USER REQUIREMENT SPECIFICATION

NAME OF THE ITEM : AUTO TAPER

FUNCTIONAL AREA : PRODUCTION

PROTOCOL No. :

OSD FORMULATION FACILITY

1.0 Introduction

1.1 Scope of the Project:

The entire project shall be designed in such a manner that it complies with the cGMP requirements/guidelines of US Food & Drug Administration (FDA), World Health Organization (WHO), EDQM and other relevant regulations and standards both national and international.

The project includes:

- Construction of green-field OSD and topical formulation Production Block.
- Construction of QC Laboratory, Microbiology labs & QA,
- Installation, testing and commissioning of HVAC (Heating, Ventilation & Air conditioning)
- Installation, testing and commissioning of Electrical Systems.
- Installation, testing and commissioning of Process Equipment
- Installation, testing and commissioning of Utilities.

1.2 Scope of the Document:

This document gives user requirements specifications for OSD and topical formulation manufacturing Facility to facilitate design and implementation of the project.

2.0 Project Basis

The facility should be designed to meet the production demands for general category oral solids and topical semi solids. It is intended to be operated as a concurrent multi products manufacturing facility compliant to the Indian as well as global regulatory norms.

3.0 Project Site Location and Environmental Conditions.

The proposed site is clear of any obstructions or underground services.

The Production buildings to be located centrally within the site. The Engineering, Utilities and Waste Disposal areas to be located away from the site entrance.

3.1Facilities.

The site should be developed to produce a range of oral solid dose formulations (Tablet & capsules) products along with external preparations (Cream & Ointment).

3.2 Production Building

This should include the areas listed below, together with their necessary support areas:-

- Stores area
- Finished goods and Secondary packing material Ware house
- Dispensing area
- Granulation area
- Blending area
- Compression area
- Coating area
- Capsule area
- In process store or Intermediates stores
- IPQA area
- Primary packing area
- Secondary packing area.
- Bulk Manufacturing for ointments and creams
- Ointments and creams filling area
- Ointments and creams Secondary packing
- Change rooms and other support areas

Change rooms should be given appropriate interlocking system, to prevent opening of more than one door at a time.

3.3 Building Design Philosophy.

The formulation manufacturing facility is intended to have production buildings to manufacture tablets, capsules & external preparations (Ointments & Creams).

The flow of materials & personal through the building or facilities should be designed to prevent mix-ups or cross-contamination.

The building design shall incorporate accommodation where space shall be provided for the equipment which shall not be installed until a future date. In this way, the ability to quickly and easily respond to production increase demands can be incorporated without the risks of compromising the operation.

When production volumes continue to grow, then the modular design shall be considered for stage-wise expansion of the relevant areas of the facility, without causing undue disturbance to the then ongoing operations.

The corridors and manufacturing areas shall be provided with glazed wall panels to enable good visibility to the operators within the manufacturing rooms, and also enable visitors to view the operations from corridors without the need to access the manufacturing environments.

The production building shall be designed as a controlled area, within which there should be two categories:-

- Areas where product is not exposed (i.e. Warehouse and Secondary packaging.)
- Areas where product is exposed to the processing environment(i.e.; manufacturing areas)

All these areas shall be provided with appropriate finishes and air quality to comply with the cGMP guidelines relevant to their stage of the process. In the areas where the product is exposed during operations, the environment (both air quality and finishes), shall be of the highest standard appropriate to the product and process stage. Further, where the product is in its final packaging (e.g.: Finished goods packing area and Finished goods stores), provision is required simply to ensure that storage conditions are sufficient to prevent degradation of the product, which should reduce its shelf life.

In terms of environmental finishes and air quality, each change area and airlock, shall be designed & maintained to the level of the higher standard area.

3.4 Internal Finishes.

Appropriate standards of internal finishes shall be provided in each area of the production building to meet the relevant GMP Guidelines.

Grade 'D' Areas

Grade D defines a Cleanliness Class of ISO 8 environment at rest and is recommended. e.g.: All product exposure rooms, GMP corridors, washing area etc.

These conditions shall be achieved by the use of Air Handling Systems with terminal HEPA filters, low level return ducts, appropriate air changes adequate pressure differentials, local dust extraction, and use of CIP

systems wherever possible and washing areas close to operating rooms, closed transfer of materials, good clean room finishes and properly trained manpower.

The interior surfaces (walls, floor, ceiling) shall be smooth and free from cracks, coved, permit easy cleaning, painting and disinfections.

Light fittings and air grills shall be flushed with walls and not hanging from the ceiling, to prevent contamination.

Floors and covings- Epoxy resin with integral coving on prepared substrate; coved at wall junctions.

Doors shall be made of non-shedding materials, Doors shall open towards the high-pressure area so that they close automatically due to air pressure.

General Clean Areas

Clean area defines an area that is provided with appropriately filtered air environment and is recommended for Circulation corridors, Secondary packing areas, finished goods Quarantine and stores areas etc.

3.5 Internal Design Conditions

The internal environmental conditions provided by the various HVAC systems particularly in the GMP areas shall be subjected to appropriate levels of monitoring and qualification to confirm that they remain within the predefined compliant operational range at all times.

Appropriate levels of lighting shall be considered throughout the facility in accordance with regulations; however the lighting levels stated below shall be considered as minimum requirement in the specific areas listed:

- Manufacturing Areas 500 lux at working plane
- QC,QA Areas 500 lux at working plane
- Controlled Packing areas 300 lux at floor level

Summary of Internal design conditions:

General Temperature Condition.

Temperature 25 ± 2 °C, RH. NMT 55%

For some areas low RH provision has been made to achieve NMT 40%

3.6 Process, Process support and Utility systems:

The GMP requirements for Process, Process support and Utility systems shall be based on the concepts of product exposure, level of protection, and critical parameters and systems.

Process systems in this context refers to the systems which are:

- In contact with the drug substance in its purified or unpurified state
- In contact with materials which ultimately should become, or be in contact with, drug substance.
- In contact with a surface which should contact product.

Electrical, plant steam, vacuum, compressed air etc., shall be designed to meet the process requirements.

Adequate ventilation, air filtration and exhaust systems should be provided.

The facility is visualized to be operational on a continuous production basis.

3.7 Access and Garment Management

All personnel entering the production buildings shall follow an appropriate garment changing management.

The garment change regime shall be designed to give, both product and operator an appropriate protection against contamination. Therefore, variations in garment shall be required in production areas as per the product requirements.

After Hand and Foot wash, all personnel are expected to change into a general factory uniform collected from dedicated lockers and put on their "factory shoes" kept in the change room. This general factory uniform should provide personnel with access to the general circulation corridors, secondary packaging areas etc.(Optional)

Provision should be made for staff & workers safe, hygienic entry & exit from plant to prevent the contamination to the product.

Access to the manufacturing areas shall require a complete change of garments of the working personnel into a dedicated OSD and topical form area garments.

Visitors shall be expected right from their arrival at the building to use the change facilities provided exclusively for them and have access to GMP corridors. However if they intended to enter the manufacturing Module then they shall follow the same change procedure as the production personnel of those areas, and change into the same standard of garment designated for that area.

Eating and drinking provision shall not be given within the production buildings.

3.8 Other requirements:

The facility shall be provided with fire alarm and control systems, emergency lighting etc.

Proper GMP drainage system should be provided.

There should be adequate arrangement for disposal of wastewater and other residues from the laboratory and production areas.

Facilities should be designed, constructed, and maintained to prevent entry of insects, pests, bird sand rodents.

3.9 The following equipment and accessories, wherever applicable, shall be procured in a phased manner based on the needs.

S.No.	Equipment	Control	Monitoring
1.	Sifter	√	√
2.	FBD	√	√
3.	Rapid Mixer Granulator	√	√
4.	Tablet Compression Machine	√	√
5.	Tablet De duster	√	√
6.	Metal Detector	√	√
7.	Packing Machines	√	√
8.	Capsule Packing Machines	√	√
9.	Oil Phase vessel	√	√
10.	Aqueous Phase vessel	√	√
11	Main manufacturing vessel for ointments and creams	√	√
11.	Tube filling machine	√	√
12.	Chillers	√	√
13.	chilled water pumps	√	√
14.	Cooling Towers	√	√
15.	AHUs	√	√
17.	Ventilation Exhaust air fans	√	√
18.	Door interlocks	√	√
19.	Temperature , RH and Differential pressures	√	√
21.	Fire alarm systems	√	√

3.10 CIP/SIP CONCEPT

Cleaning provision for the equipment shall be considered with due importance during basic designing of the layout.

3.11 Water Analysis Report

Water analysis report for the preparation of purified water generation should be maintained.

4.0 Operations

4.1 Proposed formulations manufactured in the Facility

Tablet, Capsules & external, preparations (Ointment & Cream) should be manufactured.

4.2 OSD formulation manufacturing Process- For Tablet Manufacturing

- Dispensing-
- Granulation-
- Compression-

- Coating (If coated tablets)
- Primary Packing
- Secondary Packing

For Capsules Manufacturing

- Dispensing
- Sifting
- Mixing/Blending
- Capsule Filling
- Primary Packing
- Secondary Packing

For Ointment Manufacturing

- Bulk Manufacturing
- Mixing of Oil phase Material
- Mixing of Aqueous phase Material
- Mixing of oil and water phase and emulsification
- Tube filling
- Secondary Packing

These operation shall be carried out on a campaign basis.

4.3 Production Capacity:

The final plan is shown below.

Production Volumes computation													
Dosage Form	Unit	Requirement 2017	CAGR%	2018	2019	2020	2021	2022	2023	add 25% Buffer	Add exports	Total Requirement in 2023	Rounded off to
OSD - Tablets	mio	80	20	96	115	138	166	199	239	299	150	449	**450**
Ointments and Creams	mio	4.8	20	6	7	8	10	12	14	0	14	29	**30**
Hard Gelatine Capsules	Mio	40	25	50	63	78	98	122	153	0	47	200	**200**

4.4 Capacity Calculations

The equipment needs and capacity calculations are based on the following assumptions:

- 312 working days per annum, based on 52 weeks and 6 days per week
- 9 hours per shift

- 2 shift working

4.5 Storage Requirements

The Raw materials and Primary Packaging materials shall be stored in stores and shall be transferred based on the production needs.

In addition space has been provided for the Secondary Packaging materials & Finished goods.

The warehouse dimensions have been based on estimated pallet quantities required to hold the stock levels of as required.

4.6 Transfer of Samples to Laboratories.

Various items need to be transferred from the production buildings to the Laboratory buildings:

- Samples from production processes
- Samples from packaging lines and finished packed products

4.7 Laboratory Requirements.

The laboratory requirements should be provided which should need to accommodate:

- Quality Control Analytical Testing Laboratory
- Quality Control Microbiology Laboratory
- Support functions

Quality control shall be independent of production area.

The lab should be designed to meet international standards with reference to Good Laboratory practices. The lab should be equipped with state of the art equipment and analytical instruments like HPLC's, FTIR, UV Spectrometers, Dissolution apparatus, Autoclaves, Ovens, Incubators& stability chambers. The lab facility shall be designed to have Wet Chemical lab, Instrument lab, Microbiology lab, Stability rooms, & Control samples room etc.

Separate Documentation storage room should be provided where all the documents related to the facility should be stored. The access shall be only for authorized personnel only.

4.8 Validation-

The facility, its utilities and equipment should need to be qualified, and the processes validated.

Successful qualification should demonstrated that the facilities, utilities and equipment are fit for purpose and can repeatable perform to the required parameters. To ensure a successful qualification, the necessary tasks shall be planned from an early stage of the project and to integrate them with the design and construction program.

Appropriate requirements for this have to be written and included in the detail design and technical specifications of the facility, utilities and equipment packages, so that the necessary documentation needs are defined and incorporated into their purchase orders.

Working and in-process space shall be adequate to permit orderly and logical positioning of equipment. Pipe-work, electrical fittings, ventilation openings and similar service lines shall be designed, fixed and constructed to avoid creation of recesses.

Documentation:

4.9 Production Start-up.

The facility start-up shall be planned as a project in its own right that should be run in parallel to the design, construction, installation and qualification of the facility.

5.0 Conclusion.

The user requirements specifications detailed in this document shall be utilized to design the facility and other infrastructure with complete documentation for the project including cost estimates, project time schedule, etc. for effective implementation, completion and maintenance of the project.