

## CONTROL-FLO ... Today's Answer for Areas with Restricted Storm Water Drainage Capacity

### WHAT IS "CONTROL-FLO"?

Control-Flo is an advanced method of removing rain water off dead-level or sloped roofs. As contrasted with conventional drainage practices which attempt to drain off storm water as quickly as it falls on the roof's surface, Control-Flo drains the roof at a controlled rate. Excess water accumulates on the roof under controlled conditions ... then drains off at a lower rate after a storm abates.

The key to economical Control-Flo drainage is the utilization of large roof areas to temporarily store the maximum amount of water without overloading average roofs or creating excessive draindown time during periods of heavy rainfall.

### ADVANTAGES OF CONTROL-FLO

**Cuts Drainage Costs** Fewer roof drains, smaller diameter piping, smaller sewer sizes, and lower installation costs are possible with a Control-Flo drainage system because roof areas are utilized as temporary storage reservoirs.

**Reduces Probability of Storm Damage** Lightens load on combination sewers by reducing rate of drain water from roof tops during severe storms, thereby reducing probability of flooded sewers and consequent backflow into basements and other low areas.

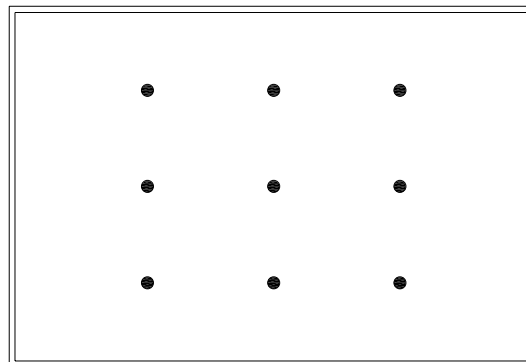
The key to successful Control-Flo drainage is a unique, scientifically designed weir containing accurately calibrated notches with sides formed by parabolic curves which provide flow rates directly proportional to the head. Shape and size of notches are based on predetermined flow rates, and all factors involved in roof drainage to assure permanent regulation of drainage flow rates for specific geographic locations and rainfall intensities.

### ROOF LOADING and RUN-OFF RATES

Extensive studies show that stresses due to water load on a sloping roof for any fixed set of conditions are very nearly the same as those on a dead-level roof. A sloping roof tends to concentrate more water in the valleys and increase the water depth at this point. The greater depth around the drain leads to a faster run-off rate, particularly a faster early run-off rate. As a result, the total volume of water stored on the roof is less, and the total load on the sloping roof is less. By using the same area on the sloping roof as on the dead-level roof the increase in roof stresses due to increased water depth in the valleys is offset by the decrease in the total load due to less water stored. The net result is the maximum roof stresses are approximately the same for any single span, rise, and fixed set of conditions. A fixed set of conditions would be the same notch area, the same frequency storm, and the same locality.

### DEAD-LEVEL ROOFS

A dead-level roof for purposes of applying the Zurn Control-Flo drainage principle is one which has been designed for zero slope across its entire surface.



Plan View

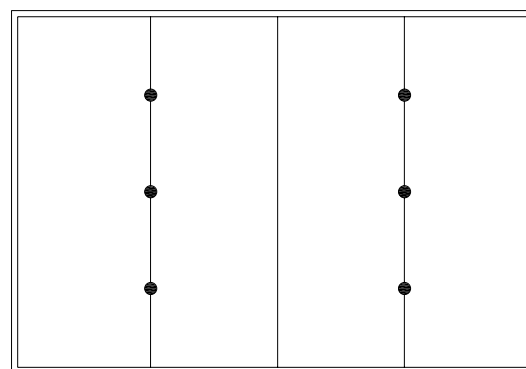


Section View

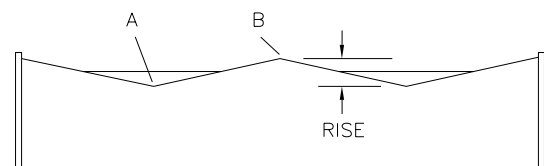
### SLOPED ROOFS

A sloped roof is one designed commonly with a shallow slope. The Zurn Control-Flo drainage system can be applied to any slope which results in a total rise up to 6 inches ... and data can be calculated for rises exceeding 6 inches.

The total rise of a roof as calculated for Control-Flo application is defined as the vertical increase in height in inches, from the low point or valley of a sloping roof (A) to the top of the sloping section (B).  
*Example:* A roof that slopes 1/8" per foot having a 24-foot span would have a rise of  $24 \times 1/8$ , or 3".



Plan View



Section View

## CONTROL-FLO, continued

### PROPER DRAIN LOCATION

The following good design practice is recommended for selecting the proper number of Control-Flo drains for a given area. On **dead-level roofs**, drains should be located no further than 50 feet from each edge of the roof to assure good run-off regardless of wind direction. Weir should be flush with roof surface, not recessed. On **sloping roofs**, drains should be located in the valleys at a distance no greater than 50 feet from each end of the valleys. Weir should be flush with the valley roof surface, not recessed. On **large roof areas**, drains should not be spaced at a distance greater than 200 feet.

### RIGID ROOF DESIGN

Normal practice of roof design is based on 30 pounds per square foot, therefore this factor should definitely be kept in mind as a prime requirement for assuring a structurally sound roof. Otherwise, roof deflection may minimize the advantages of a well-designed roof drainage system.

Failure to recognize the adverse effects of roof deflection, even with conventional roof drainage, may lead to roof failure. With the concept of Control-Flo roof drainage, the design condition of deflection is equally important. If severe deflection is permitted, rain water will simply seek low areas, thus intensifying the degree of deflection. Thus, it is extremely important that flat roofs are designed in accordance with normal load factors so that deflection will be slight enough in any way to prevent progressive deflection which could cause water depths to load the roof beyond its design limits.

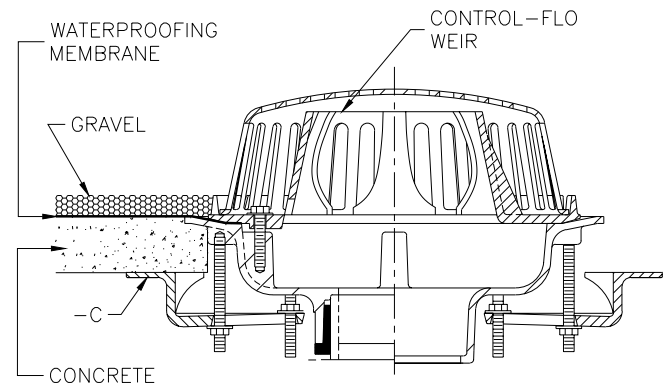
### SCUPPERS and OVERFLOW DRAINS

Roofing members and understructures, weakened by seepage and rot resulting from improper drainage and roof construction, can give away under the weight of rapidly accumulated water during flash storms. Thus, it is recommended, and often required by building codes, to install scuppers and overflow drains in parapet-type roofs. Properly selected and sized scuppers and overflow drains are vital to a well-engineered drainage system to prevent excessive loading, erosion, seepage, and rotting.

### CONTROL-FLO INSTALLED – CONCRETE ROOF Z105-C Control-Flo Roof Drain

The Zurn Control-Flo roof drain can be used for almost any type of roof design or installation where flow rates to the drainage system must be accurately controlled. The drain utilizes a unique weir design that limits the flow through the drain.

- 1) Available with 1 to 6 inverted parabolic notches.
- 2) Allows linear relationship between depth of water on roof and flow rate through drain.
- 3) Stores water on roof with controlled discharge so that drainage system and roof structural system will not be overloaded.
- 4) May allow use of smaller diameter piping.



(For sizing, contact Zurn Engineering Department for details.)