

**Revised Guidelines for Development of Basic Infrastructure of
Gypsum Handling and Storage on Railway Siding and Stack Yard**



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1.0 BACKGROUND

Phospho-Gypsum is generated in large quantities from Phosphatic fertilizer industries which contains fluoride and residual acid. In case fluoride as fluorine is more than 5000 mg/kg in gypsum it will be treated as hazardous as per schedule II of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008. These chemicals leach to soil and water when stacked in open and exposed to rain. Fluoride and acid in the Phospho-gypsum has high probability of getting leached to soil and water bodies thus, its safe handling is of utmost importance for prevention of soil and water contamination.

At the same time, Phospho-Gypsum has various utility in the field of agriculture for neutralizing alkalinity and cement manufacturing as a raw material. Utilization of this waste product in the above process offers opportunities for relieving pressure on environment as well as recovering economic value from the waste.

It is thus imperative that this bulk waste should be transported and handled properly at intermediate locations of storage before it reaches its destination for end use. Stack yards and railway-sidings are the bulk handling points which pose significant risk of contamination, thus needs special attention for precautionary measures while handling gypsum.

These guidelines are prepared for adoption by railway sidings and stacking yards meant for handling gypsum from phosphatic fertilizer plant, for prevention of environmental degradation during handling, storage and transportation of gypsum.

2.0 DEFINITIONS

i) Stack yard

Stack yard means gypsum stack yard over an area, which is used for receipt and storage of gypsum either for a short period or long period before despatch. However, this would not include stacking inside plant premises where it is generated / used.

ii) Railway siding:

A railway siding is a place / area which is used to receive, temporarily store and load / unload gypsum in rakes before despatch.

3.0 LOCATION

- 3.1 Location of the stack yard should be such that there is no public inconvenience for parking or movement of vehicles.
- 3.2 The applicant shall obtain a NOC from Sarpanch following a gram sabha if it is proposed in a rural area or obtain NOC from the concerned ULB in case of urban area.

4.0 FACILITY

The following facilities shall be provided in railway siding and stack yard

- 4.1 Leachate collection and treatment facility shall be provided to collect any leachate and/or run-off and then the leachate or run off will be adequately treated to meet the following standards as notified under Environment (Protection) Act, 1986.
 - pH - 5.5 - 8.5
 - Fluoride (F) - 2.0 mg/l.
- 4.2 Phospho-Gypsum shall be stored on impervious surface either lined or concreted as per the construction guidelines in succeeding section-5.0.
- 4.3 Storage shed will be provided with a roof in those railway siding and stack yard operating during 15th June to 31st October, so as to protect gypsum from being exposed to rain. The storage capacity shall be adequate to store an inventory of at least seven (07) days.
- 4.4 Washing bay shall be provided to wash the wheels of the vehicles used for transportation of gypsum and the wastewater shall be treated in the treatment plant to meet the standard stipulated at point No.4.1.
- 4.5 Surface water drainage system shall be provided to remove all storm water during monsoon.

5.0 CONSTRUCTION

5.1 LINER PROVISION

- A single liner at the base and side of the siding and stack yard shall be provided to make the site of storage impervious, so that leachate is prevented to contaminate groundwater. This will have the following minimum specification:

- Compacted clay / compacted amended soil of thickness = 450 mm, with coefficient of permeability $k = 10^{-7}$ cm / sec at the bottom.
- HDPE liner of thickness = 1.5 mm above the compacted clay / amended soil evenly laid down and properly anchored to prevent any slippage.
- Compacted clay / compacted amended soil of thickness = 300 mm with coefficient of permeability $k = 10^{-2}$ cm / sec as the top layer.

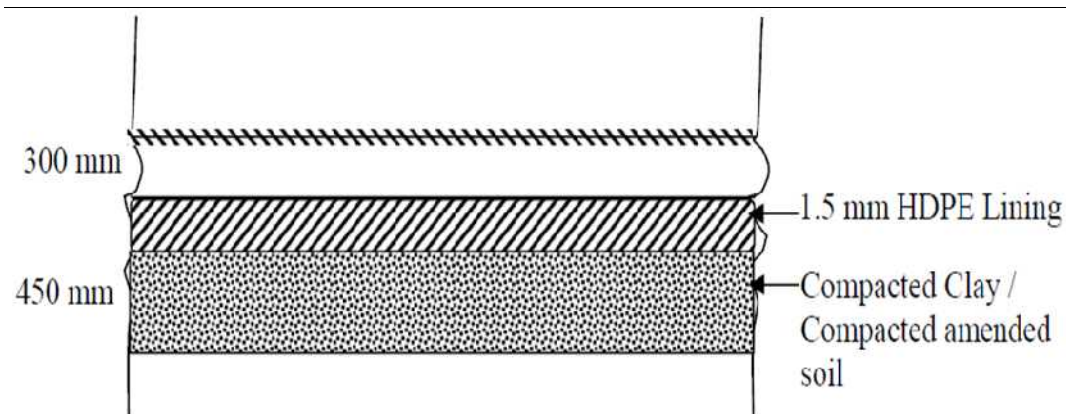


Figure-1: Cross Sectional view of the Liner Provision

OR

CONCRETING

- The storage surface of the siding and stack yard shall be concreted with M25 grade concrete (Main Course of 150mm minimum thickness and wearing coat of 75mm minimum thickness) over a sub-base course with surface drainage and collection system.
- 5.2** A boundary wall of at least **3 meter** height shall be constructed along the periphery of the gypsum stack yard to prevent the fine particles from being carried away with air.
- 5.3** Leachate collection tank shall be constructed taking the following in to consideration.
- Average rainfall of 50mm/hr shall be considered for designing the drains and leachate collection.
 - The leachate collection tank shall have adequate capacity to store at least 5-6 hour of heavy rainfall.

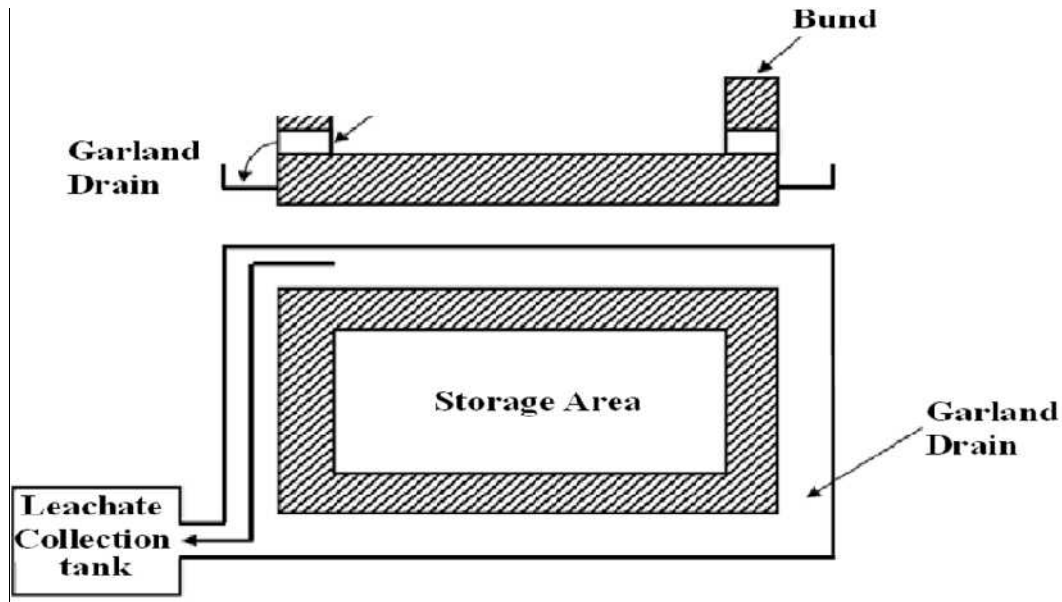


Figure-2: Schematic diagram of the storage area and other facilities

- 5.4** All entry points internal roads and loading / unloading areas must be made road worthy for movement of heavy vehicles by using low permeability material (e.g. concrete or bitumen) and be cleaned regularly to minimize potential for dust generation and off-site impact.

6.0 OPERATING PRACTICE

- 6.1 Under normal circumstances all activities like stacking, loading and unloading of gypsum in open at the intermediate transit points shall be suspended during 15th June and 31st October. During this period gypsum can be transported directly from gypsum pond of the generating unit to point of use.
- 6.2 However units having covered shed can handle gypsum during 15th June to 31st October with a condition that under no circumstances gypsum shall be stored outside the shed.
- 6.3 The height of material within storage areas must be kept below the height of the boundary wall at all times to prevent the material getting air borne.
- 6.4 During rain stacked gypsum shall be covered with tarpulin sheets to prevent washing during rain.
- 6.5 During transportation of material by trucks / tippers / wagons through public roads, the vehicles shall be properly covered with tarpaulin sheets and shall be transported in safe speed. The trucks / tippers shall have sufficient free board. Spillage of material on public roads shall be cleared immediately on occurrence.
- 6.6 Proper house-keeping at the material storage areas, loading & despatch areas, service facilities, etc., shall be practiced.