REPORT FOR RISK ASSESSMENT & MITIGATION FOR THE HANDLING OF RAW MATERIAL STORED AT BELOW 25°C TEMPERATURE IN WAREHOUSE

REPORT

FOR

RISK ASSESSMENT

& MITIGATION

FOR

THE HANDLING OF

RAW MATERIAL STORED AT BELOW 25°C TEMPERATURE IN WAREHOUSE

Location: Warehouse

LOCATION: ……...

Report No.	
Reference Protocol No.	
Supersede Document No.	NA
Effective Date	
No. of Pages	10

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REPORT CONTENTS

REPORT FOR RISK ASSESSMENT & MITIGATION FOR THE HANDLING OF RAW MATERIAL STORED AT BELOW 25°C TEMPERATURE IN WAREHOUSE

1.0 Report Approval

This is a specific Report for Risk assessment and Mitigation for handling of Raw Material stored at below 25^0C Temperature in Warehouse..

The Report has been approved by the following

Prepared By:

Name	Designation	Department	Signature	Date
		Quality Assurance		

Checked By:

Name	Designation	Department	Signature	Date
		Warehouse		
		Quality Assurance		

Approved By:

Name	Designation	Department	Signature	Date
		Quality Assurance		

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2.0 Overview

Objective:
The Objective of this Report is to adopt a systematic process for the assessment, control, communication and review of risk associated with the handling of Raw Material stored at below 25^0C Temperature in Warehouse.

Purpose and Scope

The purpose of this report is to outline a scientific and practical approach for decision making process by applying a suitable tool of risk assessment covering all aspects of risk associated with the handling of Raw Material stored below 25^0C Temperature in Warehouse.

Risk Assessment Team

- Quality Assurance Executive/Officer/Manager
- Warehouse Executive/Officer/Manager

Responsibility

S.No.	Department	Designation	Responsibility
1.	Quality Assurance	Executive /Officer / Manager	Preparation, Review and approval of Protocol & report To review all the Procedural controls To perform impact evaluation for the risk associated with the handling the raw material stored at ambient temperature in ware house. Assist and regulate the implementation of risk mitigation procedures/activity Final approval of Protocol & report By head quality Assurance
2.	Warehouse	Executive /Officer /Manager	Preparation, Review and approval of Protocol & report To provide all relevant information for the identification, analysis and evaluation of risk associated with handling the raw material stored at ambient temperature in ware house.

3.0 Introduction

Risk analysis for the handling of Raw material Raw Material stored at below 25^0C Temperature in Warehouse shall be done by considering the below mentioned factors

- The Risk Impact on the Process
- The Risk impact on the Product Quality
- The Risk impact on the environment
- The Risk impact on the person
- The Risk impact on the regulatory compliance
- The risk impact on the customer

4.0 Quality Risk Management Process

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Risk assessment is a systematic process of organizing information to support a risk decision to be made within a risk management process. Its consists Identification of hazards and the analysis and evaluation of risks associated with exposure to those hazards
Quality risk assessment begins with a well defined problem description or risk question.
For risk assessment process three fundamental questions are considered

- What might go wrong?
- What is likely hood **(Occurrence)** it will go wrong?
- What are the consequences **(severity)?**

- **Risk Identification**
  Risk Identification is systematic use of information to identify hazards referring to risk questions or problem description. Information may include historical data theoretical analysis, informed opinions and concerns of stakeholders. risk Identification will be conducted by reviewing the types of events that might occur in both normal and unusual situations. This may be done by challenging the normal presumptions, and considering the possibilities of unanticipated situations. For each risk event, the underlying (root) cause should be determined that will create the potential risk occurrence.
  Risk Identification addresses the "what might go wrong" question including identifying the possible consequences. This provides the basis for the further steps in quality risk management process.

- **Risk Analysis**
  Risk analysis is the estimation of risk associated with the identified hazards.
  It is the quantitative or qualitative process of linking the likelihood of occurrence and severity of harm and sometime the detectability of harm is also consider during estimation of risk.
- **Risk Evaluation**
  Risk Evaluation compares the identified and analyzed risk against the given risk criteria. Risk evaluation considers the strength of evidence for all three of fundamental questions.
  Risks are ranked by scoring various criteria with appropriate numerical ratings, adding to scores to determine the overall score of each risk, and sorting the risks into descending order based on each score. A risk scoring threshold is established, over which risks must be mitigated using adequate design and/ or process controls that will protect the system. Those risks that fall below the threshold are either unmitigated or scheduled for later mitigation. An additional threshold or characteristic of risk can be used to determine the differentiation of non- mitigation versus postponed mitigation.

- **Risk Control**
  Risk control includes decision making to reduce or mitigate risk. The purpose of risk control is to reduce the risk to the acceptance level

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The risk control is done by considering the following question

- Is the risk above an acceptable level?
- What can be done to reduce or eliminate risk?
- What is appropriate balance among benefits, risks and resources?
- Are new risk is introduced as a result identified risk being controlled?

- **Risk Reduction**

  Risk reduction focuses on processes the mitigation or avoidance of quality risk when it exceeds the acceptable level. Risk reduction includes action taken to mitigate the severity, occurrence or probability of harm and the processes that improve the detectability of harm. It is the part of risk control strategy and involves

  - Engineering Control
  - Procedural Control
  - Manual control etc.

5.0 Risk Assessment for the handling the raw material stored at ambient temperature in Warehouse

5.1 Risk Assessment Legend

A. Severity

Ranking	Effect	Criteria
10	Hazardous	Hazardous effect without warning. Safety related. Regulatory non-compliant.
9	Serious	Potential hazardous effect. Able to stop without mishap. Regulatory compliance in jeopardy.
8	Extreme	Item inoperable but safe. Customer very dissatisfied.
7	Major	Performance severely affected but functional and safe. Customer dissatisfied.
6	Significant	Performance degraded but operable and safe. Non-vital part inoperable. Customer experiences discomfort.
5	Moderate	Performance moderately affected. Fault on non-vital part requires repair. Customer experiences some dissatisfaction.
4	Minor	Minor effect on performance. Fault does not require repair. Non-vital fault always noticed. Customer experiences minor nuisance.
3	Slight	Slight effect on performance.Non-vital fault notice most of the time. Customer is slightly annoyed.
2	Very Slight	Very slight effect on performance. Non-vital fault may be noticed. Customer is not annoyed.
1	None	No effect.

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B. Probability or Occurrence

Ranking	Possible Failure	Probability of Failure
10	≥ 1 in 2	Almost certain.
9	1 in 3	Very high.
8	1 in 8	High.
7	1 in 20	Moderately high.
6	1 in 80	Medium
5	1 in 400	Low
4	1 in 2,000	Slight
3	1 in 15,000	Very slight.
2	1 in 150,000	Remote.
1	1 in 1,500,000	Almost impossible.

C. Detection

Ranking	Detection	Likelihood of Detection by design control
10	Absolute Uncertainty	No design control or design control will not detect potential cause
9	Very Remote	Very remote chance design control will detect potential cause.
8	Remote	Remote chance design control will detect potential cause.
7	Very Low	Very low chance design control will detect potential cause.
6	Low	Low chance design control will detect potential cause.
5	Moderate	Moderate chance design control will detect potential cause.
4	Moderately High	Moderately high chance design control will detect potential cause.
3	High	High chance design control will detect potential cause.
2	Very High	Very high chance design control will detect potential cause.
1	Almost Certain	Almost certain that the design control will detect potential cause.

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5.2 Risk Assessment Tool – Failure Mode effect Analysis (FMEA)

5.2.1 Risk Identification

Risk assessment team shall identify all possible failure modes associated with the handling the raw material stored at ambient temperature.

1. **Identification of Failure Mode**
   a. Equipment Malfunctioning.
   b. Failure of instrument.
   c. Calibration of Instrument expired.
   d. Failure of process.
   e. Failure of procedure.

2. **Identification of Potential cause**
   a. Equipment Malfunctioning.
   b. Instrument malfunctioning.
   c. Operator Error.
   d. Inefficient Provisions for operations etc.

3. **The consequences i.e. End results of failure mode**

   Higher the temperature it will have following impact
   a. Poor process Performance.
   b. Poor Product Quality.
   c. Deterioration of Environmental condition for manufacturing.
   d. Regulatory non compliance.
   e. Unsafe operating conditions.
   f. Unsafe environmental conditions etc.
   g. Customer dis-satisfied.

4. . **Justification**

   The identification done for the risk shall have scientific rational and must be justified for its validity. The below mentioned table shall be used for Risk Identification process

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5.2 Risk Assessment Tool-Failure Mode effect analysis

5.2.1 Risk identification

<table>
<tr><th>S.No.</th><th>Failure Mode {What can go wrong)</th><th>Potential cause of Failure</th><th>What are the Consequences</th><th>Justification</th></tr>
<tr><td></td><td colspan="4">Risk Identification</td></tr>
<tr><td>1</td><td>Case-I

Equipment/ Instruments</td><td>1) The sensors of cold rom in warehouse A,B,C are not in state of calibration i.e. the due date of calibration would have been expired of sensor No.
<table>
<tr><th>S.No.</th><th>Location</th><th>Sensor No.</th></tr>
<tr><td>1</td><td>FG Store</td><td></td></tr>
<tr><td>2</td><td>FG Store</td><td></td></tr>
<tr><td>3</td><td>FG Store</td><td></td></tr>
<tr><td>4</td><td>FG Store</td><td></td></tr>
<tr><td>5</td><td>RM Store</td><td></td></tr>
<tr><td>6</td><td>RM Store</td><td></td></tr>
<tr><td>7</td><td>Returned Goods Store</td><td></td></tr>
</table></td><td>The quality attributes of Raw material stored used for various products hold get adversely effected if the temperature is not prevailed.</td><td>It might be possible that after the due date the sensors may not give the actual value for theses parameters.

So the actual temperature may be at higher side or lower side</td></tr>
</table>

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S.No.	Failure Mode {What can go wrong)	Potential cause of Failure	What are the Consequences	Justification
	Risk Identification			
		2) Electrical fluctuation 3) Equipment Breakdown 4) Preventive Maintenance of Temperature Monitoring system		
2	**Case-II** Manpower	5) Non availability of supervisory control. 6) People are not trained for the Handling of procedures. 7) Non existence of verification procedures or supervisory control.	Product quality will not stable as desired.	Untrained Persons can make mistakes & errors because of unawareness about the end results
3	**Case-III** / Temperature Controlling effect	8) Inappropriate door Opening and Closing	Product quality will not stable as desired.	Inappropriate door opening & Closing give a chance of Temperature fluctuation

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5.2.2 Risk Analysis

S.No.	Failure Mode {What can go wrong}	Potential cause of Failure	What are the Consequences	Existing Design Control	Severity	Probability	Detection	Risk Priority Number
					(S)	(P)	(D)	RPN=S x P x D
	Risk Analysis							Risk valuation

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<table>
<tr>
<td>01</td>
<td></td>
<td>1) The sensors of cold rom in warehouse A,B,C are not in state of calibration
i.e. the due date of calibration would have been expired of sensor No.

<table>
<tr><th>S.No.</th><th>Location</th><th>Sensor No.</th></tr>
<tr><td>1</td><td>FG Store</td><td></td></tr>
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<tr><td>4</td><td>FG Store</td><td></td></tr>
<tr><td>5</td><td>RM Store</td><td></td></tr>
<tr><td>6</td><td>RM Store</td><td></td></tr>
<tr><td>7</td><td>Returned Goods Store</td><td></td></tr>
</table>
</td>
<td></td>
<td>Work order system to rectify the failure of door functioning.

SOP on Calibration of Instruments</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>RPN = 5X6X2 =60</td>
</tr>
</table>

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S.No.	Failure Mode {What can go wrong}	Potential cause of Failure	What are the Consequences	Existing Design Control	Severity	Probability	Detection	Risk Priority Number
					(S)	(P)	(D)	RPN=S x P x D
	Risk Analysis							**Risk valuation**
01		) Electrical fluctuation 3) Equipment Breakdown 4) Preventive Maintenance of Temperature Monitoring system	Work order system to rectify the failure of door functioning.	Calibration & preventive Maintenance	5	6	2	RPN = 5x6x2 =60
02		5) Non availability of supervisory control. 6) People are not trained for the Handling of procedures. 7) Non existence of verification procedures or supervisory control.	Product quality will not stable as desired.	SOP on procedure for training of employee	5	6	2	RPN = 5x6x2 =60

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S.No.	Failure Mode {What can go wrong}	Potential cause of Failure	What are the Consequences	Existing Design Control	Severity	Probability	Detection	Risk Priority Number
					(S)	**(P)**	**(D)**	**RPN=S x P x D**
	Risk Analysis							**Risk valuation**
		8) Inappropriate door Opening and Closing	Product quality will not stable as desired	SOP on Storage of raw material in warehouse areas and monitoring of temperature in these areas SOP on Receipt & storage of raw material & packaging material	5	6	2	RPN = 5X6X2 =60

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5.2.3 Risk Reduction or Mitigation

<table>
<tr><th rowspan="2">S.No.</th><th>Failure Mode {What can go wrong}</th><th>Potential cause of Failure</th><th>Existing Design Control</th><th>Severity</th><th>Probability</th><th>Detection</th><th>Risk Priority Number</th><th>Additional Design Control</th><th>Severity</th><th>Probability</th><th>Detection</th><th>Risk Priority Number</th></tr>
<tr><th></th><th></th><th></th><th>(S)</th><th>(P)</th><th>(D)</th><th>(RPN)</th><th></th><th>(S)</th><th>(P)</th><th>(D)</th><th>(RPN)</th></tr>
<tr><td></td><td colspan="12">Risk Mitigation</td></tr>
<tr><td>02</td><td>Equipment/Instruments</td><td>The sensors of cold rom in warehouse A,B,C are not in state of calibration i.e. the due date of calibration would have been expired of sensor No.
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<tr><th>S.No.</th><th>Location</th><th>Sensor No.</th></tr>
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<tr><td>7</td><td>Returned Goods Store</td><td></td></tr>
</table></td><td>Work order system to rectify the failure of door functioning</td><td>5</td><td>6</td><td>2</td><td>RPN = 5X6X2 =60</td><td>Existing design control keep the risk at acceptable level.</td><td>5</td><td>6</td><td>2</td><td>RPN = 5X6X2 =60</td></tr>
</table>

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S.No.	Failure Mode {What can go wrong}	Potential cause of Failure	Existing Design Control	Severity (S)	Probability (P)	Detection (D)	Risk Priority Number (RPN)	Additional Design Control	Severity (S)	Probability (P)	Detection (D)	Risk Priority Number (RPN)
	Risk Mitigation											
01		) Electrical fluctuation 3) Equipment Breakdown 4) Preventive Maintenance of Temperature Monitoring system	Calibration & preventive Maintenance	5	6	2	RPN = 5X6X2 =60	Existing design control keep the risk at acceptable level.	5	6	2	RPN = 5X6X2 =60

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S.No.	Failure Mode {What can go wrong}	Potential cause of Failure	Existing Design Control	Severity (S)	Probability (P)	Detection (D)	Risk Priority Number (RPN)	Additional Design Control	Severity (S)	Probability (P)	Detection (D)	Risk Priority Number (RPN)
	Risk Mitigation											
		5) Non availability of supervisory control. 6) People are not trained for the Handling of procedures. 7) Non existence of verification procedures or supervisory control.	SOP on Receipt & storage of raw material & packaging material SOP on Operation and cleaning of cold room	5	6	2	RPN = 5x6x2 =60	Existing design control keep the risk at acceptable level.	5	6	2	RPN = 5x6x2 =60

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S.No.	Failure Mode {What can go wrong}	Potential cause of Failure	Existing Design Control	Severity (S)	Probability (P)	Detection (D)	Risk Priority Number (RPN)	Additional Design Control	Severity (S)	Probability (P)	Detection (D)	Risk Priority Number (RPN)
	Risk Mitigation											
		Inappropriate door Opening and Closing	SOP on Storage of raw material in warehouse areas and monitoring of temperature in these areas	5	6	2	RPN = 5x6x2 =60	Existing design control keep the risk at acceptable level.	5	6	2	RPN = 5x6x2 =60

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6.0 Acceptance Criteria

The Risk Priority Number shall be within the range 0<RPN<125

7.0 Risk Control Strategy

S.No.	Risk Priority Number	Risk Decision	Risk control strategy
1.	0<RPN<125	Risk Acceptable	No control is required
2.	125<RPN<500	Risk Reduction	Additional Procedural Control
			Manual Control
			Documentary Evidence
3.	500<RPN<1000	Risk Reduction	Rugged Procedural control
			Additional Manual Control
			Auditing
			Engineering controls (if Possible)

8.0 Summary & Conclusion

On the basis of Risk assessment process using FMEA tool it is concluded that Raw Material stored at below 25^0C. Temperature in Warehouse is associated with an acceptable level of risk and there is no any adverse impact of on carrying out the handling the raw material at below 25^0C temperature in warehouse under the given set up.

9.0 References

1. Risk Management Master Plan
2. ICH Q9

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10.0 Annexures

Annexure No.	Annexure Title
01	List of RM stored at below 25^0C in warehouse
02	List of SOP's
03	Calibration record of RTD sensors Instrument Tag No.
04	Back up data for the 2 month

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List of SOP index

S.No.	SOP No.	Name of SOP
1.		SOP on Calibration of Instruments.
2.		SOP on procedure for training of employee.
3.		SOP on Operation and cleaning of cold room.
4.		SOP on Storage of raw material in warehouse areas and monitoring of temperature in these areas.
5.		SOP on Receipt & storage of raw material & packaging material.