

Purpose of Roofs

First of all, the roof protects the building and its contents from damaging elements, and by means of a roof drain system directs rain water to the storm sewer.

Structurally, roofs transfer the combined weight of live and dead loads to the support members. (Live loads include snow, rain, wind, moving installation equipment, etc. Dead loads include HVAC units, roof drains and the deck itself.)

Types of Roof Decks

- Cement-wood fiber panel decks
- Lightweight insulating concrete roof decks
- Poured gypsum concrete roof decks
- Precast concrete panel roof decks
- Prestressed concrete roof decks
- Reinforced concrete roof decks
- Steel roof decks
- Thermo-setting insulating fill roof decks
- Wood plank or plywood roof decks

Note: These types and others have their own function and the surfacing or covering applied to the deck varies with the ultimate use. Wade drains are available for all types of roof deck construction.

Uses of Roofs — Modern building techniques and methods of construction have pioneered many new uses for the roof:

- Some roofs may be used for cooling purposes where a predetermined level of water is maintained or a constant sprinkler effect is desired during periods of high temperature.
- An increasingly popular use is as a promenade or outdoor terrace where light traffic is permitted.
- Roofs are used as automobile parking decks suitable for heavy traffic.
- To avoid overloading street sewers, roofs are in some cases being used as a reservoir whereby excessive rainfall is retained on the roof and allowed to drain slowly.

Design Considerations — This is not a roofing specification for deck design. . . it is merely an aid to the specifying engineer.

(1) A roof must be designed in conjunction with the roof drainage equipment serving it. It is necessary to correlate the type roof specified with proper and adequately sized drains.

(2) A roof pitched properly to drains is usually designed for a loading of thirty pounds per square foot. A roof that backs up water either by design or by improper drain placement can be loaded in excess of this design factor and cause failure.

(3) A bonded roof is not necessarily a guarantee of a water tight roof; a well written specification calling for a two year guarantee is usually better than a long term bond.

(4) The purpose of the roof must be clearly defined. One function of a roof is to rapidly dispose of rainwater. If, however, it is to serve as a storm water retention area the selection of both roofing and drainage units must be specified so that a minimum of maintenance can be expected.

(5) A dead level roof should be avoided unless its aspects are carefully detailed on plans and in specifications. The number and weights of plies should be specified for all built-up roofing. If a minimum of four plies over a concrete deck is specified, the total thickness would be approximately five-eighths inches. A roof drain selected for the installation must be designed to securely hold all plies regardless of thickness and should be recessed below the roof level.

Roof drains should be clearly detailed and located on plans to avoid ponding or pool formation. It is advisable to tie small outlet drains into large ones by running horizontal lines under the deck to the vertical leaders.

(6) Specify scuppers for parapet roofs. A scupper should be provided for each roof drain and it should be at least 4" above the high point of the roof. This precaution is essential if the roof is used as a reservoir. In effect, such roofs become small lakes and are subject to wind action. Scupper omission or inadequacy can cause water build-up beyond

load safety factor.

(7) Expansion Joints: The use of expansion joints is recommended in one story buildings with high ceilings. Such buildings are subject to settling which can cause rupture of the flashing around the roof drains. Expansion and contraction of the deck can be compensated for by the installation of expansion joints.

(8) Maintenance: The multipurpose roof or deck area so prevalent in modern buildings places a burden on the owner to maintain it properly. Such roofs and promenade areas are subject to waste water from clean-up operations as well as normal rainfall. Low maintenance costs can be achieved by carefully specifying the proper drain for each area, and by using an adequate number of drains to insure the removal of water.

(9) Vapor barriers should be provided under roof insulation especially in high humidity areas. A vapor seal is a layer of three or four plies of mopped felts placed on the rough concrete deck, allowed to dry and later covered with a variable thickness of insulation over which the final roofing is applied.

(10) Vent stacks through roofs should pass through flashing sleeves.

(11) Roof drains should not be located near column heads because this is usually the high point of the roof, and when deflection occurs water cannot reach the drain.

(12) Drains and stacks should be at least one foot from parapet walls.

(13) Metal flashing should be installed around roof drains as this is the area of hardest wear, and most likely source of leaks. The flashing is usually placed between the roofing plies and extends outward eighteen to twenty-four inches from the center of the leader.

(14) All roof drains except "Control-Flo" type should be installed below finished roof level.