



OUTDOOR DRUM STORAGE

The safest manner in which bulk flammable liquids can be stored is in underground tanks, or properly constructed flammable liquid stores.

However, many industrial undertakings use a variety of flammable liquids in varying quantities often making underground storage or provision of stores impractical.

Local authorities generally require certain safety measures in relation to siting, maximum quantities and protection of outdoor storage and should be consulted.

SABS Code of Practice

The following extracts are from the SABS Code of Practice 089 : Part I – 1983 (as amended 1988, The Handling, Storage and Distribution of Petroleum Products.

5.4.8 Storage

Packages must be stored only in the building or other space allocated specifically for this purpose.

From the time the packages are received empty until they are sent out, they should be subject to a regular cycle of operations so planned as to eliminate any unnecessary handling.

Where full packages of Class 1 or 2 petroleum products are stacked, they should be arranged that leakage from any individual package can be readily detected and the spillage removed. They should be regularly inspected and the contents of packages found to be leaking should be immediately decanted into sound containers.

When high stacks of packages are built up, they should be properly and adequately checked to ensure that there is no danger of collapse of the stack.

The number of tiers of drums should not be such as to impose an excessive load on those in the bottom tier. Within this limitation the number of tiers may be extended to the safe capacity of the mechanical handling equipment used, except that where the pyramid method of stacking full drums on the roll is adopted, the number of tiers should be limited to three. All drum stores on the roll should be secured to prevent accidental movement.

Empty packages of any size may be restored to suit operational requirements and package design limitations, provided that packages which have held Class 1 or 2 petroleum products are treated as a fire hazard and the appropriate safety precautions are observed.

5.4.9 Handling

When packages are being handled in a dangerous area, adequate precautions must be taken to avoid the risk of sparks from movement of either the packages or ancillary equipment.

5.4.10 Mechanical Handling Equipment

If conveyors, forklift trucks, or other similar mechanical handling devices are used, the safe permissible working loads should be marked on them and must not be exceeded.



All such appliances, lifting gear, and chains used with them should be in good working order and should be regularly examined and tested, records being kept of the tests.

Petrol- or diesel-driven forklift trucks, or similar mechanical handling devices.

- (a) must have the exhaust pipes and an intake fitted with efficient flametraps,
- (b) may only be used for handling packed products inside a closed building if there is adequate ventilation inside the building.
- (c) may be used in the open or in areas having roof covering only for handling all packed products of all types.
- (d) must not have the fuel tank filled or the engine started up inside a storage building. (Both these operations should take place in a safe area)

The use of battery-driven equipment in a dangerous area should not be permitted unless all electrical equipment, including battery boxes, is certified 'flameproof' (see SABS 089 : Part II in this connection). The re-charging of batteries should be allowed only in a safe area; limitation given in (b) and (c) above apply also to battery-driven equipment.

Reference should also be made to SABS 050.

Note: Packages, in terms of this Code range in size from small containers of a few millilitres to steel drums of 225 l capacity or larger.

Recommended Storage Practices

The following recommended storage practices are based on advice by the Factory Mutual Engineering Corporation of the USA.

Drums stored in yards may become involved in fires, causing extensive damage not only to drums and their contents but also to nearby buildings and equipment.

Well-arranged outdoor storage lots are preferred to indoor locations, particularly for Special Group liquids.

1. Whenever possible, locate drum-storage lots at least 23 m from important buildings. The number of drums per lot and distance between lots should be as specified in Table 1. Lesser quantities may be stored within 23 m of buildings as indicated, greater quantities if exposed openings in buildings are protected.
2. Locate and arrange drum-storage lots so that spilled or burning liquid will run off without involving buildings, equipment or other lots. The ground should slope to a safe location; if not, low ramps and dykes and underground trapped drains may be necessary to divert flows safely.

Use areas for storage purposes only. Dispensing should be done in a separate area at least 8 m distant, provided for that purpose alone and with the number of drums in it kept to a minimum.

1. One-high storage is preferred. On-side storage in steel racks and other storage arrangements are acceptable. Liquids in the Special Group should be sheltered from the direct rays of the sun by canopies of non-combustible construction. Use skids or dunnage to prevent direct contact between drums and ground.



2. Make frequent careful leakage inspections. Any flammable liquid on the ground should be promptly flushed away. Leaking, corroded, or damaged drums should be removed and the contents transferred to tight containers.
3. Keep the area clear of grass, weeds, and other foreign combustibles. The use of crushed stone in the drum-storage area will assist in controlling vegetation as well as in reducing the intensity of any spill fires. Smoking and use of open flames must be prohibited. In some locations, such as open city property, the area should be surrounded by a manproof fence to prevent entry by unauthorised persons. Avoid locations near yard incinerators or near railway tracks used by coal-fires locomotives or cranes.
4. Provide hydrants and completely equipped hose houses within 60 m of all drum-storage lots. Equipment should include spray nozzles and, for large storage areas, sufficient 63 mm fire hoses for at least two jets.
5. Train plant fire brigades in the prompt use of hose streams for cooling exposed drums and flushing away burning or escaping liquid.

MAXIMUM NUMBER OF DRUMS PER LOT*												
Distance from buildings (m)	Special Group FP below 26,7°C BP below 51,7°C			Category 1 FP below 26,7°C BP 51,7°C or higher			Category 2 FP 26,7°-93,3°C			Category 3 FP above 93°C		
	Openings Unprotected		Open bricked up **	Openings Unprotected		Open bricked up **	Openings Unprotected		Open bricked up **	Openings Unprotected		Open bricked up **
	Multi-storey	One-storey		Multi-storey	One-storey		Multi-storey	One-storey		Multi-storey	One-storey	
More than 23	15	25	25	50	100	100	100	200	200	500	500	500
15 – 23	5	10	25	25	50	100	50	100	200	500	500	500
8 – 15	3	5	10	15	25	50	25	50	100	250	250	500
3***-7	1	2	5	2	5	25	5	10	50	100	100	200
Min. distance from other lots			8 m			8 m			8 m			8 m

* MIXED STORAGE: Segregation of each class of liquid in separate lots, particularly in Special Groups, is recommended. Permissible quantities of Category 1, 2 and 3 liquids in a single lot are based on straight-line percentages, the sum of which should not exceed 100.

For example, in a lot 18 m from a main building, the exposed wall of which is blank fire-resistant construction, the following quantities are acceptable:

Cat.1 - 50 drums (50 per cent)

Cat.2 - 60 drums (30 per cent)



Cat.3 - 100 drums (20 per cent)

** Exposed openings in buildings bricked up or windows of wired glass in metal frames protected by automatic deluge-system window sprinklers.

*** Permit no storage within 3 m of buildings except against blank, fire-resistant walls.

Published by
Fire Protection Association of Southern Africa
(Incorporated Association not for Gain)
(Reg. No. 73/00022/08)
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Impala Park
1472

