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The design specification of the ground and storehouse for chemical solid material

化工固体物料堆场及仓库设计规定

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Notice on the issue of chemical professional standard *Design Regulation of Ground and Storehouse for Chemical Solid Material*

Provinces, autonomous regions, municipalities directly under the central government, and municipalities with independent planning status (Department of construct), Chemical Hall (bureaus, companies), and the related design units:

The Design Specification of the Ground and Storehouse for Chemical Solid Materials prepared by the lifting transportation design technology center station in Ministry of Chemical Industry, upon examination, the current standard is the recommended chemical industry standard with the number of HG/T20568-94. It will be implemented as of March 1, 1995.

Lifting transportation design technology center station of the Ministry of Chemical Industry is responsible for the management of the Standard, and the Engineering Construction Standard Editing Center of the Ministry of Chemical Industry is responsible for its publication and distribution.

Ministry of Chemical Industry

November 28, 1994

The design specification of the ground and storehouse for chemical solid material

1 General previsions

1.0.1 The specification is in order to better implement the national technological and economic policy and the *Specification for Chemical Mechanized Transportation Design Principles* HG20518 - 92 issued by Ministry of Chemical Industry so as to improve the engineering design level of the ground and storehouse for chemical solid materials, investment efficiency and save engineering land.

1.0.2 This specification applies to newly-built or expanded engineering design of the ground and storehouse storage system for solid materials in large and medium-sized chemical enterprises. The ground and storehouse design for solid materials of construction engineering in small-sized chemical enterprises and other industries may also be referred to use.

For the storage system area layout and system facility design for flammable, explosive and toxic, radioactive or corrosive chemical solid materials and those prone to generate dust, they shall comply with the relevant provisions in current *Specification for Design Fire Prevention for Refining and Chemical Enterprises and Code for Architectural Design Fire Prevention, Rules for Hazardous Materials Transportation*, *Safety and Hygiene Specifications for the Powder Engineering of Chemical Industry*.

1.0.3 The reference standards of this regulation are as follows:

GB 190-90 *Packing Mark for Dangerous Goods*

GB 3811-83 *Code for Design of Cranes*

GB 12463-90 *General Technical Specifications for Transport Packages of Dangerous Goods*

GBJ 9 *Load Code for Building Structures*

GBJ 16-87 *Code of Design on Building Fire Prevention*

GBJ 17 *Design Code for Steel Structure*

GBJ 41-79 *Design Code* for *Industrial Boiler Room* (Trial)

GBJ 77-85	*Design Code for reinforced concrete silos*
HG 20518-92	*Regulations on Chemical Mechanized Transport Design Principles*
JBJ 6-80	*Technical Regulations for Plant Power Designing*
YBJ 52-88	*Code for Design of General Plot Plan and Transportation of Chemical Industrial Enterprises*
TJ36	*Health Standard in Designing Industrial Enterprises*

2 General requirements

2.1 General requirements of ground design

2.1.1 Selecting the form of the ground shall combine the local natural environment, weather conditions, engineering geological and hydro-geological conditions, the ground location shall avoid adverse geological segments such as active faults, landslides, caves, tombs, silt, etc.

2.1.2 Raw and fuel material ground and the whole plant storehouse (shed) shall be arranged intensively in the place for raw and fuel material entering into the plant and in one area of close to major users, roads and fire lanes shall be provided in the area.

2.1.3 Open ground of bulk material should be arranged in the downwind direction of the plant area, and its long edge should be parallel to the prevailing wind direction as possible.

2.1.4 It shall be left the passage to move the material stacking and taking equipment and fire passage around the ground. If one or both sides of the ground can not be set with the passage, the span between one side of the ground without passage and another side of the ground with passage shall be generally not more than 30m, the maximum value shall not exceed 45m.

2.1.5 For items requiring rain, snow and sun protection, such as temporary transit storage, open ground can be adopted air storage with tarpaulin stamped for protection, rain and sun prevention shed can be added when the storage time is longer.

2.1.6 In the absence of special requirements for ground terrace, the underlying layer is tamped with plain soil and the surface layer is compacted with gravel; coal field terrace can be compacted with poor quality coal; a layer of plain concrete can be painted on coke terrace; the ore ground can be compacted with similar crushed ore.

2.1.7 Generally, the terrace elevation of the ground is 0.20-0.30m above the elevation of the surrounding ground or road.

2.1.8 When the ground adopts ground rail-mounted stockyard machinery, it shall take appropriate measures to prevent the collapse of the material pile to bury the rail.

2.1.9 When storing pyrophoric materials (such as lignite, combustible shale and spontaneously combustible bituminous coal etc.), material stacking and taking equipment

shall be selected to handle pyrophoric materials and the corresponding coal stacker or other auxiliary swaging equipment and wet spaying facilities shall be equipped.

2.1.10 For materials with dust emissions in the process of unloading and inverting storehouse, such as mixed coal, broken coke, dry sand, etc., its ground shall take appropriate dust-prevention measures, such as water spraying.

2.1.11 The layout of the ground shall meet the relevant provisions of *Architecture design Fire Prevention Code*. The fire separation distance between the coal, coke ground and the building shall not be less than the provisions of Table 2.1.11.

The table of the fire separation distance between the coal, coke ground and the building (m)

Table 2.1.11

Name	The total capacity of one ground (t)	Fire resistance rating of the building		
		Grade I, II	Grade III	Grade IV
Coal or coke ground	100-5000	6	8	10
	>5000	8	10	12

2.1.12 When there is a railway line in plant, the ground and storehouse (shed) shall be arranged along the railway line to shorten the length of the railway line occupied as much as possible in case of meeting the requirements of production process and the transportation operations.

2.1.13 Generally, the bulk material in the ground shall be transported to the users using the continuous conveyor machinery to avoid the secondary loading and reshipment.

2.1.14 When the ground is set at one side of loading and uploading line of train, the material shall be at least 2m away from the outside railway rails, when unloading by gantry unloader and stacking up materials in internal door frame, the distance of stacking materials from the inside of the travel rail of unloader shall be no less than in lm.

2.2 General provisions of storehouse (shed) design

2.2.1 Bulk material not afraid of wet and materials packaged in rain-proof package shall choose open rain-proof shed or semi-open storehouse; flammable and explosive materials must be in fire-proof, explosive–proof and static–proof storehouse.

2.2.2 The storage period of materials is long (generally refers the storage period is more than 30 days), if the storage capacity is large (generally refers the maximum storage

capacity is greater than or equal to 5000t within a specified storage period), elongated storehouse with large span shall be adopted and side platform is adopted for loading and unloading; if the storage capacity is large and the storage period is short (generally refers the storage period is less than 10 days), the vehicle warehousing storehouse can be adopted and semi-open storehouse shall be used as much as possible.

2.2.3 The terrace elevation inside the storehouse (shed) shall be 0.15-0.4m above that outside the storehouse (shed). To increase storage capacity, the storehouse can be made into pit-type, and the pit depth is generally less than -2.50m.

2.2.4 The distance of storehouse for flammable, explosive, dangerous goods from other plants shall meet provisions of the code for design fire prevention of building, if flammable, explosive materials are still stacked outdoor, the fire-protection distance shall be calculated from the external side of the stacking place.

2.2.5 The ground and storehouse for flammable and explosive materials shall be as far away from the substation and power distribution stations as possible, the distance between them shall be greater than 15m; the ground and storehouse shall be set with the necessary lightning prevention measures.

2.2.6 Terrace area of every single storehouse such as independently constructed ammonium nitrate storehouse, calcium carbide storehouse and coal blending storehouse shall be no more than 1500m^2, the area of fire partition room is 500m^2 and the fire resistance rating shall be no less than Grade II.

2.2.7 The span, column spacing and elevation of the storehouse shall be selected according to the building module of the industrial plants. See the provision in Table 2.2.7.

Parameter series table of column height, column spacing and span

Table 2.2.7

Column height series (m)	2.5, 4.2, 5.4, 6.0, 7.2, 8.0, 9.0,10.0,12.0, >12.0 Not limited
Column spacing series (m)	(2.7), 3.0, 3.3, 3.6, 4.0, (4.2), 4.5, (4.8), (5.1), (5.4), 6.0, 7.2, (8.4), 9.0
Span series (m)	(3.0), (4.5), (6.0), 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 33.0 36.0

Notes: 1. The numerical value in the bracket is not recommended to use.

2. The column height of the storehouse with crane is generally not more than 18m, with the column spacing of not less than 4.5m.

2.2.8 Generally, the store shed is full open type or the type with keep-off wall and other types, and generally the keep-off wall shall be located in the side of the main wind direction. If there is no lifting equipment in the store shed, the elevation of the lower chord of the roof frame should not exceed 5.4m.

2.2.9 Storehouse (shed) terrace generally can be tamped with plain concrete and also plain soil according to local conditions and by filling pieces of the same type of materials.

2.2.10 For semi-open storehouse, the keep-off wall of store shed is no less 1.00 m. than the indoor terrace, the maximum height shall be 0.50-1.00m lower than allowable stacking height of materials and the maximum height shall not be higher than 2.50m.

2.2.11 The elevation of the top surface for underground yard repository hopper, trough and sluice inside the storehouse (shed) is generally 0.3m above the terrace surface.

2.2.12 If the equipment in storehouse (shed) needs to be set the operating platform and overhaul platform, the clear height above the platform surface is not less than 1.9m.

2.2.13 If the storehouse has aisle, platforms and ladders, etc., the clear height is generally not less than 2.2 m.

2.2.14 When the equipment is arranged inside and outside the storehouse, the clear space of equipment from the wall is generally not less than lm, when arrangement is difficult, and it shall be no less than 0.8m.

2.2.15 The terrace in storehouse (shed) requires drainage slope, when the equipment or steel frame is installed on the ground where it is easy to collect water, the equipment base and steel frame leg shall be set with concrete pad, its elevation of platform surface shall be generally 50-100mm above the ground.

2.2.16 Sealing measures shall be taken for the dust flying area inside the storehouse, and it should be equipped with ventilation and dust removal device.

2.2.17 When the sides or ends of the storehouse are set with a train platform, on the platform, rain-proof shed can be set and the clear distance from rain shed column to edge of the platform is not less than 2m.

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