MIFAB® RAINFALL CONSIDERATIONS FOR ROOF DRAINS

Flat roof drainage is accomplished through a system of roof drains, vertical leaders, and horizontal storm drains sized and located in accordance with established criteria in conformance with local plumbing and building codes. Therefore, when considering the design of a roof drainage system, it is recommended that local code authorities be consulted regarding the rainfall rate acceptable in their jurisdiction for design purposes. National rainfall rate information is provided in the chart below, listing rainfall rates in millimeters per hour for selected cities. When the rainfall rate for the locale of the project has been resolved, sizing of the roof drains, leaders and horizontal drainage piping can proceed.

RAINFALL RATES FOR SELECTED CITIES (INCHES PER HOUR)

Based on a storm of one hour duration and a 100 year return period.

ALABAMA
Birmingham 3.8
Huntsville 3.6
Mobile 4.6
Montgomery 4.2

ALASKA
Fairbanks 1.0
Juneau 0.6

ARIZONA
Flagstaff 2.4
Nogales 3.1
Phoenix 2.5
Yuma 1.6

ARKANSAS
Fort Smith 3.6
Little Rock 3.7
Texarkana 3.8

CALIFORNIA
Barstow 1.4
Crescent City 1.5
Fresno 1.1
Los Angeles 2.1
Needles 1.6
Sacramento 1.6
San Diego 1.3
San Francisco 1.5

COLORADO
Denver 2.4
Durango 1.8
Grand Junction 1.7
Pueblo 2.5

CONNECTICUT
Hartford 2.7
New Haven 2.8

DELAWARE
Georgetown 3.0
Wilmington 3.1

DISTRICT OF COLUMBIA
Washington 3.2

FLORIDA
Jacksonville 4.3
Key West. 4.3
Miami 4.7
Pensacola 4.6
Tampa 4.5

GEORGIA
Atlanta 3.7
Macon 3.9
Savannah 4.3
Thomasville 4.3

HAWAII
Hilo 6.2
Honolulu 3.0

IDAHO
Boise 0.9
Pocatello 1.2

ILLINOIS
Cairo 3.3
Chicago 3.0
Peoria 3.1
Springfield 3.3

INDIANA
Evansville 3.2
Fort Wayne 2.9
Indianapolis 3.1
South Bend 3.0
Terre Haute 3.2

IOWA
Burlington 3.3
Davenport 3.3
Des Moines 3.5
Dubuque 3.3
Sioux City 3.6

KANSAS
Atwood 3.3
Dodge City 3.4
Topeka 3.7
Wichita 3.7

KENTUCKY
Ashland 3.0
Bowling Green 3.2
Lexington 3.1
Louisville 3.2
Middlesboro 2.8
Paducah 3.3

LOUISIANA
Baton Rouge 4.8
Lake Charles 4.7
New Orleans 4.8
Shreveport 3.9

MAINE
Bangor 2.2
Caribou 2.0
Portland 2.4

MARYLAND
Baltimore 3.2
Hagerstown 2.8
Salisbury 3.1

MASSACHUSETTS
Boston 2.5
New Bedford 2.6
Pittsfield 2.8
Springfield 2.7

MICHIGAN
Alpena 2.5
Detroit 2.8
Escabana 2.4
Grand Rapids 2.8
Lansing 2.8
Marquette 2.4
Sault Ste Marie 2.2

MISSISSIPPI
Biloxi 4.7
Columbus 3.9
Jackson 4.0
Natchez 4.4

MISSOURI
Columbia 3.3
Kansas City 3.6
St. Louis 3.3
Springfield 3.4

MONTANA
Billings 1.9
Havre 1.6
Helena 1.5
Missoula 1.3

NEBRASKA
Grand Island 3.5
Omaha 3.8
Sidney 3.2
Valentine 3.2

NEVADA
Carson City 1.1
Elko 1.0
Las Vegas 1.5

NEW HAMPSHIRE
Berlin 2.5
Claremont 2.5
Portsmouth 2.4

NEW JERSEY
Atlantic City 3.0
Newark 3.1
Trenton 3.1

NEW MEXICO
Albuquerque 2.0
Hobbs 3.0
Las Cruces 2.0
Santa Fe 2.0

NEW YORK
Albany 2.6
Binghamton 2.3
Buffalo 2.3
New York 3.0
Syracuse 2.3
Watertown 2.2

NORTH CAROLINA
Asheville, ... 4.1
Charlotte 3.7
Greensboro 3.5
Raleigh 3.7
Wilmington 4.2

NORTH DAKOTA
Bismarck 2.8
Fargo 3.2
Grand Forks 3.0
Williston 2.6

OHIO
Cincinnati 3.0
Cleveland 2.8
Columbus 2.8
Toledo 2.8
Youngstown 2.7
Zanesville 2.8

OKLAHOMA
Oklahoma City 3.8
Tulsa 3.8

OREGON
Medford 1.4
Pendleton 1.0
Portland 1.3

PENNSYLVANIA
Erie 2.6
Harrisburg 2.8
Philadelphia 3.1
Pittsburgh 2.6
Scranton 2.7
Williamsport 2.6

RHODE ISLAND
Providence 2.6

SOUTH CAROLINA
Charleston 4.3
Columbia 4.0
Greenville 4.2

SOUTH DAKOTA
Aberdeen 3.3
Pierre 3.2
Rapid-City 2.9
Sioux Falls 3.6

TENNESSEE
Chattanooga 3.5
Knoxville 3.2
Memphis 3.7
Nashville 3.3

TEXAS
Abilene 3.6
Amarillo 3.5
Brownsville 4.5
Corpus Christi 4.5
Dallas 4.0
El Paso 2.4
Houston 4.6
Lubbock 3.3
Odessa 3.2
San Antonio 4.2
Tyler 3.9

UTAH
Cedar City 1.6
Salt Lake City 1.3

VERMONT
Brattleboro 2.5
Burlington 2.2

VIRGINIA
Bristol 2.7
Charlottesville 2.9
Norfolk 3.4
Richmond 3.3
Roanoke 3.2

WASHINGTON
Bellingham 1.1
Seattle 1.1
Spokane 1.0
Yakima 1.0

WEST VIRGINIA
Charleston 2.8
Elkins 2.7
Parkersburg 2.8

WISCONSIN
Ashland 2.5
Eau Claire 3.0
Green Bay 2.5
La Crosse 3.1
Madison 3.0
Milwaukee 3.0

WYOMING
Casper 1.9
Cheyenne 2.2
Rock Springs 1.3
Sheridan 1.7
Yellowstone Park ... 1.4

SIZING AND PLACEMENT OF MIFAB ROOF DRAINS

As a first step in the sizing procedure it will be necessary to determine the quantity and placement of the drains required for the roof. Even though there are a number of opinions regarding roof areas that can be effectively drained by one drain, it is recognized that for minimized ponding with adequate drainage, two roof drains are required for roof areas of 10,000 square feet or less, and at least one drain is required per 10,000 square feet of area for larger roofs. Individual judgement will be necessary when considering quantity and placement of drains on roofs where shape and size of sections may require departure from the 10,000 square feet per drain recommendation. In the replacement of drains, uniform distribution is desirable for proper roof drainage. Locating drains within 50 feet of the roof perimeter and no more than 100 feet apart is acceptable practice. Also, careful consideration of roof structural members, dividers, expansion joints, and other projections including rooftop equipment is essential in planning the roof drainage system for adequate drainage of each area of the roof. Consultation with the architect and structural engineer regarding roof details is recommended.

RAINFALL CONVERSION: INCHES PER HOUR TO GPM

For sizing purposes, rainfall-which is expressed in inches per hour, (in the following calculation) - is converted to gallons per minute per square foot of roof area. A one (1) inch per hour rainfall converts to .0104 GPM per square foot. For any given rainfall, multiply the inches per hour by .0104 to arrive at the GPM per square foot of roof area. Then multiply that figure by the square feet of roof area to be drained to arrive at the total gallons per minute to be handled by the drainage system. For example: consider a 4-inch per hour rainfall on a 10,000 square foot roof: **0.0104 x 4 x 10,000 = 416 GPM.**

NOTE: Stated flow rates for roof drains are based on particular test piping configurations and dimensions. The effects of other piping configurations and dimensions on the actual system flow rate shall be evaluated by, and is the responsibility of, the system designer/engineer.

MIFAB®, Inc., 1321 West 119th Street, Chicago, Illinois 60643-5109, USA
Toll Free: 1-800-465-2736 • Fax: 1-773-341-3049
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sales@mifab.com • Canada Toll Free: 1-800-387-3880