RISK ASSESSMENT FOR FACILITY

FACILITY SYSTEM:

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
01	**Cross Contamination**	High	Direct impact on product quality and poses a very high safety risk to the patient.	Inadequate filtration of air.	25	Interlocking system in all production area. **HVAC** system installed for controlling: Control airborne particles, dust and micro-organisms – Through air filtration using high efficiency particulate air (HEPA) filters. Maintain room pressure (delta P) Maintain space moisture (Relative Humidity) Maintain space temperature.	1	25
				Inadequate documents to specify limits and for		All critical areas Pressure differentials maintained and monitored between processes as per defined frequencies and recorded in		

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				recording of pressure difference.		documents. SOP available to provide a limits of pressure difference area wise and guidance or action to be taken in case of pressure difference is not within limit.		
				Inadequate design of Pressure differentials		The facility is designed for manufacturing and packaging of oral solid dosage form. Area pressure difference designed adequately as critical areas (processing area) are having negative pressure with respect to corridor.		
				Inadequate monitoring or testing of filters		During area qualification HEPA Filter integrity testing and non-viable particle counting was done. SOP is available for defining periodic frequency of requalification		

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						of the area and checking of integrity testing of filters.		
				Improper gowning procedure.		SOP for entry and exit is available. Periodic Training given to concerned staff. Stepwise Pictorial presentation displayed in all change rooms for easy understanding. Personnel are trained on SOP and training records are in place.		
02.	**Segregation of materials/ products**	High	May lead to mix-ups.	Inadequate material storage space.	25	**Stores:** Adequate area has been provided in the Store to facilitate segregation of materials based on status. Raw and packing materials are stored separately in different area. **Production:** Adequate area has been provided in production for	1	25

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						manufacturing, filling and packing of tablets and capsules. Separate area provided for granulation, blending, compression, coating, capsule filling and Packaging for orderly placement of equipments and materials to prevent mixups between ingredients, packaging materials, labels, in process materials and finished products. Dispensed raw and packing material stored separately in day store area. Final Blend, filled capsules, core tablets, coated tablets stored in Quarantine area. Personnel are trained on SOP and training records are in place.		
				Inadequacy in		Colour coded labels are affixed to		

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				identification of materials having different status.		identify between different status of quarantine and approved materials. Materials are allocated retest dates and are segregated once they are due for retesting.		
				Improper segregation of raw and packing material in production.		Dispensed Raw and packing material (primary and secondary) properly segregated and kept in day store area under lock and key provision with proper status label for material as well as area. After line clearance activity when material required for production activity then transfer to respective area and material again verified by production and QA before its use.		
				Improper segregation of Intermediate		Intermediate products such as final blend, filled capsules, core tablets, coated tablets properly stored in		

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				products.		quarantine area with proper status label and segregated by partitions. After Line clearance activity Intermediate products transfer to packaging activity on respective packaging line and recorded in batch manufacturing record and batch packaging record.		
				Improper Segregation of packing lines.		Different packing lines are separated by partitions to avoid mix ups. Line clearance activity, proofs verification and in process checks carried out as per batch packaging record. Dispensed packing material kept under lock and key with proper status label.		
				Improper		SOP is available for status labeling, training provided on regular basis as		

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				status labeling		per define frequency to all concerned staff. Status labels counter checked during line clearance activity by QA on routine basis.		
03	**Flow of material/ product and personnel**	High	May lead to contamination and mix-ups between products No cross over bench in secondary change room.	Cross flow of materials/ products Uncontrolled and inadequate gowning of personnel Chance of cross contamination	15	Uni-directional flow of materials/ product designed in facility lay out. Written procedures are available area wise for man and material movement. Man movements from change rooms and material movements through pass boxes / material entry. SOP of Entry and Exit of Personnel / for visitor in production, SOP for Entry and Exit of personnel in the centralized Store, SOP for Entry and Exit to dispensing and sampling area	1	15

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						are in place. Individual manufacturing, packaging, and testing areas are clearly defined and if necessary segregated. Personnel are trained on SOP and training records are in place. Company shoes are provided at gate. Company shoes replace with sleeper in change room. So there is no chance of cross contamination during secondary growing without cross over bench. SOP for gowning and de-gowning procedure.		
04	**RLAF failure in dispensing area**	High	Extraneous contamination	Power failure, Filter	25	SOP available to handle the situation of power failure. SOP available for	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			Viable / Non Viable contamination resulting in failure to meet predetermined standards of quality.	blocking, Filter damage, No clear instructions for filter cleaning & replacement, Deviation from written down procedures, Mechanical failure.		monitoring & recording of manometer readings for filter. Cleaning and Periodic validation of RLAF & PAO testing done at defined frequency as per protocol. Clear written instructions for filter cleaning & replacement are in-place. Trained staff, UPS backup is provided. Periodic Preventive Maintenance schedule available.		
05	**Environment control**	High	Increased bio-load of the area and thereby contamination of the product manufactured in the area	Inadequate Procedures	25	Limits given for temperature, RH and pressure differential as per area wise in environmental monitoring SOP. Environment monitoring is carried out for all core process areas as per SOP.	1	25

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			Extraneous contamination Viable / Non Viable contamination resulting in failure to meet predetermined standards of quality.			Environmental parameters are checked as per defined frequencies and recorded in batch production record or logs. Gowning procedures are followed as per SOP. Fumigation of area is carried out as per SOP. Procedure for Cleaning and Sanitization given and rotation of sanitizing agents and their usage frequency given in SOP. SOP is available to handle the situation during power failure. Personnel are trained on SOP and training records are in place.		

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				Disinfectant efficacy study and rotation schedule not defined		Efficacy of disinfectants is established and cleaning procedures define the rotation of disinfectants at a designated frequency.		
				Inadequacy in design of air changes per hour.		The no. of air changes designed and observed are greater than 20 air changes per hour in all the processing areas.		
				Inadequate air conditioning.		The entire area is well lighted. Heating, ventilation and air conditioning system are to be controlled to avoid decomposition of chemicals, materials and product.		
06	**Construction of Rooms**	High	May lead to difficulty in production activity Difficulty in Cleaning	Improper design of building or facility. Dimensions of the rooms not adequate.	25	Facility qualification is carried out prior to approval of the facility for manufacturing use, which includes verification of each room and layouts. The facility is designed, constructed,	1	25

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			which may lead to contamination. DP of area will disturb.	Floors are not joint less, smooth. Corners are not smooth (wall to floor/wall to wall/wall to ceiling) Wall/Paint is not washable. Door direction is inadequate. Opening is towards negative pressure side.		and maintained such that they prevent the entry of pests into the building and also prevent the migration of extraneous material from the outside into the building and from one area to another. Doors, windows, walls, ceilings, and floors are designed such that no holes or cracks are evident (other than those intended by design). Production areas are segregated from all non-production areas. Floors, walls, and ceilings are hard, smooth and free of sharp corners and easy for cleaning. Brick, cement blocks, and other porous materials are sealed. Joints between walls, ceilings and floors are sealed. Pipes, light fittings, ventilation points and		

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						other services surfaces are designed for easy cleaning. Floor drains are screened and trapped. Wash-up and toilet facilities are well separated from production areas and are sufficiently spacious, well ventilated, and permits good sanitary practices. Doors are opened in positive area. Facility Qualification protocol & Report are in place.		
Utilities – Compressed Air								
07	**Filters**	High	Any contamination will pose a risk to product quality as	Inadequate filtration of compressed air.	25	Terminal filters of 0.01µ are placed at all points where the compressed air comes in direct contact with the product.	1	25

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			compressed air comes in direct contact with the product	Integrity of the filter Compressed air not meeting the requirements for bio-load, oil and water content and particulate matter.		The filter integrity tests are carried out in schedule plan. The compressed air tested as schedule for particle count, bio-load, oil content and water content. All the terminal filters are replaced in schedule manner. SOPs, Protocol & Report for validation of compressed air are in-place.		
08	**Combine HVAC system**	High	Cross contamination HEPA filter of the processing area, cattered by same AHU,	Cross contamination between two or more cubical Ruptured HEPA filter	25	SOPs, Protocol & Report for validation of HVAC system are in-place. HEPA filter (EU13) on terminal. Filter (EU 08) on plenum. PAO test for filter integrity test.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			get ruptured	during processing of different product cause cross contamination.		Personnel are trained on SOP and training records are in place. For the areas cattered by same AHU, in addition to terminal HEPA filters, semi HEPA filters are installed. Continuous differential pressure monitoring of semi HEPA filter is carried out. Periodic integrity checking of semi HEPA and HEPA filter are carried out as per SOP.		
09	**Pest Control**	Medium	Un-control of pest and rodent	No Program to be conducted for routine basis.	15	Perform the Pesticides spraying activity twice a week. SOP of pest control program. Record of Pest treatment conducted Safe disposal of pesticides outside the factory premises after use as per	1	15

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						given SOP.		
10	**Utilities – Purified Water**	High	Microbial Contamination of product	Inadequately designed purified water system No controls for quality parameters of purified water system at generation and in distribution	25	Purified Water System has been designed with a continuous loop in distribution system with no dead legs and the material of construction of the pipeline is SS 316 electro polished. The system is designed to provide purified water meeting our specifications. The Purified water system and all the user points have been subjected to 3 phase PQ which involves extensive sampling from all the user points at regular frequencies. SOP available with details for frequency of Filter replacement, UV Lamp replacement (After 7000 burning hrs), Sanitization of system.	1	25

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						Water system validation & Qualification SOPs for Operation, cleaning, Regeneration, and Sanitization are in place.		
11.	**Fire System**	High	May lead to catch fire. Harmful for person and product. Harmful for assets	Short circuit. Mishandling of inflammable material. Fire extinguisher for small fire.	25	Proper training as per SOP. Fire extinguishers checked & refilled are timely Fire fighting team member are trained. Fire alarms are working properly. Fire hydrant pumps, hose pipe checked regularly. Site emergency plan is in place. Smoke detectors are in place. Mock drill procedures are in place.	1	25

RISK ASSESSMENT FOR FACILITY

EQUIPMENT SYSTEM:

S.No.	Risk identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
01	**Design of equipment**	High	Unsuitable for manufacturing	Inadequately defined URS	25	A detailed URS was signed off and the equipments were complying to all the criteria for Installation, Operation and Performance and product requirement. SOPs for Preventive Maintenance are in place and PMs are executed based on designated frequency as per SOP and associated checklist.	1	25
02	**Material of construction**	High	Contamination of the product manufactured	Inadequately defined URS MOC prone to corrosion, reactive	25	All the product contact parts of the equipment are SS 316 and certification provided by vendors. Verification of test certificate	1	25
03	**Instruments/In Process instruments**	High	May lead to product failure		25	Calibration schedule/planner is in place. Calibration is carried out by External Agency as per schedule.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)

MATERIAL SYSTEM:

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
01.	**Receipt of material from unapproved vendor.**	High	Material may not meet specification requirements.	Vendor approval not in place.	25	Vendors are approved by QA. Raw materials are procured by Purchase from approved vendors and send to warehouse for further processing. At the time of receipt, warehouse personnel checked it against approved vendor list provided by QA.	1	25
02.	**Receipt of Material in Damage condition.**	High	Material Contamination	Material receipt procedure not in place.	25	Procedure for Receipt of material is in place with warehouse personnel. Checklist has been filled by warehouse personnel at time of receipt of raw material which includes	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						verification of COA of supplier, Container/ material integrity, Batch number, Mfg. and Exp. Date of raw material.		
03.	**Receipt of Material with short expiry**	Medium	Shelf life of finished product may not fulfill or shelf life of FP to be reduced down as per local regulatory requirements.	Expiry of API not confirm at time of receipt.	9	At the time of receipt, raw material expiry confirmed by warehouse personnel against the shelf life of finished product. In case of short usable shelf life matter is referred to QA for decision. Additionally, usable shelf life is verified and noted down on BOM at the time of dispensing of API. Deviation is being filed by warehouse personnel with approval from QA for utilizing material with less usable shelf life in batch processing with reduced shelf life of FG.	1	9
04.	**Receipt of less quantity of material than the**	Medium	Less Qty. of material may	Qty. of material not	9	At time of receipt, Qty. of materials cross checked against ordered qty.	1	9

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
	ordered quantity.		not fulfil production requirement.	verified at time of receipt. Weighing Balance of lower capacity not available for weighing of less qty. material.		Calibrated Balance with defined operating range is used at time of receipt of material.		
05.	**Improper segregation of material**	High	May lead to mix up and cross contamination	Separate area for quarantined, under test, approved and rejected material not available.	15	Separate area is in place with warehouse personnel for storage of quarantined, under test, approved and rejected material. Each material handled separately during storage and movement. Personnel are trained on SOP and training records are in place.	1	15
06.	**Inadequate Environmental**	High	May impact quality	No provision of air	25	List of material along with recommended storage conditions	1	25

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	conditions and controls.		attributes of material due to adverse environmental conditions.	conditioning system or HVAC unit Malfunctioning of Air conditioning system or HVAC unit. Non availability of continuous temperature monitoring &recording system. Temperature excursion alarm not in place.		available with warehouse personnel. Material for which temperature conditions are specified stored in cool room. Deep freezer is in place for storage of temperature sensitive raw material. Temperature recording of deep freezer, and cool room area done twice in a day. Separate storage area has been allocated by warehouse personnel for storage of raw materials used for processing of products. SOP sampling of raw material is in place with warehouse personnel.		

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				In appropriate storage space				
07.	**Inadequate sampling environment leads to Material contamination** **Inadequate or wrong sample quantity or wrong sample**	High	Impact on final finished product quality wherein material will be used. Rejection of materials Miss leading conclusion on quality	Sampling not performed in controlled environment. Intermediate cleaning not performed during sampling. Pressure differential under sampling station with respect to sampling room	25	Sampling performed under sampling station designed in-house and provided with supply & return air filters fitted with HEPA filters. At a time only one material container is being taken inside the sampling room. As per cleaning procedure cleaning performed after sampling of each material. Approved list of sample Qty. available. Sampling procedure is in place which includes 100 % sampling for API and	1	25

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			attributes of material.	is not being monitored. Sampling procedure not in place or not adequately described		square root n + 1 for excipients. Procedure for pooling of samples is explained in SOP.		
08.	**Release of material without testing or after partial testing**	High	Product may not meet release specification. Batch rejection	Standard testing procedure not followed**.** Lack of timely maintenance of instrument Lack of manpower for testing. Use of non-	25	Provided raw material STP. Materials are being analyzed and released or rejected by QC based on analysis outcomes by following site QA SOPs. COA is being prepared and then approved/rejected label are pasted on materials as per disposition decision. Only QC approved material has been used for dispensing. Control is in place for verification of approval status of material at the time of	1	25

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				calibrated glasswares/ Class A glassware's		storage & dispensing. All instruments are calibrated prior to use. Validity for calibration is being verified prior to start of the analysis.		
09.	**Improper storage, dispensing & handling of Isopropyl alcohol and other liquid chemicals**	High	Material may catch fire. Loss of the materials. Personnel may lead to injured. Loss of assets.	Catch fire during dispensing. & mishandling. Effect on EHS	15	Proper separate storage, SOP for dispensing of raw and packing materials. Flame proof dispensing booth & Drum filling machine has been installed. Proper training given to operator in schedule manner. Balances are calibrated as per frequencies specified in SOP. "Operation, cleaning, calibration and verification of electronic weighing balances and calibration procedure of weighing balance". Balance operating / weighing range is displayed on each balance.	01	15

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						Dispensing activity is carried out by trained personnel only. Assay calculation performed by production officer and cross checked by QA officer. API Weighing activity is cross checked by QA officer and upon receipt of dispensed material at production cross verified by production officer.		
	Improper storage, dispensing & handling of Isopropyl alcohol and other liquid chemicals	High	Material may catch fire. Loss of the materials. Personnel may lead to injured. Loss of assets.	Catch fire during dispensing. & mishandling. Effect on EHS	15	Material tested & released by QC is only issued for dispensing. Material issued for dispensing based on FIFO and/or FEFO (wherever applicable). Material issued for dispensing against Bill Of Material (BOM)/issue		

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						note of batch manufacturing record. At time of dispensing Material Name, Mfg. date, Expiry date, Use before/Retest date is checked by Stores & verified by Production personnel against work order.		

PRODUCTION SYSTEM:

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
01	**Dispensing performed under inadequate environment**	High	May lead to contamination and/or cross contamination.	API and excipient dispensed in same dispensing booth / sequence of dispensing of API & excipient not proper.	25	Sequence of dispensing of API, excipient along with the intermediate cleaning after each material dispensing is specified in raw material dispensing procedure. After every product change over pre-filters cleaning of RLAF is being	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Dedicated/ separate scoops not used for dispensing of raw material. RLAF not working properly. Improper cleaning of filters of RLAF station. Required pressure difference not maintained.		done Dedicated AHU provided for dispensing room. Separate cleaned scoop used for dispensing of each API and excipient to avoid cross contamination during dispensing. QA line clearance is in place to ensure cleanliness of area, Temperature, RH, pressure difference and presence of previous raw material prior to start of dispensing activity. Personnel are trained on SOP and training records are in place.		

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Required environmental conditions not maintained i.e. temperature, humidity, use of Sodium vapour lamp for light sensitive materials				
02	**Inadequate Environmental conditions and controls**	High	Impact on dispensed raw material quality attributes i.e. Moisture content Impact on final finished product quality wherein	No provision of air conditioning system or HVAC unit Malfunctioning of Air conditioning system or HVAC unit.	25	Air conditioning system provided for dispensed material stores for maintaining the temperature below 25ºC. Temperature of the area is being monitored. Dispensed raw material is packed in polybags with dispensed material identification labels &stored in SS	1	25

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
	Mix-ups & cross contamination		material will be used. Batch rejection Risk to patient's health if not identified during in-house testing's & batch release.	Non availability of temperature monitoring &recording system to identify out of temperature condition after working hours Improper material identification. Inadequate space for storage of dispensed materials No or inadequate control on movement of		containers with batch identification in dispensed material staging area till it's used for next processing step. Access to dispensed material storage is limited to Shift Production Supervisor. Lock & key arrangement provided for dispensed material stores. Verification of material is being done after taking it in granulation area by Production Supervisor before proceeding with manufacturing. Personnel are trained on SOP and training records are in place.		

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S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				materials from quarantine area				
03.	**Usage of wrong mesh size SS sieves**	High	Improper particle size distribution in batch. Problem during compression. Effect on the physical parameters of granules. Contaminants, if any will not be separated.	Absence of procedure for management of sieves i.e. Receipt, Storage, issuance, usage, Inspection and destruction of sieves. No clarity on mesh size and/or Sieve number to be used in respective product BMRs	25	SS sieves with specified mesh to be used for each raw material is mentioned in respective product Batch Manufacturing Record. Separate storage area used for storage of sieves and only required sieves bring to area before start of sifting operations. Sieve integrity is checked before and after sifting of each material by production officer and observations are being recorded in BMR. Damaged sieves during handling are sent back to engineering department for further disposal after final	1	25

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				Broken /damages sieve used.		decision from management.		
04.	**Metal particles in sifted material.**	High	Contamination of raw material with metallic particles.	Receipt of contaminated raw material consignment.	25	Vendors are qualified. Sieve integrity is checked at before and after sifting operations.	1	25
05.	**Binder paste not uniform.**	High	May results into improper granules formation. May affect physical appearance of tablets	Insufficient quantity of purified water / binding agent. Inadequate Stirring. Improper heating	25	Quantity of purified water is specified in Batch manufacturing Record which is based in MFR. Stirring done manually. Heating of purified water done as per temperature specified in BMR. Temperature is verified by calibrated probe and being recorded in Batch Manufacturing Records.	1	25

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06.	**Non-qualified water used for paste preparation**	High	Microbial growth in paste leads to failure in product	Supply of non-qualified (i.e. tap water) nearby supply of purified water in binder preparation area.	25	Supply point of tap water and purified water is well labelled. Operator is well aware about which water is to be use for manufacturing of paste.	1	25
07.	**Improper dry mixing** **RMG operating system is manual (not PLC based) without any facility for operating parameter print outs.**	High	May leads to uneven distribution of drug substances with other material. Which may the affect content uniformity and other physical and chemical parameters	Non adherence to validated material loading sequence. Improper setting of dry mixing time. Improper speed of impeller	25	Well defined instructions & loading sequence is given in BMR. Each activity is carried out by trained operator & verified by production officer and being recorded in batch manufacturing record. Speed of impeller is set as per instruction given in BMR and recorded. Timing of dry mixing checked visually against normal wall watch.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						Trained personnel.		
08.	**Inadequate / Improper granulation**	High	It may affects physical and chemical parameters. It may lead to processing problems during compression. It may lead to delay in process time.	Improper setting of process control parameters. Improper temperature of binder paste during addition	25	Wet mixing time is given in Batch Manufacturing Record (BMR) and end point of granulation judged manually by trained person to get the consistency of wet mass. Binder paste temperature checked before addition into dry mixed material. Validated process.	1	25
09.	**Improper / inadequate drying** **FBD operating system is manual (not PLC based) without any facility for operating**	High	May impact on granules flow property which may impact compression activity.	Incorrect setting of inlet temperature / exhaust temperature. Improper	25	Inlet and exhaust temperature set as per BMR. Line clearance is in place. Planned preventive maintenance of FBD is in place	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
	parameter print outs.		Insufficient drying will cause sticking problem Over drying will cause capping and will affect the physical / chemical parameters of compressed tablets.	functioning of temperature controller and temperature sensors. Leakages at gasket sealing of bowl. LOD not checked.		LOD checked during drying process. Personnel are trained on SOP and training records are in place.		
10.	**Selection of wrong finger bag during drying**	High	May leads to Cross contamination of product	Improper labelling to finger bag. Incorrect coding on finger bag.	25	Labelling procedure is in place. Product dedicated finger bags used and also Product name specified on each finger bag for identification. Before and after usage cleaning&	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Un-cleaned finger bag.		drying of finger bag performed.		
11.	**Damaged finger bag.**	High	Loss of material. Low yield.	Improper checking of finger bag. More wear & tear of finger bag.	15	Damage to finger bag ensured before and after usage.	1	15
12.	**Quality of air used for drying**	High	May leads to contamination of product	Air filtration system not in place. Filter leakages. Improper maintenance of Fluid bed dryer	25	Inlet air used for drying has been filtered through fine & HEPA filter. Cleaning of filters done on weekly basis.	1	25
13.	**Improper/ Inadequate sifting / sizing**	High	Poor granules flow leading to problems during	Improper selection of sieve / screen.	25	For Sifting / Sizing of granules/mesh/ screen size is specified in BMR.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			compression.	Damaged Screen /sieve integrity. Sizing is not done at specified speed and direction of knives		Screen / sieve integrity is checked before starting of batch & after completion of batch. Screen / sieve used in processing are checked by production officer. Damaged sieves / screen during handling are send back to engineering department. Speed and direction of knives kept as per BMR.		
14.	**Non uniform blending / Lubrication of granules**	High	Variation in Content Uniformity may result in product failure.	Selection of incorrect occupancy of blender. Improper loading sequence of	25	Occupancy of blender with respect to batch size is verified at validation stage and freezed. Blender to be used is defined in BMR with equipment code number. Loading sequence of material is given	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			Physical parameters may out of specified limit. Rat holing or bridging during compression	material in octagonal blender. Blending/lubrication time not validated. Incorrect setting of mixing / lubrication time Variation in speed of octagonal blender.		in BMR and checked by production officer during operation. Blending time and lubrication time is considered as critical process parameter and same is verified during validation. Mixing and lubrication time set as per BMR. Blender stops automatically upon completion of set time.		
15.	**Cross contamination of one product to other product**	High	Product may not as per specification.	Incorrect status label. Un-cleaned Drum.	25	Material is segregated with proper labelling. Granules stored in double polybag and kept in carets with proper status	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Lack of access control		labels. Lock and key access control available. Logbook maintained for in & out movement of the granules from granules quarantine area. Personnel are trained on SOP and training records are in place.		
16.	**Tablets fail in thickness variation**	High	Out of specification tablets with respect to thickness and it may affect other parameters too.	Punch height variation. Improper die filling. Variation in machine speed	25	Punch height verified at time of receipt. Weight variation of tablets checked during compression. All compression machine are operated through PLC based operating system and speed of	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						machine controlled through PLC. Recording of speed of machine done in BMR.		
17.	**Tablets fails in hardness**	High	Out of specification tablets with respect to Hardness. It may affect other physical and chemical parameters.	Inadequate compression force. Non-uniform punches. Speed variation in machine.	25	Compression force verified through checking of Hardness. At time of receipt Punch height verification performed. Punches verification done at time of setting. All compression machine are operated through PLC based operating system and speed of machine controlled through PLC. Recording of speed of machine done in BMR.	1	25
18.	**Tablets fail in**	High	Out of specification	Improper granulation.	25	Process controlled parameters are set as per limits given in BMR and	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
	disintegration test.		tablets with respect to disintegration time. It may affect other chemical parameter.	Hardness more than specified limit. Improper handling of disintegration apparatus. DT apparatus out of calibration.		monitored during granulation process and same is recorded in BMR. Practice of verification of hardness at initial and every 2 hr. is in place. Persons are trained operation of DT apparatus. Calibration of DT apparatus performed quarterly (In-house) and annually (External party).		
19.	**Sticking and picking of tablets.**	High	Will not meet the requirement of description of tablet. Market complaint	Damaged upper punch. High moisture level in granules. Higher RH in the	25	Punch damage verification at the time of setting of machine. Appearance of tablets checked at start and during compression at an interval time. LOD checked during drying and then proceeded further.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				compression cubicle. Insufficient lubricants in the formulation or Insufficient lubrication. Insufficient compression force.		RH of area checked at start of batch. Area temperature and RH monitored at thrice in day (i.e. Morning, afternoon and evening). Product formulation is validated and Qty. of lubricant is used as per BMR. Compression force verified through checking of Hardness.		
20.	**Capping of tablets.**	High	May result in market complaint. Product may not pass as per specification.	Variation of punches. Die ring formation. Excess pressure. Over dried granules.	25	Punch verification done at the time of setting of machine. Appearance of tablets checked at start and during compression at an interval time. LOD of granules checked during drying and then proceeded further.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
21.	**Soft Tablets**	High	May result in market complaint. Product may not pass as per specification. May failing in friability test	Improper granulation. Extreme speed variation in machine. Insufficient Compression force.	25	Process controlled parameters are set as per limits given in BMR and monitored during granulation process and same is recorded in BMR. All compression machine are operated through PLC based operating system and speed of machine controlled through PLC. Recording of speed of machine done in BMR. Compression force verified through checking of Hardness.	1	25
22.	**Black or foreign particles in compressed tablets.**	High	May lead to undesirable effect. Patient non-compliance. Market	Black or foreign particles in granules. Black particles generation during Compression	15	Vendors are approved. Black particle, if any is caught at sifting stage. Punches are cleaned.	1	15

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			complaint					
23.	**Storage of compressed tablets in in-process storage area.**	High	May leads to contamination / Mix up if not stored / segregated properly.	Incorrect status label. Un-cleaned IPC. Lack of access control	15	Status labelling procedure is in place and followed properly. Tablets kept in polybags in cleaned carets. Lock and Key access control is in place to quarantine area. Logbook maintained for in & out movement of the tablets from in-process storage area.	1	15
24.	**Dispensing of wrong quantity of coating material**	High	Coating may not as per specification	Balance out of calibration. Balance of	25	Balances are calibrated as per frequencies specified in SOP. AM138 "Operation, cleaning, calibration and verification of electronic weighing balances and calibration procedure of weighing balance".	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				wrong capacity is used for batch where the quantity of raw material is in small quantity.		Balance operating / weighing range is displayed on each balance. Dispensing activity is carried out by trained personnel only. Upon receipt of dispensed material at production end, cross verification done by production officer.		
25.	**Wrong tablets issued for coating**	High	Coating may not as per specification.	Status labelling not followed. Material issuance procedure not in place. Material not verified at start of coating.	25	Status labelling procedure is in place and followed properly. Different color coded status labels are used for products which are same in dimensions, shapes but different in strength. Bulk transfer note is in place, QA officer put 'Approved by' stamp on each label.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						At time of line clearance and start- up of activity bulk tablet identification/ verification is performed by Production & QA.		
26.	**Improper coating**	High	May affect quality of coated tablets	Improper setting of spray rate, Atomizing air pressure, Inlet and outlet Temperature and Pan RPM. Non following of validated operating parameters by operator	25	Coating is performed by trained operators. Parameters are validated and set within ranges as specified in BMR. Operating parameters are being recorded by operators & verified by Production Pharmacist & In-process Quality Assurance (IPQA) personnel on regular interval.	1	25
27.	**Storage of coated tablets in storage area.**	High	May leads to contamination / Mix up if not stored /	Incorrect status label. Un-cleaned	25	Status labelling procedure is in place and followed properly. Tablets kept in polybags in cleaned	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			segregated properly.	drum. Lack of access control		crates. Lock and Key access control is in place to quarantine area.		
28.	**Granules/ Blend Manufacturing**	High	Difficulties during capsule filling	Bulk Density outside limits Moisture Content/ Loss in Drying outside the limits	25	Critical process parameters are set as per limits given in Master Formula Records &Batch Manufacturing Procedure and monitored during granulation process and same is recorded in BMR.	1	25
29.	**Capsule fails in weight variation test.**	High	Capsule failing in assay and may not meet the specification	Variation in machine speed Improper level of granules in hopper Improper	25	Semi- automated machine operated by trained operator. Hopper levels maintained by pouring granules manually. Machine setting evaluated at start of activity and confirm by in process	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				machine setting. Improper flow of granules		checks done at defined intervals.		
30.	**Improper length of filled capsules**	High	Capsule may not meet the specification	Improper machine setting. Improper level of granules in hopper. Variation in machine speed.	25	Machine setting evaluated at start of activity and confirm by in process checks done at defined intervals. Machine speed controlled manually.	1	25
31.	**Capsule fails in disintegration test.**	High	Capsule may not meet the specification	Capsule shell not proper. Improper handling of disintegration apparatus. DT apparatus out	25	Vendors are approved. Upon receipt Capsules shell is tested by QC and after approval released for dispensing. Persons are trained operation of DT apparatus.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				of calibration.		Calibration of DT apparatus performed quarterly (In-house) and annually (External party)		
32.	**Improper inspection**	High	Defective tablets may get packed which may leads to market complaint	Insufficient trained & qualified man power Checkers are not trained and qualified. In consistency of checkers due to continuous checking	25	Checkers are permanent employee and they are trained. Checkers rotation done among them without any predefined interval. Personnel are trained on SOP and training records are in place.	1	25
33.	**Hold Time**	High	Product may degrade. May be microbial	Hold time during flowing stages:- Binder preparation to granulation –	25	dispensed raw materials and packaging materials, Intermediate products, bulk and finished products are stored under appropriate Conditions.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			growth Effect on water content Hardness, Thickness, disintegration, uniformity of dose, Appearance, bulk/tap density.	consider the granulate; Wet granulation to drying – consider the dried granulate; Dried granules to lubrication/blending – consider the lubricated blend; Blend to compression; compression to coating – consider the tablet cores; Coating solution to preparation –		SOP for hold time study. Training given to concern person. Hold time study to be performed		

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				consider the coating solution; Coating to packing – consider the bulk coated tablets; Coating to packing in bulk; Packing of bulk to finished packed dosage form.				

RISK ASSESSMENT FOR FACILITY

PACKAGING & LABELLING SYSTEM:

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
1.	**Wrong packing material dispensed**	High	Wrong packing material dispensed	Mix up from supplier. Mix-up during storage of printed packaging materials. Work order and SOP instructions not followed. Mix-up during storage of dispensed materials	25	Packing material is procured from approved supplier only. Each consignment verified at the time of receipt for correct material code/item code against the documents received. Each consignment of packaging material is sampled &tested by QC before released for packing. Small labels are stored in the cupboard with individual partitions and lock & key in controlled manner. Printed packs are being stored on the racks in shippers with a proper identification labels in secured area with lock & key. Dispensing done against work order.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						Item code, Item description and quantity of material to be dispensed are given in work order. Dispensed material is checked by production officer and QA officer prior to taking it on packing line for use & also at regular intervals during packaging operations.		
2.	**Improper product feeding**	High	Improper product feeding	Improper feeding station. Improper thickness/ rough surface of products. Incorrect setting of product feeding channel	25	Change parts provided. Process controlled parameters such as thickness and appearance is set as per limits given in BMR and monitored during compression process and same is recorded in BMR. Setting of product feeding channel verified initially before packing of products.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Use of wrong change parts Vibrator not functioning properly.		Change parts issued are cross checked by production and IPQA person at time of line clearance activity. Vibrator maintenance covered in PPM of blister pack machine.		
3.	**Improper blister formation.**	High	Improper blister formation.	Incorrect temperature setting of blister forming roller. Low vacuum or stopped supply of vacuum Inadequate chilling to	15	Temperature range required for blister pocket formation given in BPR and considering this temperature range temperature of blister forming roller set during packing. Visual inspection done for pocket formation during packing. Quality of PVC/ PVDC roll verified during QC test and during setting of packing machine.	1	15

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				blister forming roller. Quality of PVC/PVDC rolls. Wrong mounting/ direction of PVC / PVDC rolls.		Morphiline test done on each roll to confirm the direction of film at the time of mounting on shaft of machine.		
4.	**Improper sealing**	High	Improper sealing	Incorrect temperature setting of sealing roller. Material problem (i.e. Improper	15	Temperature range required for blister sealing given in BPR and considering this temperature range temperature of blister sealing roller set during packing. QC approved material only used for packing.	1	15

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				VMCH coating) Improper alignment of Pressure Sealing Roller.		Alignment of sealing roller verified during machine setting.		
5.	**Empty/ partially filled blister** **(No Fill Detector/ Camera System not provided on packing machines)**	High	Empty / partially filled blister (No Fill Detector/ Camera System not provided on packing machines)	Non availability of tablets in hopper. Sensor failure. Incorrect handling of rejects. Vibration level of hopper not proper Non-filled	25	Non filled pockets checked manually by keeping additional checkers. Availability of tablets in hopper checked manually and sensor is present in between hopper and feeding channel to maintain the level of tablets in feeding channel. ➢ Rejection bin is available to keep rejection separately. ➢ Hopper vibrator covered during PPM of machine.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				detection (NFD) system not in place. Error on part of checkers during manual inspection				
6.	**Broken tablet in blister.** **(No Fill Detector/ Camera System not provided on packing machines)**	High	Broken tablet in blister. (No Fill Detector/ Camera System not provided on packing machines)	Camera system not in place Improper tablet inspection. Tablets getting damaged at feeding station. Pack verification not done for	25	Checkers are trained in inspection activity. Feeding channels provided. Tablets flow in feeding channel verified at initial setting and during packing activity. Primary pack verification done at primary and secondary packaging stage by trained checkers.`	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				identification of missing/ broken tablets.				
7.	**Missing / wrong/ Improper Batch details Overprinted on Blister**	High	Missing / wrong/ Improper Batch details Overprinted on Blister	Stereo letters not uniform &print verification of stereos not performed. Stereo management not in place Presence of Previous batch stereos.	25	Stereo print verification performed by production officer upon receipt of stereo and at time of start of packing operation. Procedure for stereo management is in place. Presence of previous product stereos checked during line clearance activity. Previous product stereo retrieval and destruction done in presence of IPQA personnel.	1	25
8.	**Improper pack cutting.**	Medium	Improper pack	Improper setting of	9	Primary pack verification done at primary and secondary packaging	1	9

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			cutting.	punch indexing. Obstruction during punching.		stage by trained checkers. Machine setting checked at start of packing activity.		
9.	**Improper rejection**	High	Improper rejection	Improper handling of rejection.	15	Rejected blisters collected in rejection box which has status label. Rejected blisters de-foiling and repacking stopped.	1	15
10	**Less quantity of blister in final pack.**	Medium	Less quantity of blister in final pack.	Incorrect setting / error in check weigher. Human error	9	Filled pack count verification done by weighing it on calibrated weighing balance. Weighing range with respect to pack count is given by production officer. In process checks done by production and IPQA personnel every 1 hr.	1	9

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
11.	**Wrong carton or Mix up of carton**	High	Wrong carton or Mix up of carton	Mix- up of carton from supplier end / during dispensing. Partitions not available between two packing line at secondary packaging	25	Cartons dispensed against code number given in work order. Partitions available between two packing line, except packing line 1 & 4 Line clearance procedure is in place.	1	25
12.	**Wrong shipping Mark**	High	Wrong shipping Mark	Shipping mark verification not performed	25	Verification of shipping mark performed at start of packing activity by production and IPQA personnel.	1	25
13.	**Mix up of one product with other product.**	High	Mix up of one product with other product.	Improper cleaning of equipment / area.	25	Cleaning of equipment / area done on daily basis.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Partitions not available between two packing line at secondary packaging stage. Presence of previous batch / product.		Partitions available between two packing line. Line clearance procedure is in place.		
14.	**Less yield**	Medium	Less yield	Processing loss. Each stage yield not confirm while processing for next stage.	9	Each stage yield calculated and considered while processing next stage. Each stage yield limit given in BMR. Investigation is performed in case of less yield.	1	9
15.	**Wrong testing**	High	Wrong testing	Standard testing procedure not	25	Standard testing procedure (STP) is provided and followed by CMO. Analysis is performed as per	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				followed. Wrong wavelength column selected. Analyst is not qualified for assigned work. Testing instrument not calibrated Wrong sample preparation. Balance of wrong capacity used for weighing of sample.		instructions given in Standard testing procedures and verified by Senior Analyst prior to final disposition. Column labelling procedure is in place. In STP wavelength of column specified. Analyst qualification procedure is in place and qualified analyst only assigned for testing activity. Testing instruments such as HPLC, UV, Dissolution test apparatus calibrated in scheduled manner. Sample preparation performed by qualified and skilled analyst. Working range of balance specified on balance.		

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						Calibrated weighing balance used for weighing of sample.		
16.	**Release of finished product without test/ with partial testing**	High	Release of finished product without test/ with partial testing	Production load and lack of manpower & instruments for testing of finished product.	25	Certificate of analysis is not prepared and certified unless and until completion of complete testing. None of batch is released without COA and QA review.	1	25
17.	**Inadequate cleaning of workers and staff change room.**	High	Inadequate cleaning of workers and staff change room	Cleaning procedure not followed to full extent.	15	Cleaning procedure is in place. Cleaning of Garments done by external agency twice in a week.(i.e. on Monday and Thursday).	1	15
18.	**Improper gowning practices**	High	Improper gowning practices	Gowning procedure not in place / not followed by	25	Gowning procedure is being followed by all employees and monitored by Production Shift Supervisor and Personnel &	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				personnel.		Administration department of Pharma.		
19.	**Dirty area, equipment's and accessories used for processing of products**	High	May leads to cross contamination Microbial contamination.	Unavailability of cleaning procedure. Wrong concentration of cleaning agents used. Cleaning procedure not followed full extent.	25	Cleaning procedure for each equipment is in place. Concentration of cleaning agent is specified in each equipment cleaning procedure. Cleaning procedure followed for batch to batch, product to product.	1	25

RISK ASSESSMENT FOR FACILITY

LABORATORY CONTROL SYSTEM:

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
01	**Data integrity and security**	High	Data generated may not be secure and may not be traceable May lead to erroneous results of quality parameters not consistent with the accurate data	Instruments not qualified and /or not qualified wrt 21 CFR part 11 as applicable	25	All the Instruments are qualified. Routine calibration is carried out as per defined frequency and SOP. Instruments are 21 CFR part 11 compliant. Personnel are trained on SOP and training records are in place.	1	25
02	**Out of specification not being detected and/or investigated**	High	Inability to detect an OOS may lead to release of a batch not meeting the quality	SOP for investigation of OOS is not in place. Personnel are not trained on SOP.	25	SOP for investigation of OOS is in place. Personnel are trained on SOP and training records are in place.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			specification					
03	**Unqualified analyst performing testing**	High	Testing by an unqualified analyst may lead to generation of erroneous data	Analysts are not trained and qualified on respective SOPs. Analysts are not qualified.	25	Personnel are trained on SOP and training records are in place.	1	25
04	**Instruments not calibrate**	High	May lead to product failure. Impact on results. Instrument may not meet the calibration acceptance criteria	Instruments out of calibration 1. Calibration schedule/planner/SOP is not in place. 2.Calibration is not carried out by trained personnel	25	Calibration schedule/planner is in place. Calibration is carried out by External Agency as per schedule (if applicable). SOP is in place. Incident report will be filed and Impact on the quality of the product shall be assessed by retesting of the batch/batches tested prior to its calibration. If the retested batch/batches do not meet the specification, same shall be	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						investigated as per the OOS investigation and preceding batch/batches shall be investigated for the compliance.		
05	**Stability failure**	High	May lead to product failure A stability sample does not meet the acceptance criteria. Significant change observed in stability sample during stability study with respect to analysis	1. Due to Impurities of active drug or excipients. 2. Due to change in manufacturing process. 3. Due to improper cleaning. 4. Procedure of stability programmes not defined. 5. Stability Storage	25	Stability programmes to be carried out as per SOP. Cleaning validation done Raw material release as per approved Specification Product manufactured as per approved BMR/BPR. Stability sample shall be shifted to stand by stability chamber. Shall be investigated as per OOS or OOT investigation.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Chamber breakdown.				
06	**Break down of Laboratory Instruments**	Medium	Impact on the product testing Delayed in analysis Repeat analysis.	Power failure. Untrained staff/ new staff	9	All critical instruments are having UPS supply. Instruments handled by only trained staff and periodic training conducted as per schedule. On the job training is given to new employees are accompanied with trained personnel during initial stage. Incident report shall be raised by the analyst and analysis shall be re-performed with system suitability parameter. Concerned QC supervisor shall investigate the cause and impact on the calibration of the instrument. If so shall be recalibrated prior to use. If the calibration fails service eng. shall be informed for rectification.	1	9

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
07	**Substandard Reagents**	High	Impact on the product testing and instrument. Delayed in analysis Wrong results.	Wrong supplier.	25	Analysis shall be re-performed using the new lot or different make of chemical / reagent and substandard chemical shall be subjected for investigation. The incident shall be intimated to the supplier and black listed if required. Material purchased only from approved suppliers only.	1	25
08	**Inadequate Documentation**	High	Improper tracking of documents may lead to product failure	In adequate training of personal	25	Personnel are trained on respective SOPs and training records are in place. Documents verification and approval procedure is in place Highly sophisticated instruments/Equipments are available.	1	25
09	**HPLC / Column failure**	High	Fails to meet system suitability criteria during	Wrong column selection. Untrained staff	25	Stop the analysis and regenerate the column if fails to meet the acceptance criteria discard the column.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			analysis Impact on the analytical result of the batch			Instruments handled by only trained staff and periodic training conducted as per schedule. On the job training is given to new employees are accompanied with trained personnel during initial stage.		
10	**Raw Material and Packing Material fails to meet acceptance criteria.**	High	Impact on the finished product	Low quality. Untrained staff.	25	Investigate the failure as per OOS SOP and reject the material. Same shall be informed to supplier / manufacturer and if required black list the manufacturer. Analysis done by only trained staff .On the job training is given to new employees is accompanied with trained personnel during initial stage.	1	25
11	**Water Sample fails to meet acceptance criteria.**	High	Impact on the product quality.	Low quality	25	Informed to engineering and production department and stop the usage of water from the system. Investigate and rectify the problem or sanitize the system if applicable.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score (SxO)	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
12	**Incubators failure**	High	Impact on the incubation of media plates.	Due to power failure	25	Stop the usage and transfer the plates in standby chamber inform to engineering and rectify the problem. Before starting calibrate the equipment	1	25

QUALITY SYSTEM:

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
01	**Inadequate Document Control**	High	Improper tracking of documents. i.e. issuance, retrieval and destruction will not happen.	Procedure for Document controls is not defined.	25	Quality Manual. SOP for Document Control and Change Control is in place SOP for SOP. BMR & BPR issued & retrieved through QA. Batch release SOP is in place.	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			Manufacturing/ testing with obsolete documents can result in failure of product i.e. OOS/OOT.			Documents verification &Review system is in place.		
02	**Inadequate CAPA**	High	Reoccurrence of failures, having impact on product quality	Improper investigation. Procedure for CAPA is not defined.	25	SOP for CAPA is in place CAPA verification &Review system is in place Training on investigation and CAPA. CAPA implementation and close out done as per SOP	1	25
03	**Inadequate handling of Customer complaints**	High	Reoccurrence of complaints. Can lead to product recall.	Procedures for Handling of Market complaints are not defined.	25	Quality manual SOP for handling the Complaints for drug products is in place. Respective annual product quality	1	25

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
				Improper investigation. Procedure for CAPA is not defined.		review and audited Training on handling the Complaints for drug products and CAPA.		
04	**Internal Audits/Self Inspection**	High	Verification of quality systems implementation will get affected and scope of improvements will not be in place.	Procedure for Internal Audits/ Self Inspection is not defined.	25	Quality manual SOP for Self Inspection is in place which includes frequency of audits to be done, audit report, subsequent compliance report and evaluation of compliance report. Self Inspection/Internal audits carried out quarterly at site.	1	25
05	**Trainings**	High	SOPs will not be followed which will have impact on product quality	Procedure for trainings and evaluation of trainings is not defined.	15	Quality manual SOP for training is in place which includes the induction training, online training on SOP's, GMP training and training	1	15

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
						evaluation and External trainings		
06	**Vendor Qualification**	High	Insufficient Vendor Qualification may lead to improper product development and will have impact on product quality leading to Deviations, Incidents and OOS or OOT.	Procedure for Vendor Qualification and evaluation is not defined properly.	25	Quality Manual, Site Master File. SOP for Vendor Qualification is in place, which includes the evaluation of vendors through Pre Audit Questionnaire (PAQ) and Audit of the Vendor Site (as applicable) as per Annual Audit Planner of vendor qualification and evaluation of the PAQ and Vendor Audit Report before approval of the material.	1	25
07	**Product Quality Review**	Medium	Product manufactured without evaluation of manufacturing, analytical,	Procedure for product quality review is not defined appropriately	9	SOP for Product Quality Review is in place	1	9

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			stability performance					
08	**Release of Finished Product**	High	Product may be released into market without evaluation of the batch documents and analytical documents.	Procedure for release of Finished Product is not defined properly.	15	SOP for Release of Finished Products is in place.	1	15
09	**Data integrity and security**	High	Data generated may not be secure and may not be traceable May lead to erroneous results of quality parameters not	1.No defined procedure for documents and data control 2.No traceability defined for data integrity and security	15	SOP for documents and data control is in place. Change control, BPRs, Deviations & incidence reports are maintained	1	15

RISK ASSESSMENT FOR FACILITY

S.No.	Risk Identified	Severity	Potential Effect	Probable causes for Failures	Risk Score	Risk Mitigation through Detectability	Detectability Class (D)	RPN (SOD)
			consistent with the accurate data					

CONCLUSION: Based on the Risk Evaluation through the identification of risks and the respective mitigation by effective detection systems, it is established that all the risks identified are mitigated successfully and the corresponding Risk Probability Number meets the acceptance criteria of ≤ 30.

REFERENCE:

ICH Q9, 4 version, 2005

WHO guideline, Ian R Thrussell, MHRA, UK, 2009

PIC guide line, L. Viornery, 2010

ISO 14971, 2011