at least one parameter is required per refining step.
- **Additives**
  - Additives can be added to the refining step.
  - Quantities of existing additives can be edited.
  - Existing additives can be deleted as needed.

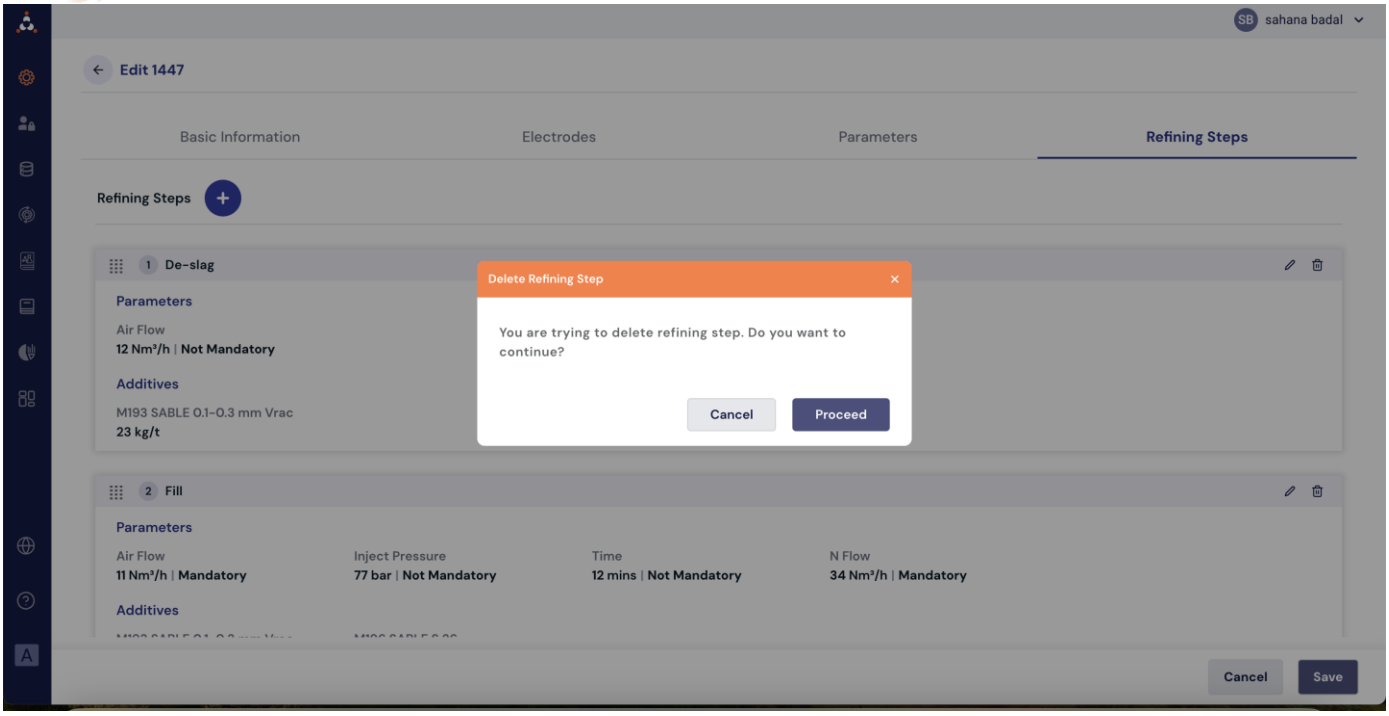


4.4.1. Re-order Refining Steps

The refining steps can be reordered by dragging and dropping each step into the desired sequence. To reorder, the user selects a refining step from the list and drags it to the new position.
Once the desired order is set, the user must click the Save button to commit the new sequence.

4.4.1. Delete Refining Steps

To delete a refining step, the user clicks on the delete icon next to the step. The system will prompt a confirmation message asking the user to confirm the deletion. Once confirmed, the refining step is removed from the list of steps, but the changes will only be finalized when the user clicks Save to complete the deletion process. If the user leaves the screen without saving, the deletion will not be applied.



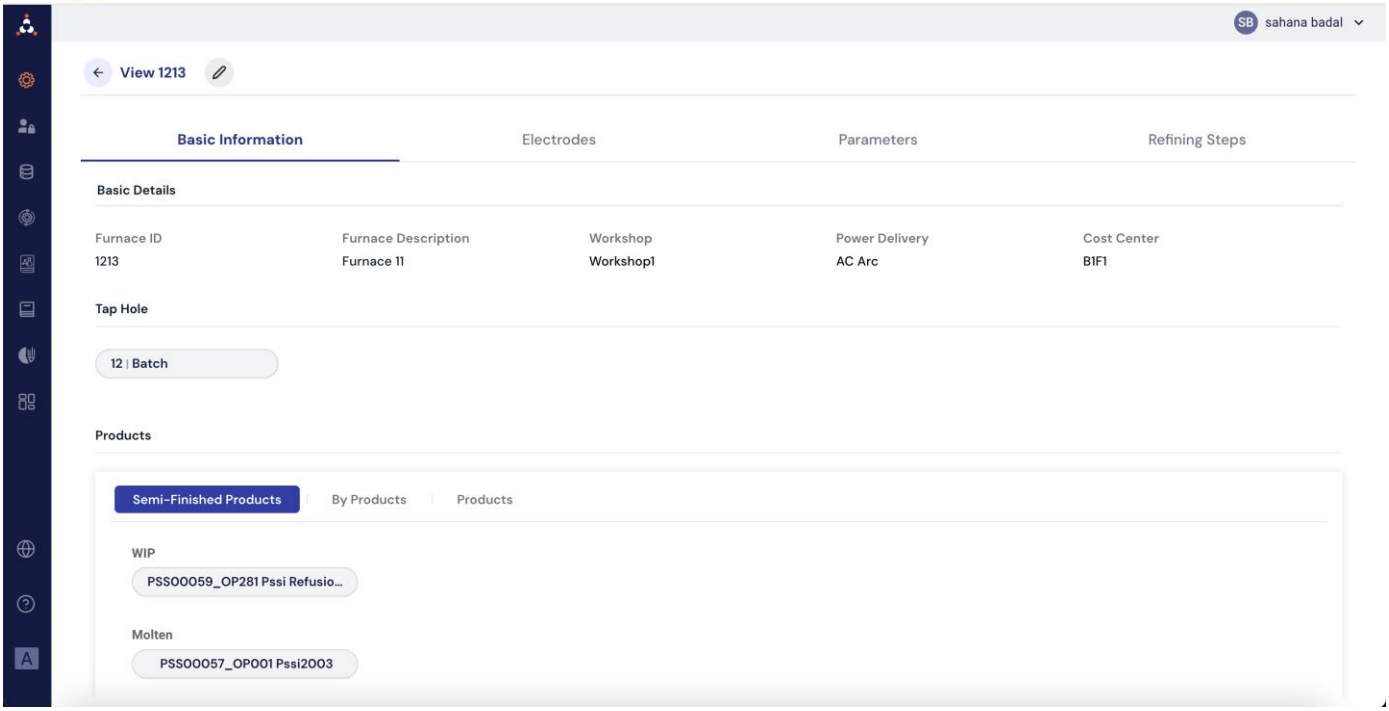
6. View Furnace

Users can view furnace details by clicnkin gon the Furnace ID hyperlink in List page or selecting View option from the list

Header – Back Icon | View “Furnace ID” | Edit Icon

6.1. Basic Information

All the basic details are displayed in a read-only format. This allows users to review the configuration and operational details of the furnace without the ability to make any changes.



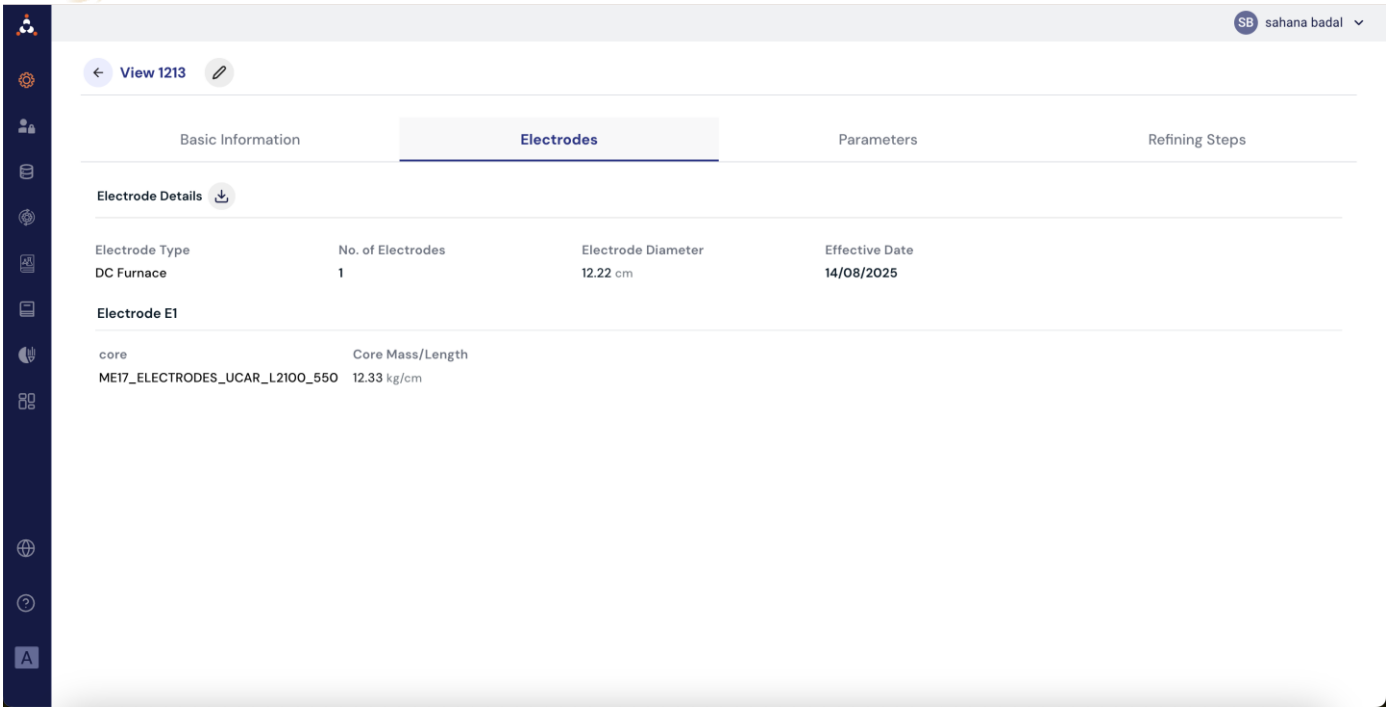
6.2. Electrodes

All the details are displayed in a read-only format.

User can download Electrode details with their corresponding effective date by clicking on the Download icon with a tooltip which reads Download CSV

Filename- FurnaceID_Electrodes_DD-MM-YYYY

Effective Date	Furnace ID	Electrode Type	Electrode Name	Electrode Diameter	Casing	Casing Mass/Length	Core	Core Mass/ Length	Paste	Paste Mass/Length	Created By	Modified By	Created At	Modified At	
06/08/25	8888	DC Furnace	E1	11.00cm			ME17 Electrodes UCAR L2100 550	11.00kg/cm			shivateja | Shiva Teja	shivateja | Shiva Teja	06/08/2025 | 05:59 AM	06/08/2025 | 05:59 AM	



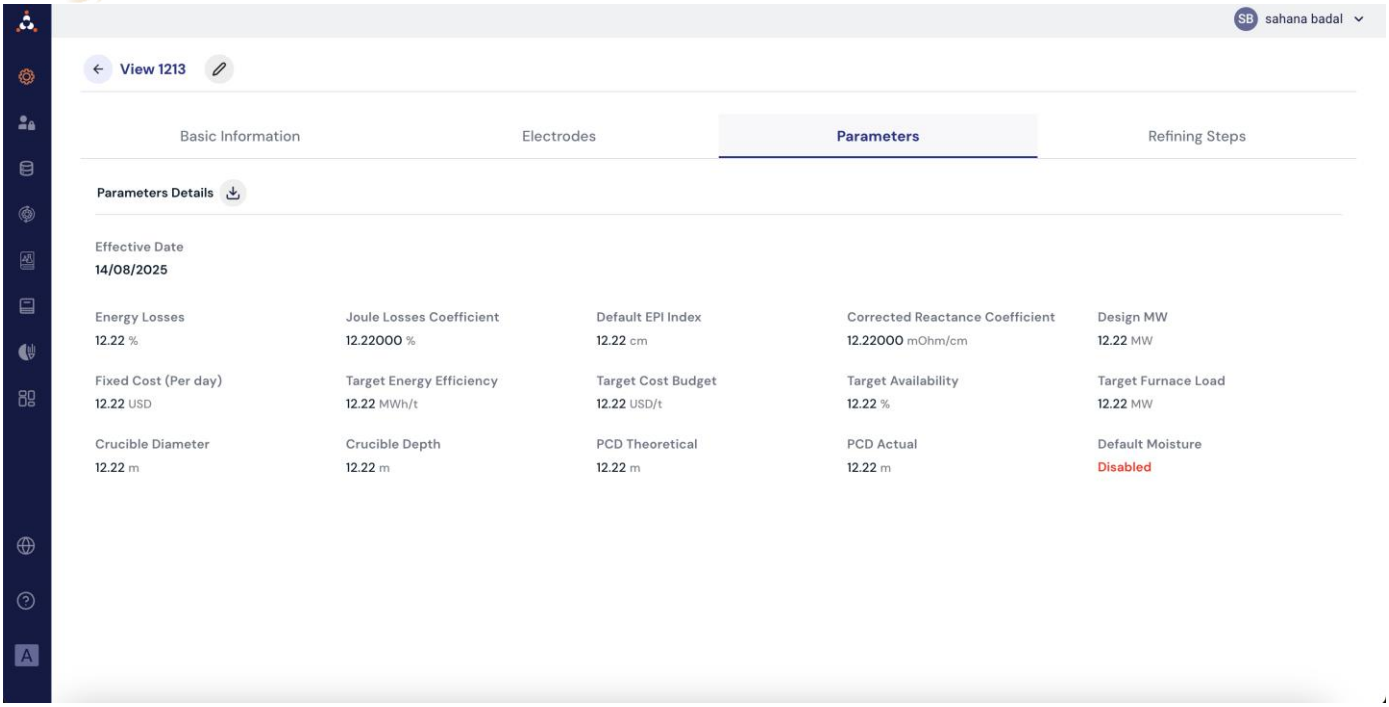
6.3. Parameters

All the details are displayed in a read-only format.

User can download Electrode details with their corresponding effective date by clicking on the Download icon with a tooltip which reads Download CSV

Filename- FurnaceID_Parameters_DD-MM-YYYY

Effective Date	Furnace ID	Energy Losses	Joule Losses Coefficient	Default EPI Index	Corrected Reactance Coefficient	Design MW	Fixed Cost (Per day)	Target Energy Efficiency	Target Cost Budget	Target Availability	Target Furnace Load	Crucible Diameter	Crucible Depth	PCD Theoretical	PCD Actual	Default Moisture	Created By	Modified By	Created At	Modified At	
06/08/25	8888	11.00 %	11.00 %	11.00cm	11.00000mOhm/cm	11.00 MW	11.00USD	11.00 MWh/t	211.00USD/t	12.00%	33.00MW	34.00m	44.00 m	55.00 m	65.00 m	disabled	shivateja | Shiva Teja	shivateja | Shiva Teja	06/08/2025 | 05:59 AM	06/08/2025 | 05:59 AM	



6.3. Refining Steps

All refining steps and their order, corresponding Parameter and Additive details can be viewed in read only format.

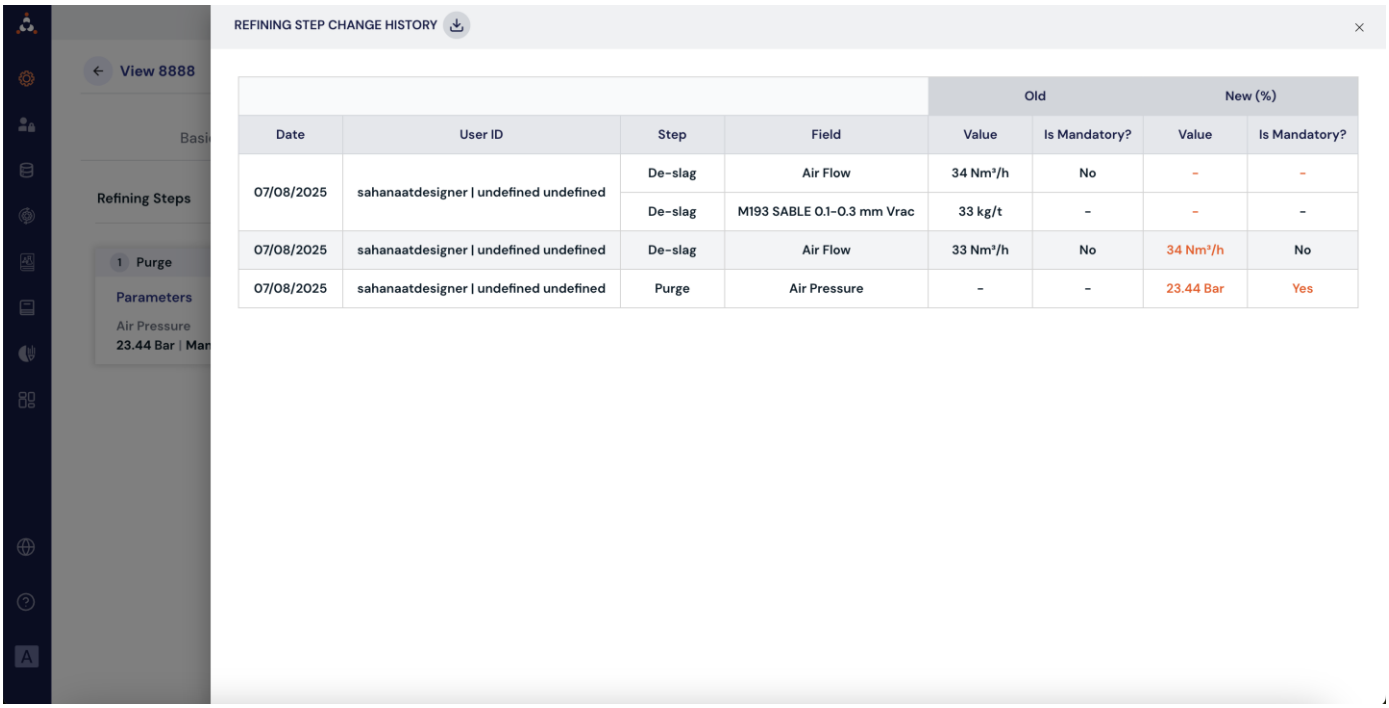
View Change History

All changes made to the steps, ie., addition of a step, deletion of a step, editing Parameter and additives are all recorded as part of change history.

User can download the change history by clicking on the download icon

Filename : FurnaceID_Change History_DD-MM-YYYY

User ID	Date	Step	Field Type	Field	Old Value	Old Is Mandatory?	New Value	New Is Mandatory?
sahanaatdesigner | undefined undefined	07/08/25	De-slag	Parameter	Air Flow	34 Nm^3/h	No	-	-
sahanaatdesigner | undefined undefined	07/08/25	De-slag	Additive	M193 SABLE 0.1-0.3 mm Vrac	33 kg/t	-	-	-
sahanaatdesigner | undefined undefined	07/08/25	De-slag	Parameter	Air Flow	33 Nm^3/h	No	34 Nm^3/h	No
sahanaatdesigner | undefined undefined	07/08/25	Purge	Parameter	Air Pressure	-	-	23.44 Bar	Yes



REFINING STEP CHANGE HISTORY

				Old		New (%)	
Date	User ID	Step	Field	Value	Is Mandatory?	Value	Is Mandatory?
07/08/2025	sahanaatdesigner | undefined undefined	De-slag	Air Flow	34 Nm³/h	No	-	-
		De-slag	M193 SABLE 0.1-0.3 mm Vrac	33 kg/t	-	-	-
07/08/2025	sahanaatdesigner | undefined undefined	De-slag	Air Flow	33 Nm³/h	No	34 Nm³/h	No
07/08/2025	sahanaatdesigner | undefined undefined	Purge	Air Pressure	-	-	23.44 Bar	Yes