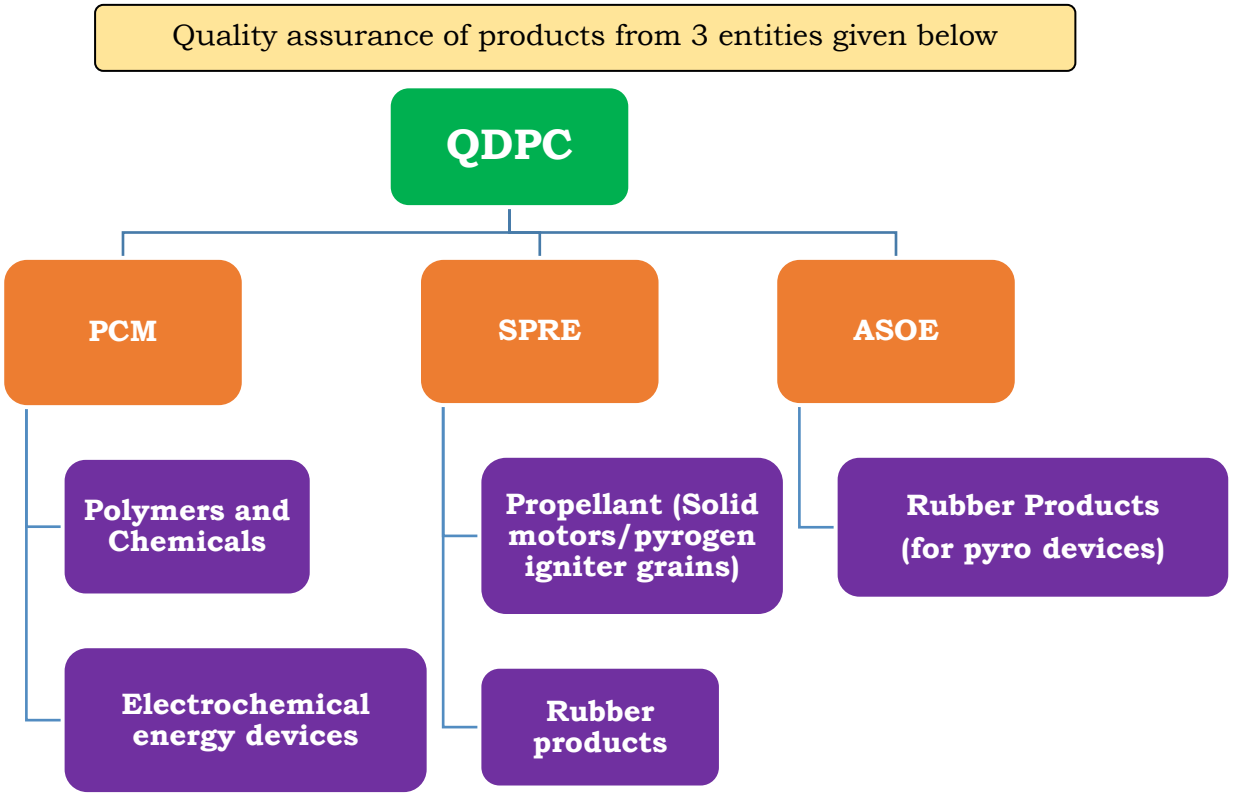
# System requirement document for a Software for automation of certification of Chemical system, Solid Motors and Energy System Products

## 1. Introduction

Quality Division Propellants and Chemicals (QDPC) provide quality assurance certificates for 229 products of VSSC used for various applications. The certification process involves products in the below category that are manufactured in-house as well as at other external work centre's for various ongoing missions.




In addition to providing QA services for in-house production activities, QA services are also provided for several products that are being outsourced form different work centres for use in various subsystems of launch vehicle and satellites. Currently there are 27 such work centres from which we receive the data related to processing of various products.

## 2. Objective of the application software

- A centralized application to receive all types of input from development agencies, testing agencies, review forums in digital format
- Maintaining a database for all information related to processing of products that are being certified by QDPC

- Automated report generation based on input data, authorization, data analytics, data storage and retrieval
- Collaboration with SDAs, testing agencies, Quality control agencies for documentation related to quality management and certification process

## 3. Platform for development of the software and deployment

- The software is to be developed as a web enabled application using Java/Python platform and MySQL/PostgreSQL database.
- The software is to be hosted on premise server provided by VSSC in the intranet.
- Any modifications in the software shall be installed without connecting to the internet.
- However, there is plan to use the software on internet in future for interaction with external industries. Hence, the capability of deploying the software on an internet server needs to be built into the software for in the initial development phase itself.
- The capability of deploying specific modules of the software on internet server with option to synchronise with modules in intranet server, need to be built into the software in the initial development phase itself.
- Since external work centres will also be involved in workflow of various products, certain modules have to be deployed in the internet domain. Hence, the software has to be thoroughly security tested for internet and intranet interfaces

## 4. Security requirement

- System functionalities shall be accessible only to authorized and authenticated users
- All transactions shall be properly logged for audit trail.
- Access logs to be maintained.
- Follow OWASP security guidelines for web applications.

## 5. Warranty and AMC

- The vendor should provide free on-site warranty support for at least one-year from the date of installation of the software. On-site warranty support should cover services such as resolving bugs related to functionality and user experience of the application, resolving performance issues etc. After expiration of the warranty period the vendor

should provide on-site support with a comprehensive AMC for a minimum of 3 years. The AMC should also include minor periodic updates and major updates for the software. AMC charges shall be quoted in the price bid submitted by the party separately (Not to be added with original cost of the software)

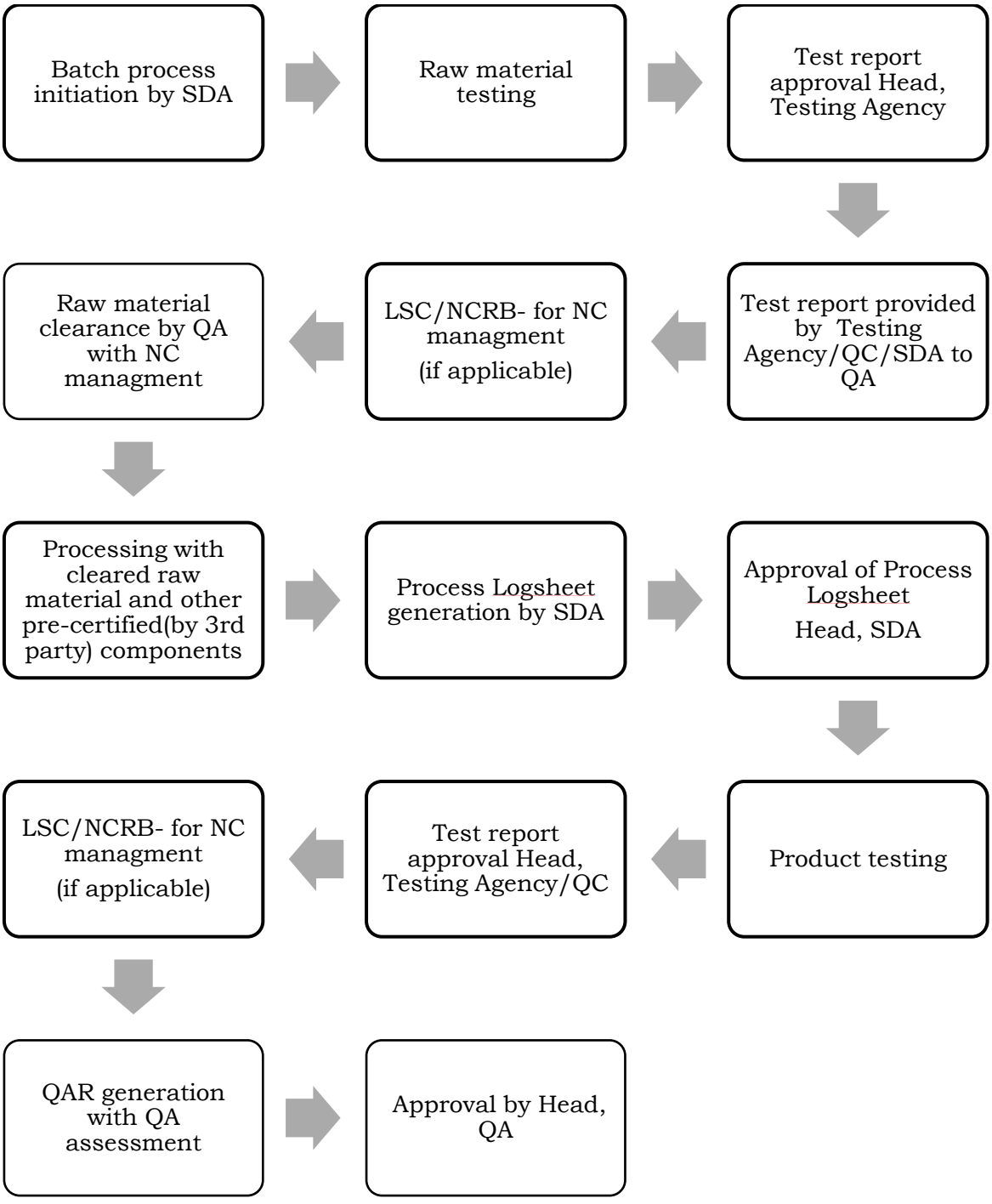
## 6. Data Security

- The vendor shall agree that all information related to this work will be treated as secret and that the contents of design, images or any other documents will not be divulged or disclosed or parted with any third party whatsoever without the written authorization by VSSC.

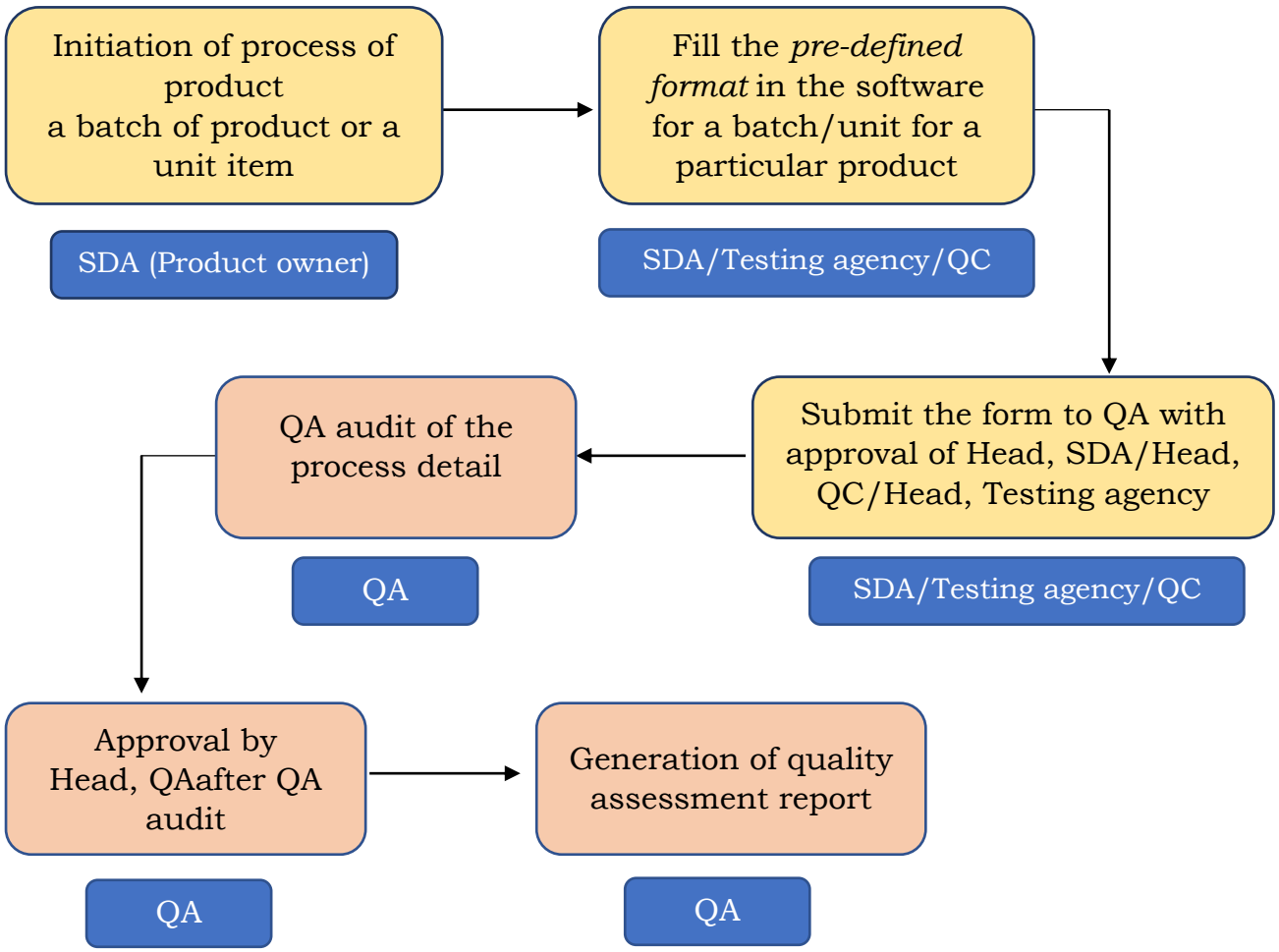
## 7. Requirements

The existing workflow (Diagram given below) has to be completely digitalized using software, including authorization and document generation/ management.

**Current workflow model (manual mode)**



**Schematic of the workflow for certification through the software**




To create the pre-defined formats for the certification of various products the following configuration options need to be designed:

1. Product configuration
2. Raw material configuration
3. Consumables configuration
4. Equipment configuration
5. Pre-certified item configuration
6. Process configuration
7. Acceptance test configuration

# 1. Product configuration

Product are the items that we have to certify using this software. Products can be of different categories. A product can have an item number or a batch number. Products are process using raw material and Pre-certified items. A product will contain the following attributes:

| Attribute | Entry method |
|---|---|
| **Name of the Product** | **Text entry, Unique identifier** |
| **Product category** | (Select from a list), Pre-defined list |
| **Product owner/SDA** | (Select from a list), User defined list<br>A division from VSSC |
| **End uses** | (Select from a list), User defined list<br>Multiple selection option |
| **Specific use** | Text entry (should be filled if applicable) |
| **Shelf life** | **Select one of the following:**<br>o In days – Provide input<br>o In month – Provide input<br>Using this duration of expiry for a batch of product will be calculated.<br>User defined date+ shelf life duration= Expiry date.<br>The user defined date may be any date in the process workflow for the product. |
| **Processing agencies** | **One of the following**<br>a) In-house<br>b) Industry<br>c) GOCO<br>d) In-house + GOCO<br>e) In-house + Industry<br>f) In-house+ GOCO+ Industry<br>g) GOCO + Industry |
| **Name of processing agency/agencies** | To be selected from an existing list as per initial selection of processing agency.<br>There may be multiple processing agencies in one category such as multiple in-house processing |

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| | agencies or multiple industries or multiple in each category as per initial selection or mix of different type. |
| **Testing agencies** | (Select from a list), User defined list/List of division in VSSC/Industry |
| **Product components** | **One of the following:**<br>o Not applicable<br>o If applicable then<br>▪ Select component type(S)<br>▪ Select component(S)<br>The user should able add multiples no. of components for a product as required. A component can be of two types: a pre-certified item or another intermediate product. The user should be able choose the components type for each component added. |
| **Product drawing** | **One of the following:**<br>o Not applicable<br>o If applicable then<br>▪ Provide drawing number (Provide text input)<br>▪ Provisional/CCB approved (select one) |
| **Method of identification** | **One of the following:**<br>o Product with batch no.<br>o Product with identification no.<br>Product are processed as batch or individual units. Each batch or unit of a particular product will have a unique identification no. The batch no./ identification no. is assigned during processing of a product. |
| **Batch size** | **One of the following:**<br>o Not applicable<br>o If applicable then<br>▪ Define batch (sizes) (Text entries)<br>If products are produced in batches this has to |

| | |
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| | defined. There may be multiple batch size for a product. The user should be able select the batch size in the workflow as per initial definition. |
| **Prefix and suffix for batch no./ Identification no.** | A list of prefix and suffix are to be maintained for the batch no./ Identification no. of a product.<br>The list should be modifiable to add new prefixes or suffixes.<br>**Usually a batch no./Identification no. should look like the following:**<br>**Prefix+ batch no./Identification no.+ Suffix** |
| **Batch identification/Item Identification** | A unique identification number is to create for each batch/each item of a product using the suffix and prefix. |

## 1.1. Product Library:

A product once defined will be saved to the product library. The library should show the products and the following attributes in a tabular format. There should be option for various sorting and search (by name), filter options such as sort/filter by name, category, end use.

❖ The following attributes are to be shown in a tabular format (list of to be attributes shown is tentative, there should be option to configure it)

- Product name
- Category
- End use
- Shelf life
- Product unit

❖ Following functions to be shown as clickable buttons

- View documents – View the documents linked to the product (such as process document, Drawings etc.). When clicked the documents should be in a tabular format in a pop-up window with the following details:
  - Document title
  - Document type
  - Document reference

- View document
- Download document

## 1.2. Adding documents for a product:

There should be provision add various types of documents related to product design, processing, testing etc. The documents have to be uploaded under user defined categories (categories are modifiable).

The viewing access to an uploaded document for a specific product will be controlled by the product owner of that product and QA only. Version control provision for the uploaded document is to be built into the software.

**The following attributes are required for a document:**

1. **Document title:** Text entry
2. **Document category:** To be selected from a list as described earlier
3. **Issue No:** Text entry
4. **Revision No:** Text entry (Duplication not allowed)
5. **Release date:** Date entry from calendar
6. **Approved by:** Text entry
7. **Upload document:** File upload, in PDF
8. **Validity:** Duration in years

## 1.3. Viewing the documents for a product:

The following attributes are to be shown in a tabular format when viewing the list of the documents for a product

- Document title
- Document category
- Issue No
- Revision No
- Release date

❖ Following functions to be enabled for each document of a product:

- **Grant access -** To provide access to other users to view/download the document. The user should be able select the name of a user or group of users under a category based on their role.
- **Delete** – To permanently delete the document from the database
- **Deactivate/activate** – To activate or deactivate the process document functions. After activation deactivation it should be tagged accordingly. Inactive process document in red colour, Active in green colour.

## 2. Raw material configuration

Raw materials are used for processing of products. A master database has to be maintained for raw materials with their acceptance parameters and respective specifications. Raw materials will be selected from this data base during product process definition with pre-defined acceptance parameters and specification. Once selected for a product there should be provision to edit the raw material acceptance parameters and specifications for that specific product and freeze it for that particular product. A raw material should have the following attributes:

i. **Name of the raw material**: **Text entry, Unique identifier**

ii. **Name of Source:** To be selected from an existing list (There may be multiple Sources)

iii. **Name of Supplier:** To be selected from an existing list (There may be multiple suppliers)

iv. **Grade: Text entry**

v. **Shelf life:** To be selected as one of the two options, in days / in months and then provide the numeric value.

**The expiry date will be calculated using this data.**

User defined date+ shelf life duration= Expiry date. The user defined date may be the date of procurement or date of manufacture or some other as per user definition**.**

vi. **Raw material properties/acceptance tests:** The raw material properties are selected from a list of pre-defined properties from material (common to products and raw materials) property library. A **periodicity of analysis (in days/months)** is also to be assigned for each of the property of a particular raw material. Some examples of raw material properties are purity, colour, density, viscosity, tensile strength etc. The user should get alert if the validity of any analysed property has expired.

vii. **Sampling plan:** A list of values for a particular property of raw material. This is no of samples to be tested for a particular property of the raw material per batch/lot. This has to be configurable. The sampling plan for same raw material when used for different product may change.

viii. **Batch Number/Lot number:** This is a modifiable attribute. Raw materials are used as lot/batches and this input is to be provided by the

user as a text entry. This attribute is unique for each lot/batch of same raw material. The user has to select the applicable identification method while defining a raw material such as to use batch number or lot number**.**

ix. **Batch size/Lot size:** Text entry

x. **Packing details:** Text entry

### 2.1. Adding a new batch/new lot of raw material to the data base

Raw materials are used in batches. All the relevant data for any new batch of raw material should be first entered into the database and saved. Only saved batches can be used during data entry for production workflow of products. The option for entering new batch of material can be put as a separate option. When adding the acceptance test results/properties for a batch of raw material corresponding test report as PDF/JPEG to be uploaded or link to be provided to the uploaded document(this is preferable to avoid multiple upload of same file, as same raw material batch may get used for different batches of products).

### 2.2. Adding documents for a raw material:

There should be provision add various types of documents related to a raw material. The following categories(tentative and expandable) will be applicable for any raw material.

1) Sampling plan
2) Specification document

**The following attributes are required for a document:**

i. **Document title:** Text entry

ii. **Document category:** To be selected from a list as described earlier

iii. **Issue No:** Text entry

iv. **Revision No:** Text entry

v. **Release date:** Date entry from calendar

vi. **Approved by:** Text entry

vii. **Upload document:** File upload, in PDF

viii. **Validity:** Duration in years

### 2.3. Raw material library:

A raw material once defined will be saved to the product library. The library should show the raw materials and the following attributes in a tabular

format. There should be option for various sorting and filter options such as sort/filter by name, category, end use.

❖ The following attributes are to be shown in a tabular format (list of to be attributes shown is tentative, there should be option to configure it)

- Raw material name
- Grade
- Shelf life
- Source

❖ Following functions to be shown as clickable buttons

- View suppliers
- View documents – View the documents linked to the raw material (such as specification documents, Sampling plan etc.). When clicked the documents should be shown in a pop-up window in a tabular format with the following details:
  - Document title
  - Document type
- Delete – To permanently delete the raw material from database
- Deactivate/activate – To activate or deactivate the raw material

### 2.4. Defining the raw materials of a product:

After defining the raw materials of product, a user should be able to change the raw material specification for **that product** such as enable or disable an existing property or update the specification of an existing property or change validity of analysis of the property. This should not affect the original raw material definition.

## 3. Consumables in production:

Consumables in productions are similar to raw materials. Same definition and library as raw materials is to be maintained.

## 4. Pre-certified item configuration

Various pre-certified items used for processing of products. A master database has to be maintained for pre-certified items with their acceptance parameters (QAR availability) and respective disposition (Clear, pending actions, rejected, side lined). These items will be selected from this data base during product process definition with pre-defined acceptance parameters and disposition. The user has to make entry of each pre-certified item in the

database as per its attributes. There should be provision to copy the details one items for subsequent items in the same category to avoid repetitive entry of same data. A pre-certified item should have the following attributes:

i. **Name of the pre-certified items**: **Text entry, Unique identifier**
ii. **Item identification no**: Text entry, each identification number should be for a particular type of item.
iii. **Name of Source:** To be selected from the list manufacturers/sources (There may be multiple Sources)
iv. **Name of Clearing agency:** To be selected from a list of divisions in VSSC (There may be multiple clearing agencies)
v. **Item type:** To be selected from a configurable list
vi. **Grade:** Text entry
vii. **Use by date/Expiry date:** Date entry
viii. **Item disposition:** The dispositions for each individual instance of the pre-certified items are selected from a list of pre-defined disposition or user defined disposition as per the following:
ix. **Upload QAR/Certificate:** The documentary proof regarding the clearance of the item is to be uploaded in PDF/JPEG format. Alternatively, a link may be provided to a central repository to avoid multiple upload of same file, as one QAR/Certificate may contains clearance for multiples components.

- **Predefined values**
  - Cleared
  - Cleared with pending action (Each pending action is to be manually entered user)
  - Rejected
  - side lined
- **Other** (user defined value)

## 4.1. Pre-certified item library

A Pre-certified item once defined will be saved to the corresponding library. The library should show the item name and the following attributes in a tabular format. There should be option for various sorting and filter options such as sort/filter by name, category, end use.

❖ The following attributes are to be shown in a tabular format

- Item name
- Grade
- Shelf life
- Source
- Clearing agency

❖ Following functions to be shown as clickable buttons

- View suppliers
- View documents – View the documents linked to the item (such as specification documents, Sampling plan etc.). When clicked the documents should be shown in a pop-up window in a tabular format with the following details:
  - Document title
  - Document type
- Delete – To permanently delete the item from database
- Deactivate/activate – To activate or deactivate the item

# 5. Equipment configuration:

An equipment is a physical object used during processing of product and used accomplish certain step in the process. Some examples of equipment are weighing balance, oven, milling machine etc. Equipment are used during some of the following instances as described below

- Inspection of raw material
- Processing of product/product parts
- Inspection of product/product parts

**The following attributes are to be required for equipment:**

i. **Name:** Text entry
ii. **Serial No/Identification no:** Text entry, **Unique identifier**
iii. **Make:** Text entry
iv. **Last calibration date:** Date entry from calendar
v. **Calibration validity duration:** Select one of the two options, in days / in months and then provide the numeric value
vi. **Calibration due date:** Auto generated based on 4 and 5 input, Text display
vii. **Upload calibration certificate: File upload, PDF/Image file**

# 6. Process configuration:

A process is sequence of steps which is performed as to achieve a certain goal or multiple goals during product manufacturing. Several smaller processes may be combined together to form the complete process chart for product manufacturing. After defining a process, it should be added to the library of processes.

**The attributes of a process:**

- **Name of the process (Unique identifier)**

  **The following attributes should be modifiable as per requirement for each product.**
- **Process step description:**
  - **Process step specification**: Each step in the unit process may have a specification such as weight of an item, time duration, start time end time, quantity etc. For steps with no specification there should be provision to select a no specification option. Process step specification will have two types of measurement either quantity measurement or time measurement.
- **Processing agency:**
  - There should an option to define a processing agency for a particular process in used for the processing of a product.

## Illustration of a process:

**Illustarion:1**

The software should be able to compare the value with specification and show alert to the user if the value is outside of the specification. The unit should be selected from the library for units.

| **Process**: Weighing of raw materials | | **Processing agency:** ABCD/XYZ | |
|---|---|---|---|
| **Date: 14/05/2023** | | **Start time:** | **End time:** |
| **Sl. No.** | **Process description** | **Specification** | **Value** |
| Step-1 | Take weight of RM-1 | 110 g to 120 g | 115 g |
| Step-2 | Take weight of RM-2 | 15 g to 20 g | 17 g |
| Step-3 | Take weight of RM-3 | 50 ml to 55 ml | 53 ml |

**Illustarion:2**

Sometimes to check repeatability of a measurement or process parameter more than one values are recorded. So, provision should be available to add multiple values. Example:

| **Process**: Measurement of dimensions | | | |
|---|---|---|---|
| **Date: 14/05/2023** | | **Processing agency:** ABCD/XYZ | |
| **Sl. No.** | **Process description** | **Specification** | **Values** |
| Step-1 | Measure diameter of Part-1 | 50mm -55 mm | 51 ,52,52.5, 53.6,54 |
| Step-2 | Measure length of part-2 | 20 mm -24 mm | 21.2, 19, 22 |
| Step-3 | Measure length of part-3 | Max 100 mm | 99.5,99.1,99.2, 98.9, 99.6 |

**Illustarion:3**

When **time** is to be measured as a process step specification only start time of the process and end time of the process will be provided as input. Duration will should be calculated automatically from the given input.

The specification unit can be the following: seconds, minutes, hours and days. The observed time duration under is to be compared with specified time duration and the application should show alert to the user if the observed value is outside of the specification

| **Process**: Mixing of raw materials | | | | | |
|---|---|---|---|---|---|
| **Date: 14/05/2023** | | | **Processing agency:** ABCD/XYZ | | |
| **Sl. No.** | **Process description** | **Specification** | **Start date and time** | **End date and time** | **Duration** |
| Step-1 | Mix RM-1, RM-2 and RM-3 using a stirrer | 30 minutes to 35 minutes | 30-05-2023 14:00 | 30-05-2023 14:33 | 33 minutes |

# 7. Intermediate products:

An intermediate product is a part or a component of another complete product. An intermediate product when added to another product its workflow should get automatically added to the main product. The workflow will be identical to that of any other product. QARs are not generated for

intermediate products. The approval process will end with QA engineer. Raw materials will be used to produce any intermediate products (IP). The attributes of intermediate products are same as that of a main product.

### Illustration of product with various pre-certified items and intermediate products:

- **Electrochemical cells:**

An electrochemical cell has various component such electrode, electrode stack, metallic combs, terminals, insulators etc. The cell is a combination of various intermediate product and pre-certified items. All the components are assembled together to form an electrochemical cell.

For an electrochemical cell the electrode, electrode stacks are intermediate products. Metallic combs, terminals, insulator etc are pre-certified items.

## 8. Acceptance tests:

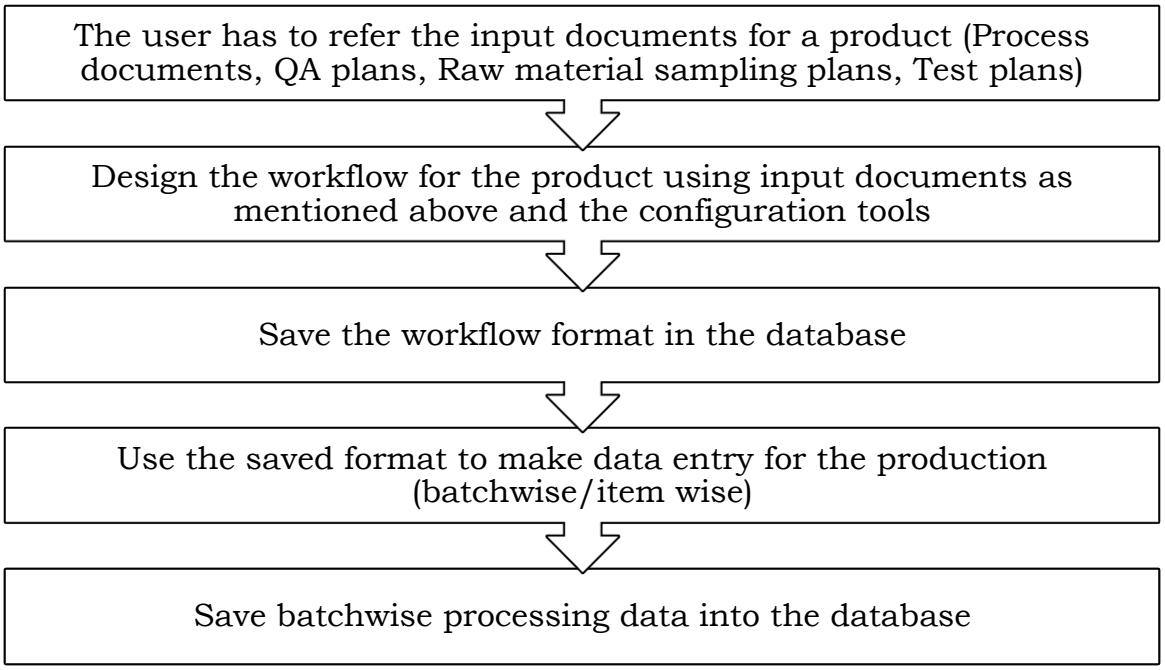
The acceptance tests of a product or raw material are to be selected from the library of acceptance tests. The following attributes are required for defining an acceptance test:

1. **Name of the acceptance test**: **Text entry, Unique identifier**
2. **Category:** To be selected from the list of acceptance test category list
3. **Testing agency:** To be selected from a list (Division in VSSC/Industry)
4. **Acceptance specification:** Specifications can be quantitative or qualitative or binary choice type.
5. **Validity of acceptance test (duration in months/days):** This attribute may vary across product/raw material. For examples, for a product A the validity of purity analysis may be 6 months, but the product B it may be 3 months and likewise for a certain raw material it may be one year.
6. **Test observations/result: Numeric** Text entry **for qualitative specification**
7. **QA remarks:** Text entry
8. **Test Report:** Upload applicable test report

The acceptance specifications should be modifiable for different product or raw materials

### Designing the workflow of a product by a user:

The user should be able to design the production workflow a product using the configuration tools described as above. The user should be able to define the sequence of each unit process and use of each intermediate product.




## Workflow for certification of a batch of product:

The products are processed in batches. The workflow starts with defining the batch no. a product. It is a continuous number. There should be provision to auto generate the batch number based on the last batch number of a product.

The process flow is as follows:

| Activity | Steps | Responsibility |
|---|---|---|
| **Product batch initiation** | • Select the product from database and initiate the batch process/item process<br>• Provide relevant details batch identification/Item identification, date of starting the production process etc. | Product owner/ SDA |
| **Component selection** | • The applicable components (such as pre-certified items and intermediate products) will be automatically listed | Product owner/ SDA |

| | | |
|---|---|---|
| | as per product definition<br>• User has to select identification/batch number of the components as per initial definition. | |
| **Raw material selection** | • The applicable raw materials will be automatically listed as per product definition<br>• Select the batch of each raw material from the database.<br>• If the user tries to use expired raw material or material outside of its validity of analysis, an alert is to be shown. | Product owner/ SDA |
| **Filling Raw material acceptance test results** | • Once the batch is selected by user this section should be filled automatically<br>• For new batch raw material, firstly the test results are to be saved to the database. Then the new batch is to be called in the workflow.<br>• While saving the data for a new batch a check has to done for duplication of batch no. of raw material. In such case an alert is to is to be shown to user as "Raw material batch number already exists"<br>• Once all the results are provided (for both new and pre-existing case) it has to submitted for approval by division head, Product owner/SDA/ Testing agency. The application should show the name of user who has made the submission.<br>• While submitting if there are any | Product owner/ SDA/ Testing agency/QC |

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|---|---|---|
| | NCs, appropriate alert should be shown to the user for applicable cases, such as "**NC in property 1, sample 5**". The NCs also should get highlighted.<br>• Material properties not meeting the specification, use of expired raw material/components, use of raw of materials after validity of analysis are considered as non-conformances. | |
| **Non conformance management** | • Nonconformance management for raw materials | Product owner/ SDA/QC/QA |
| **Filling Process log sheet** | • Fill up the pre-defined format of processing (Checklist, Logsheet etc). Checklists and log sheets will be created for product workflow definition separately using the process configuration module.<br>• After a filling the process log it has to be submitted for QA audit with approval of division head, processing agency. The application should show the name of user who has made the submission.<br>• In case of any NC is observed in process steps QA has to refer it to LSC/NCRB and same clearance workflow will be followed for the NC management as described earlier.<br>**Alternate method:**<br>**Instead of directly providing the input in the form in the software, there also should an option to upload** | Product owner/ SDA/Processing Agency/QC |

| | | |
|---|---|---|
| | **pre-filled log sheet in the software for this section in PDF/JPG format.** | |
| **Non-conformance management** | • Non conformance management for process and product | Product owner/ SDA/QC/QA |
| **Filling Product Property and other test results** | • Provide acceptance test results against the specifications in the respective fields (in a predefined format)<br>• After a filling all the pre-defined product property fields, it has to be submitted for QA audit with approval of division head, processing agency. The application should show the name of user who has made the submission.<br>• QA audit of the results and provides QA observations | Product owner/ SDA/Testing agency |
| **Approvals of review forums** | • In this field approval documents are uploaded of different review forums<br>• The documents are to be uploaded against a document title<br>• Also, provision to add link may be given incase a document has been already uploaded to the database | Product owner/ SDA |
| **QA audit and approval** | • QA engineer has to provide the QA remarks and disposition and submit to and Section head, QA. The Section head, QA will forward after review Head, QA. Final approval will be given by Head, QA. | • QA |
| • While filling the complete workflow form/log for a particular batch/item there should be an option to copy the data of a previous batch/item of the same product for which the data is already entered and populate the | | |

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| form/log for the current batch/item.<br>• An activity log is to be maintained for the workflow.<br>• In the workflow, the QA/testing agency should be able to refer back to the SDA/testing agency for any correction or further clarification at any required stage.<br>• The approval steps within the workflow of a products should be configurable (such as choosing the reviewing/approving authority for a step as per product definition)<br>• The users should be able to see a consolidated list of snags or NCs at the for a batch-based input data<br>• There should be option to save the work after any stage of data entry. After saving it should be it should visible to all the eligible users. Approval for a step should be enabled only after final submission that step in the workflow. |

## Workflow for non-conformance management:

| | |
|---|---|
| **Non-conformance management** | • If there are no deviation QA will provide clearance with approval of Section Head, QA and Head, QA.<br>• In case of deviation QA raises snag/NC and the product owner and processing agency will get an alert from QA<br>• Snag/NC are referred to LSC/NCRB by Product owner/Processing agency<br>• Decision of LSC/NCRB is to be updated in the workflow with appropriate documentary proof/approval<br>• If the proof of LSC/NCRB decision is through uploading a document such as minutes of meeting or Chairman's recommendation, it can be done by product owner/processing agency.<br>• If the recommendation of LSC/NCRB is provided directly in the workflow decides by Convener, LSC/NCRB, it should be submitted for approval by committee Chairman by the convener.<br>• In the workflow this approval is a two-step process. First |

| | |
|---|---|
| | clearance by LSC and then followed by NCRB.<br>• After LSC and NCRB clearance QA will issue clearance for the next process in the workflow<br>• This step should get enabled only if there are NCs found in any step of the workflow<br>• Input fields for LSC<br>o Description of Deviation-Text (SDA/Product owner)<br>o Cause of Deviation-Text (SDA/Product owner)<br>o Criticality-Text (SDA/Product owner)<br>o Corrective action- Text (SDA/Product owner)<br>o Preventive action- Text (SDA/Product owner)<br>o Designer comments- Text (SDA/Product owner)<br>o QA comments – Text (QA)<br>o User comments – Text (Project/Other division of VSSC)<br>o LSC Recommendation- Text (LSC, Convener/LSC, Chairman)<br>• Input fields for NCRB<br>o Description of Deviation-Text (SDA/Product owner)<br>o Cause of Deviation-Text (SDA/Product owner)<br>o Criticality-Text (SDA/Product owner)<br>o Corrective action- Text (SDA/Product owner)<br>o Preventive action- Text (SDA/Product owner)<br>o Designer comments- Text (SDA/Product owner)<br>o QA comments – Text (QA)<br>o User comments – Text (Project/Other division of VSSC)<br>o LSC Recommendation- Text (LSC, Convener/LSC, Chairman)<br>o NCRB Recommendation- Text (NCRB, Convener/NCRB, Chairman)<br>• LSC recommendation is to be approved by Chairman, LSC<br>• NCRB recommendation is to approved by Chairman, NCRB<br>**Alternative method:**<br>**Documentary proof upload**<br>Instead of NC management with direct data input to the |

| | |
|---|---|
| | application, documentary proofs related to NC management can be uploaded in the workflow by SDA. According to the documentary proofs, QA will provide the disposition. |

# Features:

- **Automated verification**

  The software should be able automatically verify the data entered by user against specifications of various parameters. In case of any deviations observed in the data entered by user compared to the specifications, the software should show an alert to the user regarding the deviation.

- **Collaboration:**

  Once a user finishes his/her activities, the user should be able to forward or assign the activity to the next user in the workflow. For this assignment the first user has to select the next user with appropriate method.

- **Notifications for activities:**
  - There should be a provision to see all the updates regarding activities related a user by clicking a single notification button.
  - A user should be able to see the new activities assigned to him/her and ongoing the activities he/she is involved thorough the software

- **Activity Log:**

  Each activity/modification carried out by a user is to be logged. Against each activity, the date and time of activity is also to be shown, the user who performed the activity is to be shown.

  - **Illustration:**

    The SDA initiates the batch process for a product and provides the raw material test details. After this step, QA has to audit the raw material test details and provide clearance for processing. So, the date on which SDA submits the results for QA audit to be shown in the activity along the user who made the submission. Similarly, when QA provides clearance to for processing that date along with QA user who provided the clearance is to be shown in the activity log.

- **Generating performance reports:**

  QA Division head should be able to generate consolidated performance reports based on selection of a date range. The consolidated performance reports should contain the following detail(s) as per user requirement:

  - Total number of reports released during a period
  - Reports released for a category of products during a period
  - Pending activities with duration

- **Data export option:**
  - The data related to processing related should be exportable to a spreadsheet

- **Data import option:**
  - There should be option to auto fill a form with data from a spreadsheet.

- **Sort and filter options:**
  - There should be a range of sort and filter options to view data of product as well as raw material
  - This data should be exportable to a spreadsheet.
  - Filter options such as:
    - Viewing a particular property of product for 10 batches as per user requirement. In this case the user should be able select the 10 batches of product and the desired property/properties of that product.
    - Viewing the details of the batches of a product that are produced within a specified period of time
    - The properties of all the batches of a product produced from a particular batch of raw material
    - Viewing the usage detail for a batch of raw material

## Generating reports

There should be provision to automatically generate reports such as (logsheets, QARs, SCRs, Surveillance report etc)) based on the data available for a particular batch of product. The formats of these documents vary widely for different product. The user should be able to design the formats for log sheets, QARs and other reports using this application. The user should be able to decide the data and parameter which need to be presented

in these reports. The report generation will be enabled only when the workflow is complete with QA assessment.

Sometimes there is requirement of generating a consolidated QAR for multiple batches of products. The software should also address the requirement of generating consolidated QAR for multiples batches or multiple items.

To meet this requirement a Reports configuration tool is to be provided. Using this configuration tool report formats are to be generated for each product. Each generated report should contain an auto generated file number in a format decided by the users.

There should be provision to view the generated reports in the software itself.

## List of libraries (Not exhaustive):

| | | |
|---|---|---|
| **Products** | A list of products added by the user. | Configurable |
| **Raw materials** | A list of raw materials added by the user. | Configurable |
| **Product categories** | A list of categories for products. The categories are to be selected from this library for product definition | Configurable |
| **Product document categories** | A list of document categories for products. While adding a new document for a product, the category of the document is to selected from this library. | Configurable |
| **Raw material document categories** | A list of document categories for products. While adding a new document for a product, the category of the document is to selected from this library. | Configurable |
| **Material Properties/ Acceptance tests** | A list of properties for raw materials as well as products. The properties/acceptance tests are to be selected from this library. | Configurable |
| **Pre-certified item category** | A list of categories for pre-certified items. | Configurable |
| **Disposition of Pre-certified item** | A list of dispositions for pre-certified items | Configurable |
| **Equipment** | A list of categories for the categories of | Configurable |

| | | |
|---|---|---|
| **category** | equipment | |
| **Units** | The product are raw material parameters will be measured in various units. A user should be able define a unit according to requirement. Some of the examples of units are: m, s, kg, g, ksc, MPa, bar, l, ml, mm, mm/s, kg/s, ohms etc. While assigning specifications units are to be selected from this library. | Configurable |
| **Product owners/ Processing agency/ Testing agencies** | A list of divisions and facilities in VSSC which are involved in the workflow. | Configurable |
| **GOCO service providers** | A list of GOCO service providers which are involved in the workflow | Configurable |
| **Manufacturers/ Industries** | list of companies/industries which may supply raw materials and also may production of outsources items. While defining the manufacturer of a new raw material or the processing agency for an outsourced product, the value should be selected from this library. | Configurable |
| **Suppliers** | Will contain a list of vendors which procure raw materials from a manufacturer and supply it to VSSC. While defining a raw material its supplier should be selected from this library | Configurable |

## User sign up process:

The user should sign up using three credentials.

1. User name
2. Password (appropriate password strength to be implemented, such as minimum 8 characters with at least 1 numeric and 1 special character)
3. Official e-mail
   Sign up will be complete with verification of link sent to respective official e-mail of users in industry/GOCO facilities

**User sign in:**

The user has to sign in using his/her user name and password provided during sign up process.

**Recovery of forgotten login credentials:**

1) Option for password change via verification with official mail
2) Option for user id recovery via verification with official mail

**Approval of User access and roles:**

- Default user sign up will be as guest.
- Once signed up, the user has to update profile with the following
  - Select Role
  - Select Name of Division/external industry
- The Administrator will approve the user roles of Division Heads/DPDs/ Managers (for Industries, has to be acknowledged by focal point in VSSC) only
- Other users working under Division Heads/DPDs/ Managers have to send request to Division Heads/DPDs/ Managers for activation of user rights for that particular role
- For change of role similar request has to be sent to system administrator

## User roles:

| **Default Role** | | |
|---|---|---|
| Guest | | |
| **Roles- In house process** | **Roles- Industry process** | **Roles- System administrator** |
| DPD Project | Operator/Technician industry | Master Administrator |
| Engineer Project | Process Manager industry | System Administrator-1 |
| Division Head SDA | QC Manager industry | System Administrator-2 |
| Section Head SDA | QA Manager industry | System Administrator-3 |
| Engineer SDA | | |
| Technical/Scientific staff SDA | **Roles- GOCO** | |
| Operator/Technicians SDA | GOCO operator | |
| Division Head QA | GOCO supervisor | |
| Engineer QA | | |
| Technical/Scientific staff QA | | |
| Division Head QC | | |
| Section Head QC | | |
| Engineer QC | | |
| Technical/Scientific staff QC | | |
| Division Head Testing agency | | |
| Section Head Testing agency | | |
| Engineer Testing agency | | |
| Technical/Scientific staff Testing agency | | |
| Member secretary, LSC | | |
| Chairman, LSC | | |
| Member secretary, NCRB | | |
| Chairman, NCRB | | |

**Some of the typical menu options (not exhaustive) for different users is attached as annexure.**

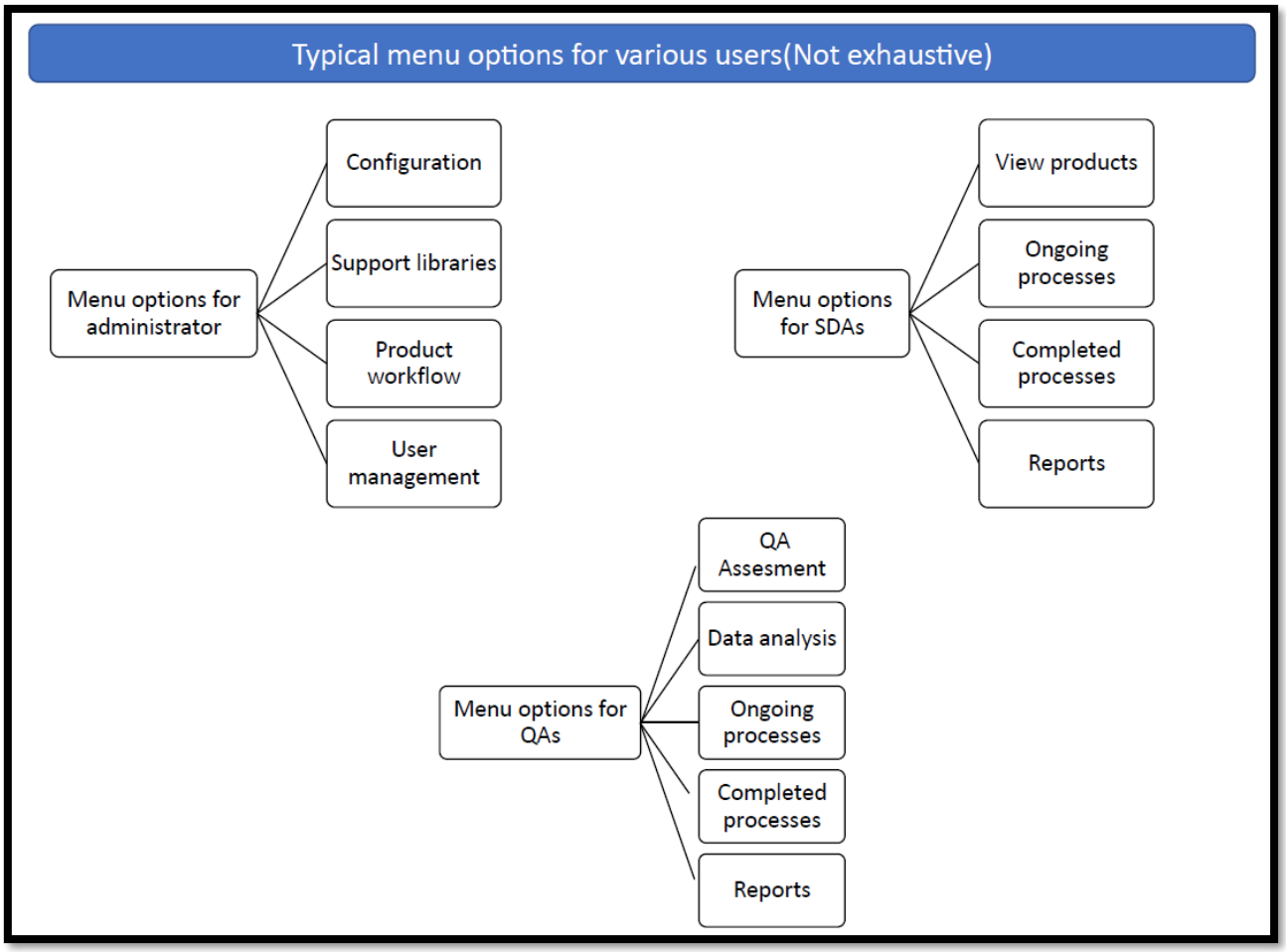
## Responsibilities and User access:

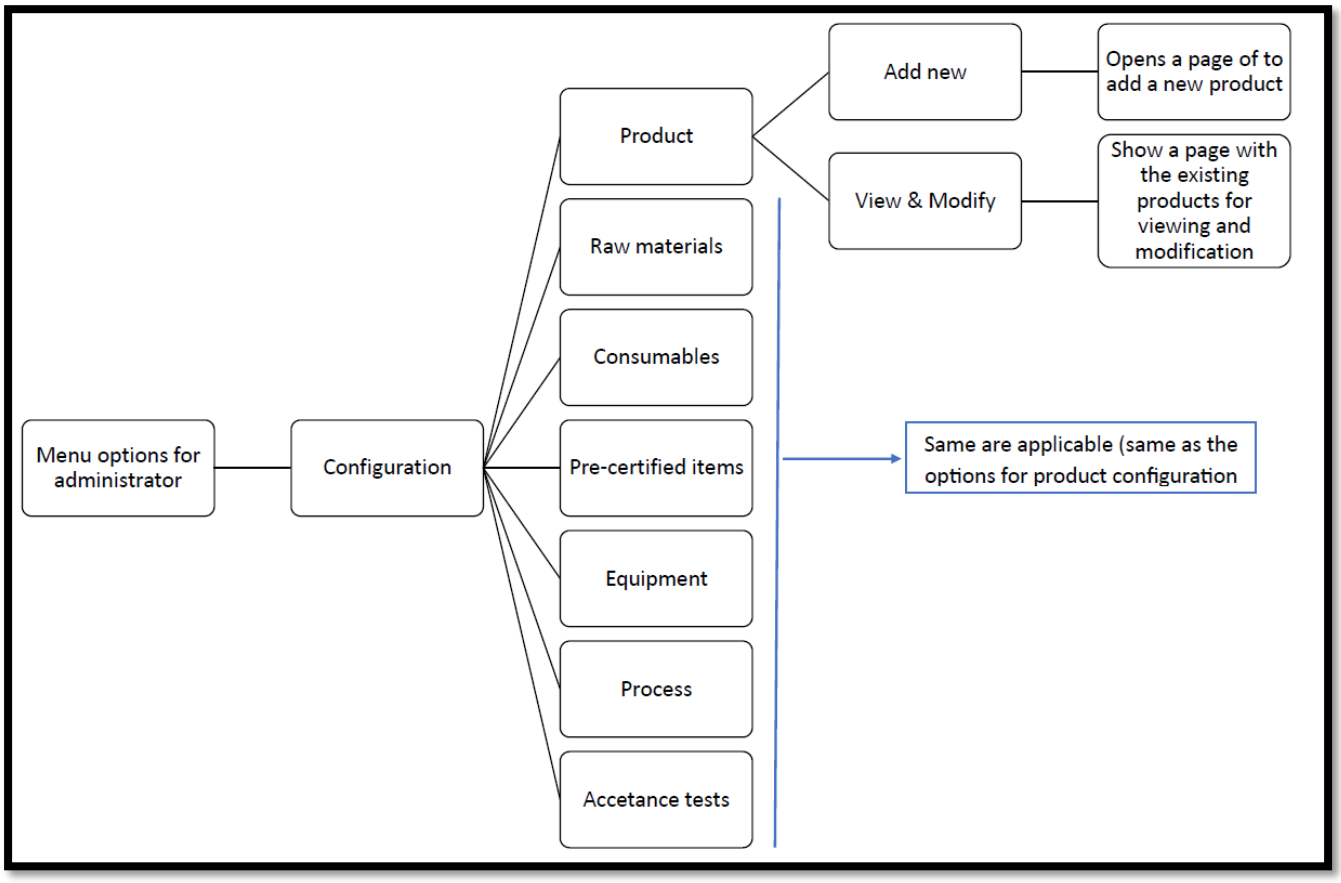
The enterprise application aims to implement a collaborative approach in product quality certification related work flow management and document management, where each stakeholder will perform their responsibilities and documentation related redundant activities will be eliminated. The roles and responsibilities should be configurable. The access of SDAs will be limited to the products they deal with.

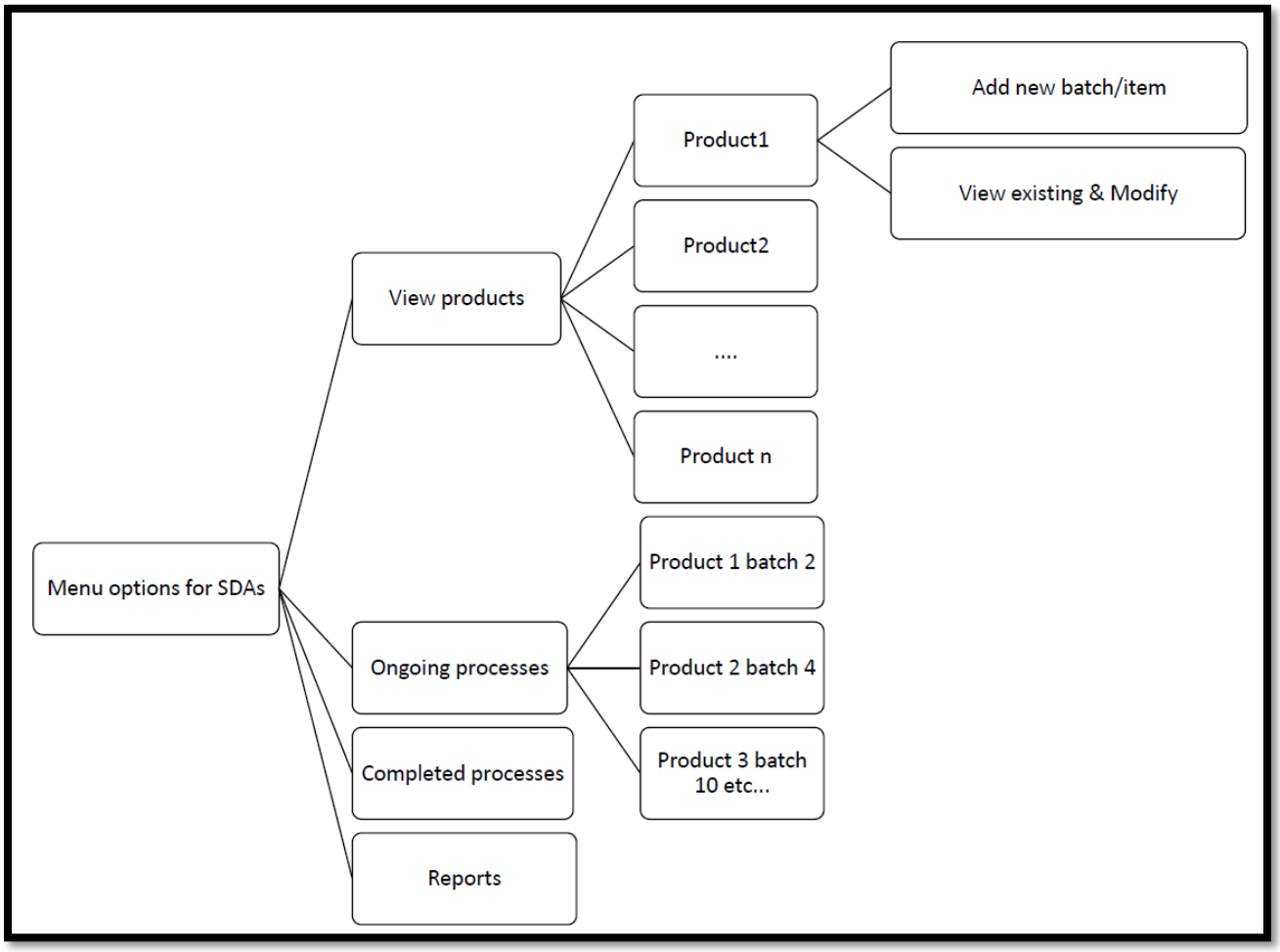
| | |
|---|---|
| Approving new users/Modifying/Deleting existing users | Administrator (admin will directly approve the Division head role only) Request for other roles are to be approved by the division head of particular division. |
| Requesting user roles under a particular division | Division head, Section heads, Engineers, Technical/Scientific staff, Operator/Technicians |
| Creating the work flow for a product | Administrator |
| Initiating batch process of a product | SDA (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| Adding/modifying raw material or product properties | SDA (Division Head, Section Head, Engineer) |
| | QA (Division Head, Section Head, Engineer) |
| Approval raw material or product property addition /modification | QA Division Head |
| Raw material testing related input | SDA (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| | Testing agency (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| | QC (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| Raw material NC /Product NC related input | SDA (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| | QC (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| Product processing related input | SDA (Division Head, Section Head, Engineer, Technical/Scientific staff, Operator/Technicians) |
| | QC (Division Head, Section Head, Engineer, Technical/Scientific staff) |
| Uploading product related documents | SDA (Division Head, Section Head, Engineer) |
| Uploading raw material related documents | SDA (Division Head, Section Head, Engineer SDA) |
| | QA (Division Head, Section Head, |

| | |
|---|---|
| | Engineer) |
| Approval of process raw material, product processing details | SDA Division Head |
| QA comments and Observation input | QA (Division Head, Section Head, Engineer) |
| Approval of QA comments and Observation | QA Division Head |
| Viewing/Downloading QARs | Projects, Product owner, QA |

# Annexure


Typical menu options for various users(Not exhaustive)
Menu options for administrator
Configuration
Support libraries
Product workflow
User management
Menu options for SDAs
View products
Ongoing processes
Completed processes
Reports
Menu options for QAs
QA Assesment
Data analysis
Ongoing processes
Completed processes
Reports


Menu options for administrator
Configuration
Product
Raw materials
Consumables
Pre-certified items
Equipment
Process
Accetance tests
Add new
Opens a page of to add a new product
View & Modify
Show a page with the existing products for viewing and modification
Same are applicable (same as the options for product configuration


Menu options for SDAs
View products
Product1
Add new batch/item
View existing & Modify
Product2
....
Product n
Ongoing processes
Product 1 batch 2
Product 2 batch 4
Product 3 batch 10 etc...
Completed processes
Reports