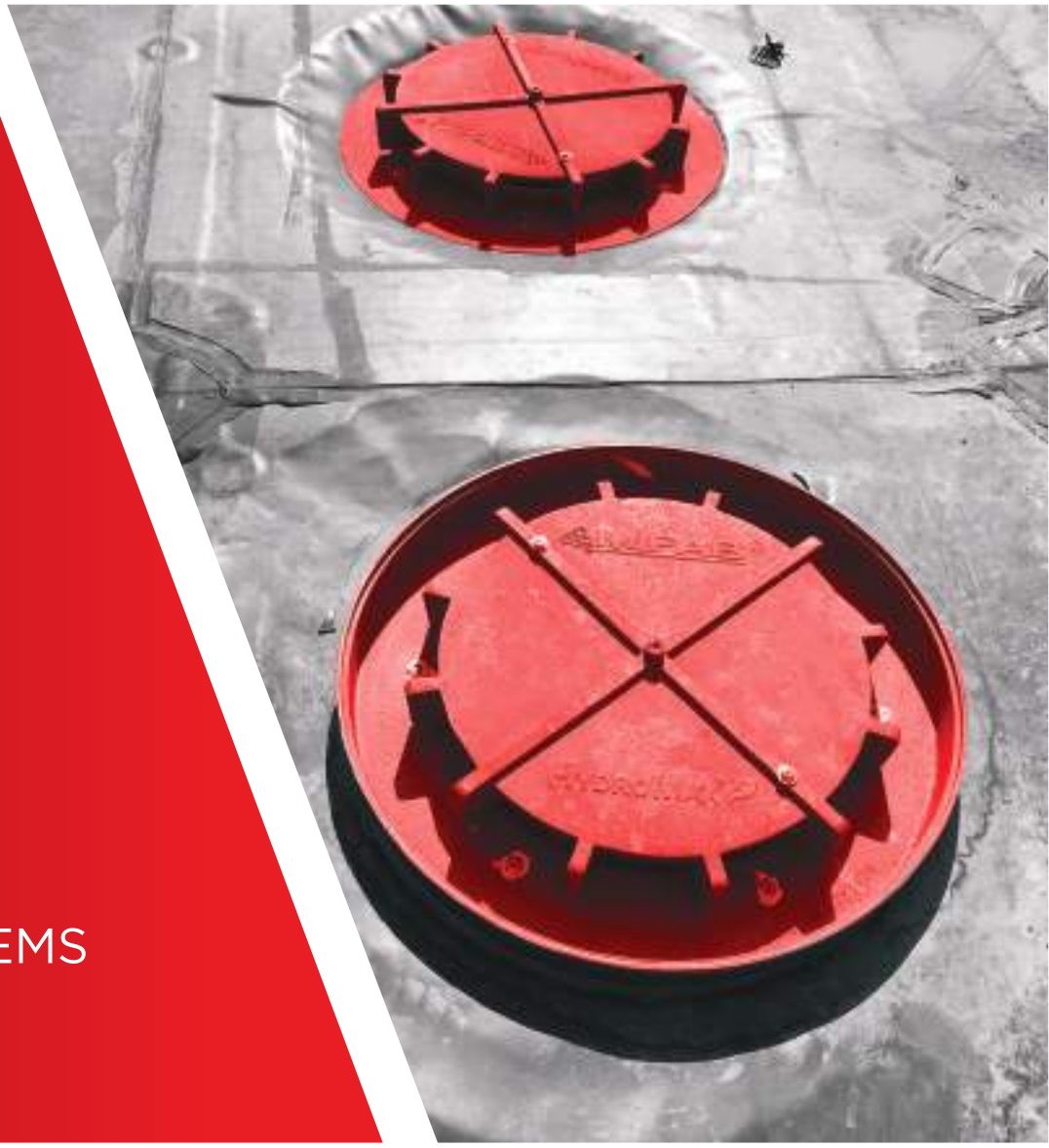
MIFAB®

HYDROMAX-2020

2020

HYDROMAX CATALOG

SIPHONIC ROOF DRAINAGE SYSTEMS



PRIMARY - OVERFLOW - GUTTER

FOR ANY DESIGN ASSISTANCE CONTACT:
HYDROMAX@MIFAB.COM

LIT-082

A New Dawn in Drainage

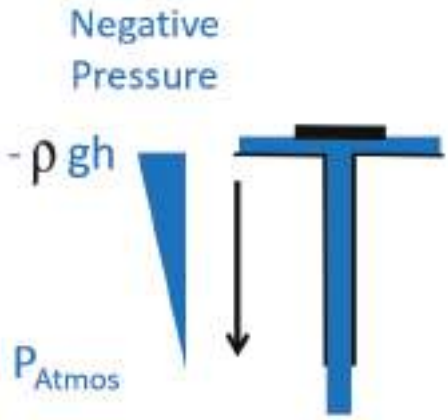
For any design assistance contact: **hydromax@mifab.com**

Top Technical Benefits of Siphonic Roof Drainage

Smaller Diameter pipe used: approximately half the size of gravity diameter pipe size **Smaller Diameter** pipe = - Smaller Fittings - Smaller Couplings -Smaller Hangers -Smaller Insulation	Horizontal pipes are installed without **PITCH – Flat Level** **Easy co-ordination** of services for BIM modeling due to pipework running flat Fewer pipes = **Reduced construction time and cost**
Rainwater downpipes **routed to the Engineer's Preferred Locations** - frees up valuable building space	Routing of rainwater downpipes to the perimeter of buildings **Eliminates Below Grade Excavation and Drainage Under the Building Floor**
A significant **Reduction in Civil Below Grade Drainage** (common range is from 20% to 60%)	Easily route rainwater pipes to **Retention Ponds** or **Detention Basins** or **Rainwater Harvesting**
MIFAB HydroMax® drains suck the water quickly off the the roof **= less ponding than traditional gravity**	**IPC Code Compliance** MIFAB® HydroMax® siphonic roof drains have performance graphs from testing to siphonic roof drains standard ASME A112.6.9 (Gravity Drain Standard has no performance test!)

MIFAB® Inc. **HydroMax®**, 1321 West 119th Street, Chicago, Illinois 60643-5109, USA
Visit **www.hydromax.com/faqs.php** for the most frequently asked questions.
USA Toll Free: 1-800-465-2736 • Fax: 1-773-341-3049
Canada Toll Free: 1-800-387-3880 • sales@mifab.com

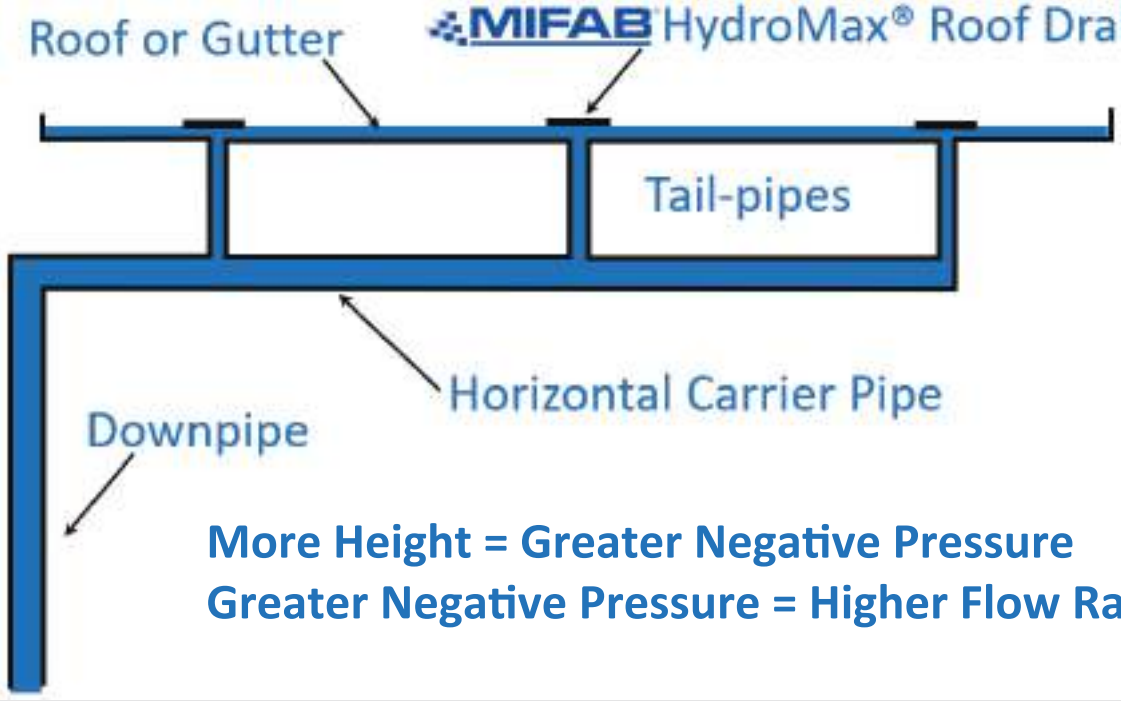
How Does Siphonic Drainage Function?



Rainwater (**without air**) falling down the vertical pipe accelerates, creating **negative pressure**, which draws water off the roof **siphonically**.

Primary Siphonic Drain

Overflow Siphonic Drain

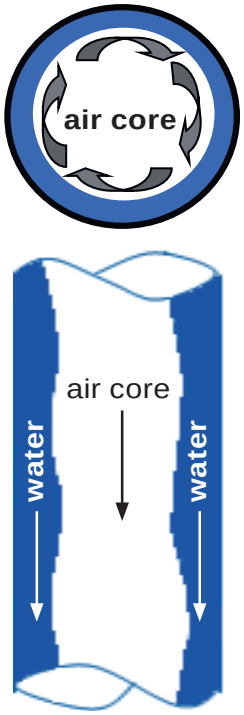


More Height = Greater Negative Pressure
Greater Negative Pressure = Higher Flow Rates

"In the course of the challenging storm design for the Embry Riddle Aeronautical University Student Union Building, HydroMax Siphonic Drainage enabled us to achieve a design solution that conventional storm system could not offer. We were enabled to incorporate smaller size cast iron, PVC and copper pipes within the HydroMax Siphonic system which provided technical benefits as well as cost savings." -Kaz Kazeminia, Principal, OCI Associates, Inc. (Orlando, FL)

System Comparison

Traditional Gravity



MIFAB® HydroMax® Siphonic

HydroMax® pipe diameters half the size of gravity

Restrictive Factors of Gravity Drainage

1. Gravity drains require **⅔ air to transport ⅓ water** = bigger diameter pipes	2. The vortex formation of a gravity roof drain results in the **water being transported in an inefficient spiral motion**	3. The flow of water in gravity drainage is **dictated by pitch**, which **limits the distance a pipe can travel**
4. The **pitch also dictates the location of discharge**, rather than the design team's choice of where to route	5. The **driving force** is directly correlated to the **depth of ponding**	6. **No Performance Test** within ASME A112.6.4 **Gravity Drain Standard** to provide GPM flow rates = **unidentified** ponding on roof

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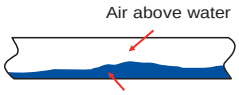
Four Flow Patterns of Siphonic Drainage

Priming of Main Pipe Work

Stage 1
Gravity Flow
Light Rainfall
Approx. 0-10% of Design



Water finds its way to the downpipe and runs down the pipe.

Stage 2
Plug Flow
Moderate Rainfall
Approx. 10% of Design

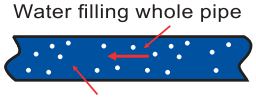
Plug of water filling whole pipe at high velocities which achieves self-cleansing.

Air pockets driven down pipework

Tests have shown that **self-cleansing** can be achieved at as low as **10% to 15%** of the design rainfall rate.

Stage 3
Bubble Flow
Heavy Rainfall
Approx. 40-70% of Design

Water filling whole pipe



Air bubbles in suspension carried at high velocity

Stage 4
Full-Bore Flow
Intense Rainfall
Approx. 70-100% of Design

No more air entry- Air within pipe now Fully Purged

Water filling whole pipe

Completed HydroMax® Projects

Marriott

Mercy West Lakes Hospital

Walmart

Wayne State Student Housing

Parking Garage

Little Caesars Arena

Phoenix Sky Harbor

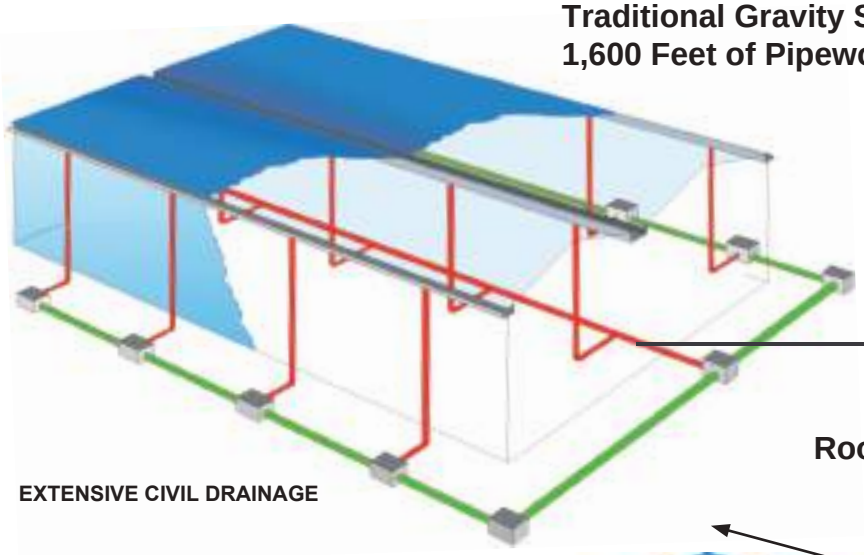
Marina Heights

Disney Springs

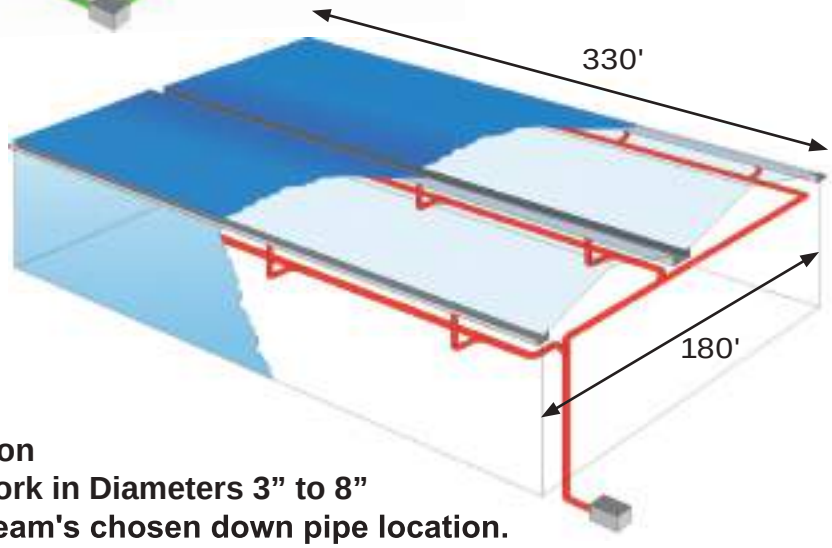
"Henderson Engineers, Inc. has designed HydroMax siphonic roof drain systems for hundreds of buildings in the United States using the HydroTechnic calculation program. HydroTechnic is an excellent tool that equips the mechanical designer with an understanding of siphonic system operation and provides an excellent graphical interface."
-Arron Cooper, PE, Vice President, Henderson Engineers Inc. (Bentonville, AR)

Gravity Layout vs. Siphonic Layout

Traditional Gravity System
1,600 Feet of Pipework In Diameters 6” to 18”



Roof Size = 59,400 Square Feet



MIFAB® HydroMax® Solution
Only 1,000 Feet of Pipework in Diameters 3” to 8”
Pipes run flat to design team's chosen down pipe location.

Costs Savings Using A Siphonic System

1. Reduction in Pipe Diameters
2. Fewer Drains
3. Reduction of Down Pipes
4. Less Pipework
5. Elimination of Under-Slab Excavation
6. Reduced Material Costs for Pipes, Fittings, Couplings, Hangers, and Insulation
7. Reduction of Civil Excavation
8. Reduction of Manholes
9. Labor Savings from Less Pipe to Hang

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MIFAB® HydroMax® Drain/Cover Options

All MIFAB® HydroMax® drains are tested to ASME A112.6.9 and IAPMO listed

Part # MH-300
Roof Drain Assembly
(3" NH, 4" NH, 5" NH, 6" NH)

Part # MH-301
Overflow Roof Drain
(3" NH, 4" NH, 5" NH, 6" NH)

Part # MH-301-DG
Overflow with Debrris Guard
(3" NH, 4" NH, 5" NH, 6" NH)

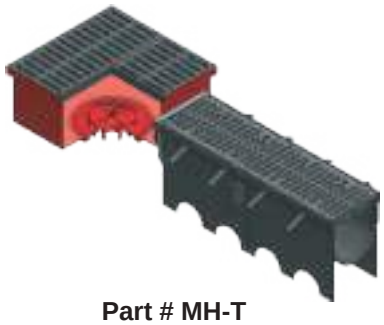
Part # MH-200
2" Terrace Drain

Part # MH-205-G
2" Gutter Drain
(Stainless Steel Spun Body)

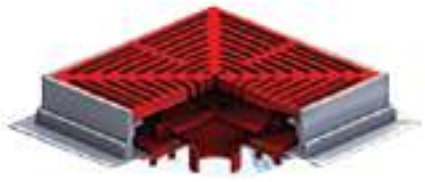
Part # MH-305-G
3" Gutter Drain
(Stainless Steel Spun Body)

Part # MH-505-G
5" Gutter Drain
(Stainless Steel Spun Body)

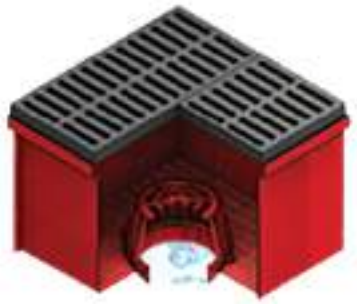
Part # MH-505-G-OF
5" Gutter Overflow Drain
(Stainless Steel Spun Body)



Part # MH-T
Siphonic Trench Assembly



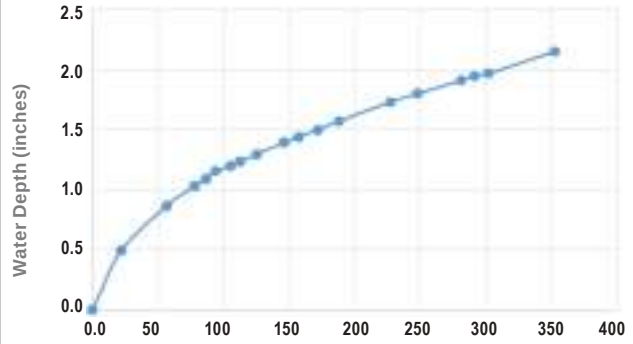
Part # MH-PG-D
Parking Garage/Deck Drain
(3" NH, 4" NH, 5" NH)



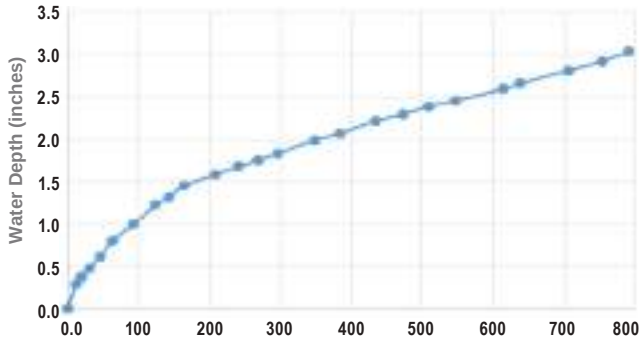
Part #'s MH-F1460, MH-F1580
Siphonic Gravity Break Drain

"Just wanted to let you all know that on our weekly conference call today the contractor said that the price for the siphonic system came in "somewhere between $201,000 & $235,000 less" than the conventional system they had originally priced."
- Engineering Firm Email (Atlanta, GA)

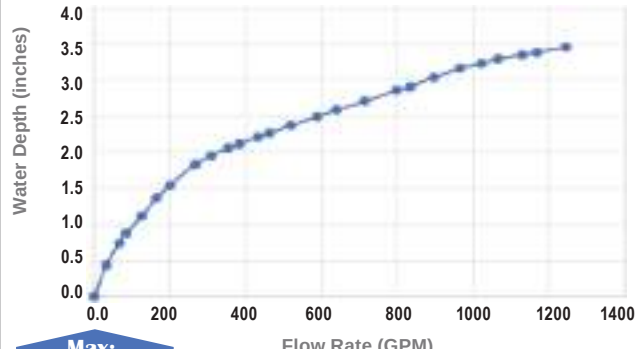
Ponding Curves of HydroMax®



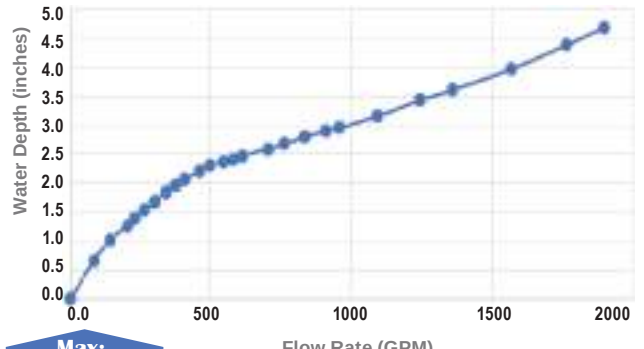
MIFAB® HydroMax® 3-inch



MIFAB® HydroMax® 4-inch



MIFAB® HydroMax® 5-inch



MIFAB® HydroMax® 6-inch

Gravity Drainage Ponding Rates

Model #R1203	Depth	1"	2"	3"	4"	5"	6"
3" Cast Iron Drain with Cast Iron Dome	GPM	25	87	214	225	231	247

Model #R1204	Depth	1"	2"	3"	4"	5"	6"
4" Cast Iron Drain with Cast Iron Dome	GPM	25	90	215	232	240	252

Model #R1205	Depth	1"	2"	3"	4"	5"	6"
5" Cast Iron Drain with Cast Iron Dome	GPM	27	100	230	295	440	720

Model #R1206	Depth	1"	2"	3"	4"	5"	6"
6" Cast Iron Drain with Cast Iron Dome	GPM	15	75	210	250	490	715

3" Drain			4" Drain			5" Drain			6" Drain		
Depth	Gravity	HydroMax®	Depth	Gravity	HydroMax®	Depth	Gravity	HydroMax®	Depth	Gravity	HydroMax®
1"	25 GPM	75 GPM	1"	25 GPM	93 GPM	1"	27 GPM	115 GPM	1"	15 GPM	140 GPM
2"	87 GPM	310 GPM	2"	90 GPM	350 GPM	2"	100 GPM	350 GPM	2"	75 GPM	400 GPM
3"	214 GPM		3"	215 GPM	785 GPM	3"	230 GPM	890 GPM	3"	210 GPM	990 GPM
4"	225 GPM		4"	232 GPM		4"	295 GPM		4"	250 GPM	1580 GPM
5"	231 GPM		5"	240 GPM		5"	440 GPM		5"	490 GPM	
6"	247 GPM		6"	252 GPM		6"	720 GPM		6"	715 GPM	

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Max SqFt at Various Rainfall Rates

Drain		GPM	Design Rainfall Rate 2"	3"	4"	5"
Absolute Min GPM		23	1,107 sq ft	738 sq ft	554 sq ft	443 sq ft
MH-300/MH-301	**MAX GPM**	450	19,972 sq ft	13,315 sq ft	9,986 sq ft	7,989 sq ft
MH-400/MH-401		750	36,094 sq ft	24,063 sq ft	18,047 sq ft	14,438 sq ft
MH-500/MH-501		1280	61,601 sq ft	41,067 sq ft	30,801 sq ft	24,641 sq ft
MH-600/MH-601		1820	87,588 sq ft	58,392 sq ft	43,794 sq ft	35,036 sq ft

MIFAB® HydroMax® Roof Area x Rainfall Rate = GPM ready reckoner chart

Tributary (Catchment) Area (ft²)	Rainfall Intensity (inches per hour) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	Roof Drains Opereating Range
500									23.38	25.97	28.57	31.17	33.77	36.36	38.96	41.56	MH-300 & 301
1000					25.97	31.17	36.36	41.56	46.75	51.95	57.14	62.34	67.53	72.73	77.92	83.12	3" Drain
1500			23.38	31.17	38.96	46.75	54.55	62.34	70.13	77.92	85.71	93.51	101.30	109.09	116.88	124.68	Min Inflow (GPM) 23
2000			31.17	41.56	51.95	62.34	72.73	83.12	93.51	103.90	114.29	124.68	135.06	145.45	155.84	166.23	
2500		25.97	38.96	51.95	64.94	77.92	90.91	103.90	116.88	129.87	142.86	155.84	168.83	181.82	194.81	207.79	Max Inflow (GPM) 450
3000		31.17	46.75	62.34	77.92	93.51	109.09	124.68	140.26	155.84	171.43	187.01	202.60	218.18	233.77	249.35	
3500		36.36	54.55	72.73	90.91	109.09	127.27	145.45	163.64	181.82	200.00	218.18	236.36	254.55	272.73	290.91	MH-400 & 401
4000		41.56	62.34	83.12	103.90	124.68	145.45	166.23	187.01	207.79	228.57	249.35	270.13	290.91	311.69	332.47	4" Drain
4500	23.38	46.75	70.13	93.51	116.88	140.26	163.64	187.01	210.39	233.77	257.14	280.52	303.90	327.27	350.65	374.03	Min Inflow (GPM) 75
5000	25.97	51.95	77.92	103.90	129.87	155.84	181.82	207.79	233.77	259.74	285.71	311.69	337.66	363.64	389.61	415.58	
5500	28.57	57.14	85.71	114.29	142.86	171.43	200.00	228.57	257.14	285.71	314.29	342.86	371.43	400.00	428.57	457.14	Max Inflow (GPM) 750
6000	31.17	62.34	93.51	124.68	155.84	187.01	218.18	249.35	280.52	311.69	342.86	374.03	405.19	436.36	467.53	498.70	
6500	33.77	67.53	101.30	135.06	168.83	202.60	236.36	270.13	303.90	337.66	371.43	405.19	438.96	472.73	506.49	540.26	MH-500 & 501
7000	36.36	72.73	109.09	145.45	181.82	218.18	254.55	290.91	327.27	363.64	400.00	436.36	472.73	509.09	545.45	581.82	5" Drain
7500	38.96	77.92	116.88	155.84	194.81	233.77	272.73	311.69	350.65	389.61	428.57	467.53	506.49	545.45	584.42	623.38	Min Inflow (GPM) 120
8000	41.56	83.12	124.68	166.23	207.79	249.35	290.91	332.47	374.03	415.58	457.14	498.70	540.26	581.82	623.38	664.94	
8500	44.16	88.31	132.47	176.62	220.78	264.94	309.09	353.25	397.40	441.56	485.71	529.87	574.03	618.18	662.34	706.49	Max Inflow (GPM) 1280
9000	46.75	93.51	140.26	187.01	233.77	280.52	327.27	374.03	420.78	467.53	514.29	561.04	607.79	654.55	701.30	748.05	
9500	49.35	98.70	148.05	197.40	246.75	296.10	345.45	394.81	444.16	493.51	542.86	592.21	641.56	690.91	740.26	789.61	MH-600 & 601
10000	51.95	103.90	155.84	207.79	259.74	311.69	363.64	415.58	467.53	519.48	571.43	623.38	675.32	727.27	779.22	831.17	6" Drain
10500	54.55	109.09	163.64	218.18	272.73	327.27	381.82	436.36	490.91	545.45	600.00	654.55	709.09	763.64	818.18	872.73	Min Inflow (GPM) 160
11000	57.14	114.29	171.43	228.57	285.71	342.86	400.00	457.14	514.29	571.43	628.57	685.71	742.86	800.00	857.14	914.29	
11500	59.74	119.48	179.22	238.96	298.70	358.44	418.18	477.92	537.66	597.40	657.14	716.88	776.62	836.36	896.10	955.84	Max Inflow (GPM) 1820
12000	62.34	124.68	187.01	249.35	311.69	374.03	436.36	498.70	561.04	623.38	685.71	748.05	810.39	872.73	935.07	997.40	
12500	64.94	129.87	194.81	259.74	324.68	389.61	454.55	519.48	584.42	649.35	714.29	779.22	844.16	909.09	974.03	1038.96	
13000	67.53	135.06	202.60	270.13	337.66	405.19	472.73	540.26	607.79	675.32	742.86	810.39	877.92	945.45	1012.99	1080.52	
13500	70.13	140.26	210.39	280.52	350.65	420.78	490.91	561.04	631.17	701.30	771.43	841.56	911.69	981.82	1051.95	1122.08	
14000	72.73	145.45	218.18	290.91	363.64	436.36	509.09	581.82	654.55	727.27	800.00	872.73	945.45	1018.18	1090.91	1163.64	
14500	75.32	150.65	225.97	301.30	376.62	451.95	527.27	602.60	677.92	753.25	828.57	903.90	979.22	1054.55	1129.87	1205.19	
15000	77.92	155.84	233.77	311.69	389.61	467.53	545.45	623.38	701.30	779.22	857.14	935.07	1012.99	1090.91	1168.83	1246.75	
15500	80.52	161.04	241.56	322.08	402.60	483.12	563.64	644.16	724.68	805.19	885.71	966.23	1046.75	1127.27	1207.79	1288.31	
16000	83.12	166.23	249.35	332.47	415.58	498.70	581.82	664.94	748.05	831.17	914.29	997.40	1080.52	1163.64	1246.75	1329.87	
16500	85.71	171.43	257.14	342.86	428.57	514.29	600.00	685.71	771.43	857.14	942.86	1028.57	1114.29	1200.00	1285.71	1371.43	
17000	88.31	176.62	264.94	353.25	441.56	529.87	618.18	706.49	794.81	883.12	971.43	1059.74	1148.05	1236.36	1324.68	1412.99	
17500	90.91	181.82	272.73	363.64	454.55	545.45	636.36	727.27	818.18	909.09	1000.00	1090.91	1181.82	1272.73	1363.64	1454.55	
18000	93.51	187.01	280.52	374.03	467.53	561.04	654.55	748.05	841.56	935.07	1028.57	1122.08	1215.58	1309.09	1402.60	1496.10	
18500	96.10	192.21	288.31	384.42	480.52	576.62	672.73	768.83	864.94	961.04	1057.14	1153.25	1249.35	1345.45	1441.56	1537.66	
19000	98.70	197.40	296.10	394.81	493.51	592.21	690.91	789.61	888.31	987.01	1085.71	1184.42	1283.12	1381.82	1480.52	1579.22	
19500	101.30	202.60	303.90	405.19	506.49	607.79	709.09	810.39	911.69	1012.99	1114.29	1215.58	1316.88	1418.18	1519.48	1620.78	
20000	103.90	207.79	311.69	415.58	519.48	623.38	727.27	831.17	935.07	1038.96	1142.86	1246.75	1350.65	1454.55	1558.44	1662.34	
20500	106.49	212.99	319.48	425.97	532.47	638.96	745.45	851.95	958.44	1064.94	1171.43	1277.92	1384.42	1490.91	1597.40	1703.90	
21000	109.09	218.18	327.27	436.36	545.45	654.55	763.64	872.73	981.82	1090.91	1200.00	1309.09	1418.18	1527.27	1636.36	1745.45	
21500	111.69	223.38	335.06	446.75	558.44	670.13	781.82	893.51	1005.19	1116.88	1228.57	1340.26	1451.95	1563.64	1675.32	1787.01	
22000	114.29	228.57	342.86	457.14	571.43	685.71	800.00	914.29	1028.57	1142.86	1257.14	1371.43	1485.71	1600.00	1714.29	1828.57	
22500	116.88	233.77	350.65	467.53	584.42	701.30	818.18	935.07	1051.95	1168.83	1285.71	1402.60	1519.48	1636.36	1753.25		
23000	119.48	238.96	358.44	477.92	597.40	716.88	836.36	955.84	1075.32	1194.81	1314.29	1433.77	1553.25	1672.73	1792.21		
23500	122.08	244.16	366.23	488.31	610.39	732.47	854.55	976.62	1098.70	1220.78	1342.86	1464.94	1587.01	1709.09			
24000	124.68	249.35	374.03	498.70	623.38	748.05	872.73	997.40	1122.08	1246.75	1371.43	1496.10	1620.78	1745.45			
24500	127.27	254.55	381.82	509.09	636.36	763.64	890.91	1018.18	1145.45	1272.73	1400.00	1527.27	1654.55	1781.82			
25000	129.87	259.74	389.61	519.48	649.35	779.22	909.09	1038.96	1168.83	1298.70	1428.57	1558.44	1688.31	1818.18			

"No Kidding? I was always under the impression that siphonic typically required more ponding than roof drains would usually incur. That is really good to know!" -Kyle Jones, Soultions AEC, (St. Louis, MO)

Case Study using HydroMax®

Far too often gravity dictates storm drainage design. Pipe can only run so far with pitch before crossing over into livable space, in times requiring a leader to drop down in the middle of the building with the only solution being to excavate though the interior of the building a long distance (still accounting for pitch) to reach the civils. But what if that excavation could be eliminated completely from the schedule? What if the pipe could run tight to the ceiling for a long run? What if the pipe diameter could be smaller while still providing the same GPM flow rates?

Do I have your attention yet? Let me introduce you to Siphonic roof drainage.

Recently, the Waldinger Corporation was tasked with helping build a state-of-the-art manufacturing facility for Viega LLC in McPherson, Kansas. Viega is building the 204,000-square-foot plant to expand production of its ProPress® Copper product line and create a master distribution facility.

THE WALDINGER CORPORATION

As a way to provide value engineering on the project, the team over at the Waldinger Corporation looked at every option available to help provide the best product, with the most efficient pricing possible to bring the strongest solution to the table. They enlisted the help of Professional Engineering Consultants (PEC) to help with the engineering on the project.

In the first round of designs, the Viega project was needing 3 separate storm drainage lines, each containing 7 gravity drains apiece, to appropriately discharge that amount of roof area. Additionally, they noticed the initial design would not allow for the storm drainage to travel all the way to the exterior wall, causing the need for internal downpipes leading to excavation inside of the building footprint on all 3 runs. This issue was caused by the limitations of a traditional gravity storm drainage system; had the discharge pipe run all the way to the exterior wall, the piping itself would have limited the ceiling space causing the piping to drop below the required clearance height and possibly become a forklift hazard.

Working with the MIFAB® HydroMax® design assist team, PEC was able to completely transform the initial design by creating a siphonic system fitting within their requirements. The biggest benefit in this given scenario was the ability to route the discharge pipe to the engineer's desired location. Whereas in the initial design, the leaders caused the need for excavation, in the HydroMax Siphonic design the pipe work runs without pitch, enabling the storm drainage piping to run high and tight all the way to the west exterior wall of the building. This ability to run the storm drainage to the exterior wall eliminated the need for excavation, as well as reduced the pipe size diameters.

Barry George with PEC commented, "With long runs, bridge cranes, and equipment the leaders needed to fit within the structure limits. The siphoning drains system was the ideal solution."

PEC
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

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Case Study using HydroMax®

How does siphonic drainage create a reduction in pipe size diameter? A traditional gravity system relies on air to push water through the system (two-thirds air and one-third water). Siphonic drainage utilizes the entire pipework, filling it completely with water, which allows on average half the diameter pipe to be used in the same scenario.

Also adding to the cost savings associated with smaller diameter pipe are smaller diameter fittings, smaller hangers, smaller couplings and less strenuous labor to install. Additionally, because a siphonic drain is so much more efficient at discharging water (can run up to 26.2 ft/s compared to gravity's 3 ft/s), PEC's siphonic system for Viega was able to function with three runs each containing four drains, reducing the total number of drains from 21 down to 12 for both the primary and overflow. Equally important, because a siphonic system runs completely flat, the systems were able to be installed parallel, giving the contractor the ability to prefab the threaded rod needed for the hangers.

As a result, the team was able to provide Viega with a more efficient system, while saving an enormous amount of money and labor. **The Waldinger Corporation stated that on this particular project they were able to see a 23% saving in material and labor.**

As Viega continues to expand, siphonic systems have been used on a number of their buildings; most recently in its racking facility to enable space savings providing even more storage space.

If you would like more information on how to utilize HydroMax® Siphonic Drainage on your next project, please feel free to contact our team at hydromax@mifab.com for a design submission form – we would be more than happy to help answer any questions/put together a design.

"We have been utilizing the MIFAB siphonic roof drain products and design services for several years. The HydroTechnic's design team is very helpful and willing to assist us in meeting the expectations of our customers. The siphonic roof drain system is a great value engineering offer that we can offer to our customers and clients. The siphonic design is a proven cost savings over traditional gravity system designs." -Dan Zimmerman, Mechanical Manager, The Waldinger Corporation (Omaha, NE)

How to Submit a Design to MIFAB® HydroMax®

Rainfall Rate	
Pipe Material	

(PVC or Cast Iron? – if multiple materials used, please identify on ISO drawing)

Drawing Requirements:

Our team needs the following data to design a Siphonic system in our HydroTechnic™ Program:

☐ **Roof drain locations**

☐ **GPM flow rate through each roof drain (*alternative: sq ft of catchment area feeding each roof drain*)**

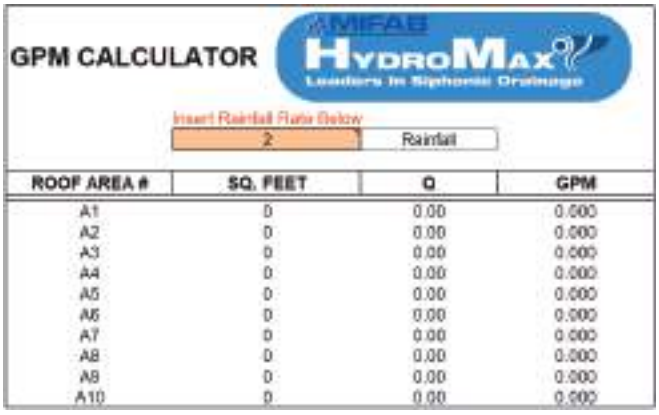
☐ **All lengths of vertical and horizontal pipe runs in the system (center of pipe to center of pipe – ft, in):**

- ☐ **Length of initial vertical drop from roof drain**
- ☐ **Lengths of horizontal collector pipe connecting each roof drain**
- ☐ **Length of vertical drop of discharge (and any other horizontal run)**

☐ **Identify point at which Siphonic action ends**

☐ **Primary or Overflow system**

☐ **If surcharging, the height between the center of Siphonic horizontal line at discharge to the manhole grate cover (ft, in)**


GPM CALCULATOR

MIFAB HydroMax Leaders in Siphonic Drainage

Insert Rainfall Rate Below

2 Rainfall

ROOF AREA #	SQ. FEET	Q	GPM
A1	0	0.00	0.000
A2	0	0.00	0.000
A3	0	0.00	0.000
A4	0	0.00	0.000
A5	0	0.00	0.000
A6	0	0.00	0.000
A7	0	0.00	0.000
A8	0	0.00	0.000
A9	0	0.00	0.000
A10	0	0.00	0.000

A sizing calculator for determining GPM flow through a drain is available from MIFAB upon request.

User only needs to know **Rainfall Rate** and **SqFt Feeding the Drain**

Download our design submission files:
tinyurl.com/HydroMaxDSForm

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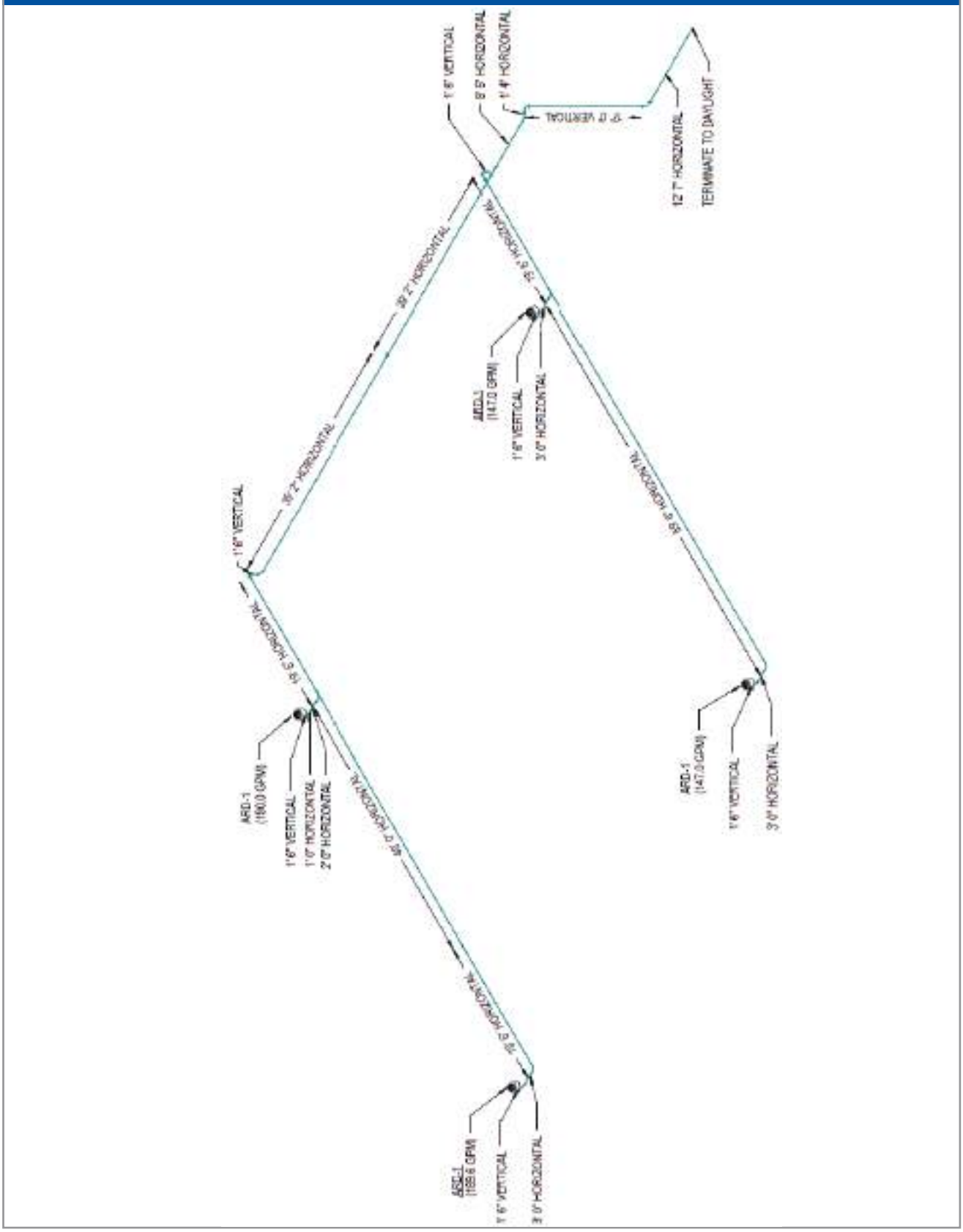
Example of ISO Riser Drawing



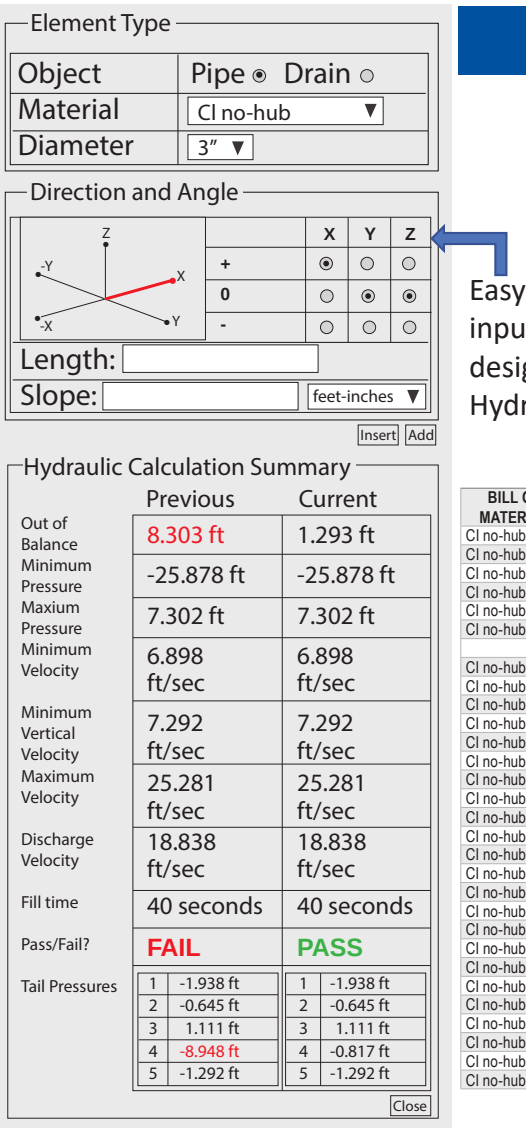
"MIFAB's HydroTechnic design software is easy to use and provides an abundance of information to place on my drawings which lessens confusion in the field. The technical staff at MIFAB have been extremely helpful, always available to answer questions with quick turnaround, no matter the time of day." -Amanda Dolber, PE, EBS Engineering (Buffalo, NY)

Why Use MIFAB® HydroTechnic™ Design Software?

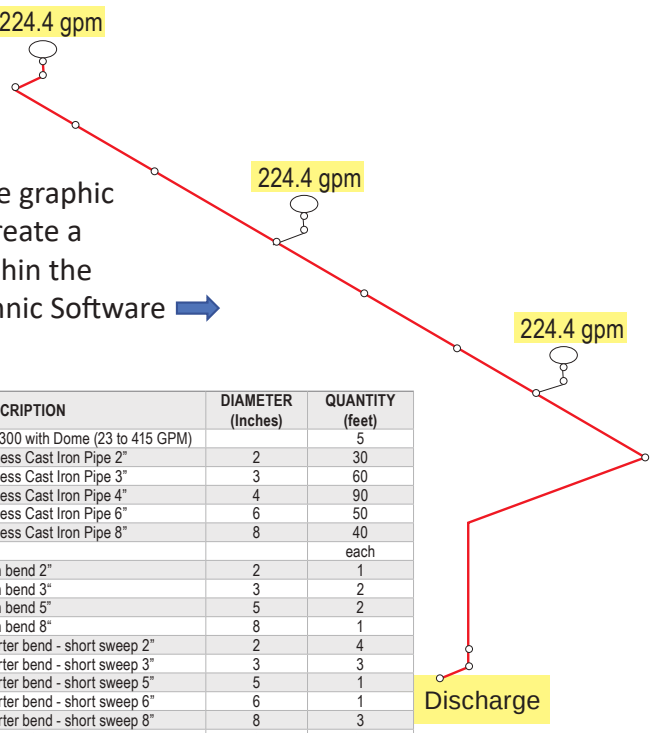
Our HydroTechnic Design software is:

1. Online Based - easy for sharing, no special download required
2. Easy to reconfigure design when changes in the field arise
3. Software is indepently tested by 3rd party certified to be 100% in compliance with ASPE 45 standards when a "**PASS**" is shown (*refer to letter from CRM in this booklet*)
4. We have a Design Assist Team in Chicago to help with projects **FREE OF CHARGE**

How to Create a Design



Easy to use graphic input to create a design within the HydroTechnic Software



BILL OF MATERIAL	DESCRIPTION	DIAMETER (Inches)	QUANTITY (feet)
CI no-hub	MH-300 with Dome (23 to 415 GPM)		5
CI no-hub	Hubless Cast Iron Pipe 2"	2	30
CI no-hub	Hubless Cast Iron Pipe 3"	3	60
CI no-hub	Hubless Cast Iron Pipe 4"	4	90
CI no-hub	Hubless Cast Iron Pipe 6"	6	50
CI no-hub	Hubless Cast Iron Pipe 8"	8	40
			each
CI no-hub	eigth bend 2"	2	1
CI no-hub	eigth bend 3"	3	2
CI no-hub	eigth bend 5"	5	2
CI no-hub	eigth bend 8"	8	1
CI no-hub	Quarter bend - short sweep 2"	2	4
CI no-hub	Quarter bend - short sweep 3"	3	3
CI no-hub	Quarter bend - short sweep 5"	5	1
CI no-hub	Quarter bend - short sweep 6"	6	1
CI no-hub	Quarter bend - short sweep 8"	8	3
CI no-hub	Coupling 2"	2	25
CI no-hub	Coupling 3"	3	34
CI no-hub	Coupling 5"	5	20
CI no-hub	Coupling 6"	6	11
CI no-hub	Coupling 8"	8	16
CI no-hub	Reducer 3/2"		10
CI no-hub	Reducer 5/3"		2
CI no-hub	Reducer 6/5"		1
CI no-hub	Reducer 8/5"		1
CI no-hub	Reducer 8/6"		3
CI no-hub	45° Y branch 5/3"		2
CI no-hub	45° Y branch 6/3"		1
CI no-hub	45° Y branch 8/5"		1
CI no-hub	Access Point 8"		1

BOM available for Cost Estimating

Calculation Report available for Engineering review

No.	Type	Material	Diameter (inches)	Length (feet-inches)	HEIGHT (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
0	Discharge		10				2609.388	10.659	1.765	0
1	Pipe	CI-No-Hub	10	3' 1 1/2"		-X	2609.388	10.659	0.133	0.133
2	Pipe	CI-No-Hub	10	3' 1 1/2"		-X	2609.388	10.659	0.133	0.265
3	90° radius bend	CI-No-Hub	10				2609.388	10.659	0.53	0.795
4	Expansion	CI-No-Hub	8				2609.388	10.659	0.607	-1.275
5	Pipe	CI-No-Hub	8	9' 7"	9 7	+Z	2609.388	10.659	1.352	-9.506
6	Reducer	CI-No-Hub	8				2609.388	10.659	0.74	-8.766
7	Pipe	CI-No-Hub	8	19' 2"	19 2	+Z	2609.388	10.659	0.814	-24.443

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Independent 3rd party certification on MIFAB® HydroMax® HydroTechnic™ software.

CRM Rainwater Drainage Consultancy Ltd

17 April 2015

CRM Building
85 Worsley Rd
Farnworth
Bolton
BL4 9LU
Tel. 01204 701934
Email: rdc@crmrainwater.co.uk

Bill Ross
HydroMax Inc. Ltd.,
Balnagowan,
Eassie
Glamis
Forfar
DD8 1SG

Dear Sirs,

Hydromax™ outlets and HydroTechnic™ software

We at CRM, one of Europe's leading independent Consultant's for Siphonic Roof Drainage, along with HR Wallingford (formerly named Hydraulic Research, Wallingford) one of the world's leading research and test facilities for hydraulics, worked together on testing the HydroMax™ siphonic roof drainage system and HydroTechnic™ analytical design software program.

We are pleased to confirm that the system functioned well under all test conditions and satisfied the performance requirements of the current ruling standards for roof drainage design, ASPE/ANSI 45:2013. The HydroTechnic™ analytical design program has been proven to be extremely accurate, a fact endorsed by HR Wallingford (who were previously commissioned by a UK Governmental Department to analyse siphonic roof drainage systems). We believe that due to its technically advanced calculation process, HydroTechnic™ produces calculations of unsurpassed accuracy together with user friendly features including the ability to calculate with varying piping materials.

We can confirm that the HydroMax 3", 4", 5" and 6" have been tested in accordance with standard ASME 112.6.9-2005.

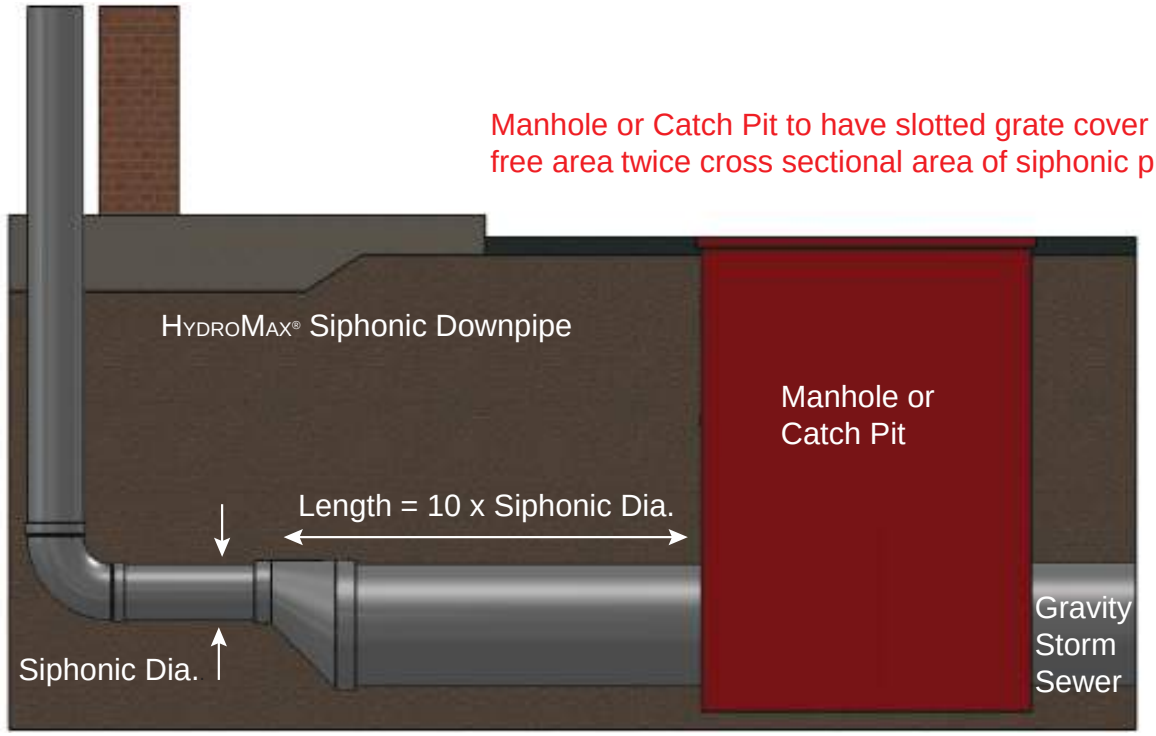
Please contact me if you require any further information.

Yours faithfully

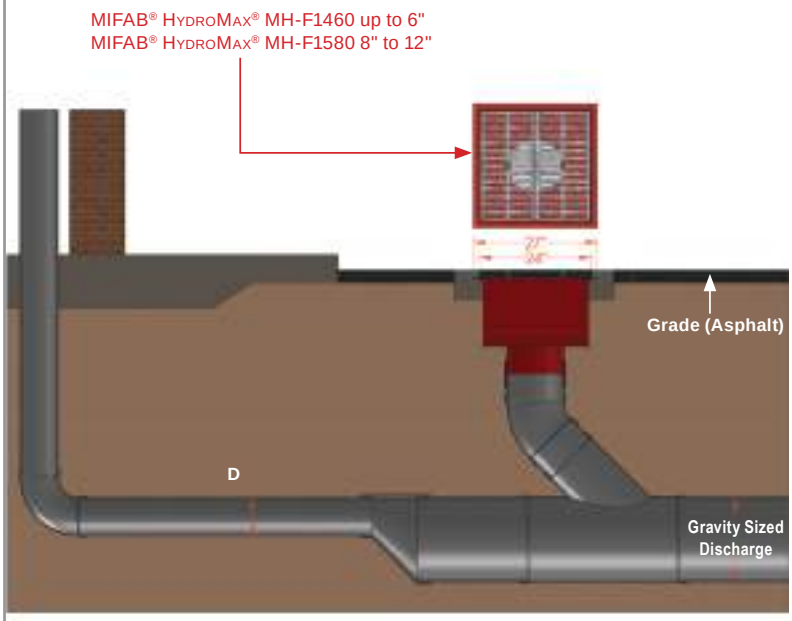
Dr. Malcolm Wearing BEng PhD CEng MICE MCIWEM

"I have been a regular user of MIFAB's HydroTechnic software since 2017. The program's intuitive user interface, coupled with the world-class support we receive from MIFAB, consistently results in fully optimized system designs with significant cost and performance benefits." -Ed Yelin, CPD, Erdman Anthony & Associates (Rochester, NY)

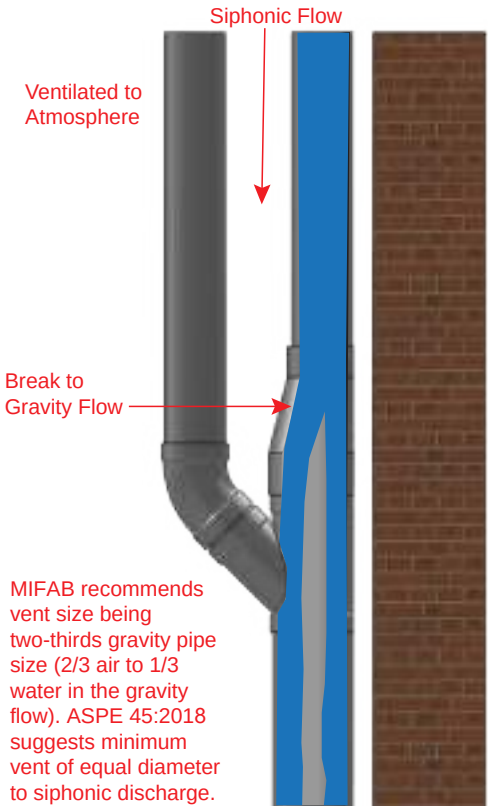
Siphon Breaks



Flare out discharge pipework 10 x siphonic pipe diameter in length from manhole and expect at least 2 step-ups in diameter for the transition to gravity pipe size.



Siphonic Break in Vertical



MIFAB recommends vent size being two-thirds gravity pipe size (2/3 air to 1/3 water in the gravity flow). ASPE 45:2018 suggests minimum vent of equal diameter to siphonic discharge.

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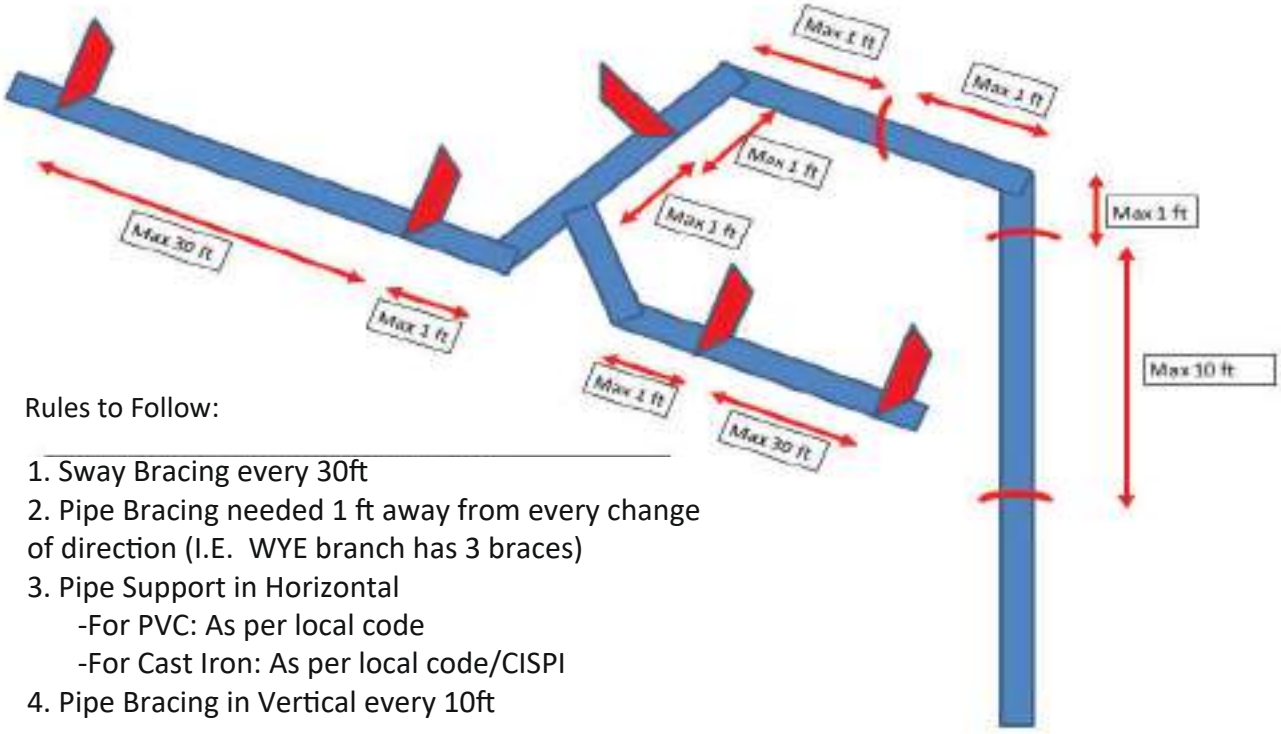
Pipe Bracing Requirements

ASPE45 9.3.4 Standard

If the distance from the top of a suspended pipe to the point of connection of the hanger rod is greater than 0.46m (18in.), lateral restraints shall be installed every 9.0m (30ft) at each branch take-off and at each change of direction



Rules to Follow:

1. Sway Bracing every 30ft
2. Pipe Bracing needed 1 ft away from every change of direction (I.E. WYE branch has 3 braces)
3. Pipe Support in Horizontal
   - -For PVC: As per local code
   - -For Cast Iron: As per local code/CISPI
4. Pipe Bracing in Vertical every 10ft

2015 IPC Code (And 2018)

SECTION 1105 - ROOF DRAINS

1105.2 Roof drain flow rate.
The published roof drain flow rate, based on the head of water above the roof drain, shall be used to size the storm drainage system in accordance with Section 1106. The flow rate used for sizing storm drainage piping shall be based on the maximum anticipated ponding at the roof drain.

SECTION 1108 - SECONDARY (EMERGENCY) ROOF DRAINS

1105.2 Roof drain flow rate.
Secondary roof drains systems shall have the endpoint of discharge separate from the primary system. Discharge shall be above grade in a location that would normally be observed by the building occupants or maintenance personnel.

CREIGHTON DENTAL
OMAHA, NE

CREIGHTON DENTAL PIPEWORK
OMAHA, NE

"HydroMax is the most innovative, cost effective roof drainage system solution on the market."
-Mark Evans, Principal, Evans and Associates (Atlanta, GA)

IAPMO/ASPE Research Study: Issues with Gravity Roof Drains

Issue #1: Gravity Roof Drain Standard ASME A112.6.4 does not include a performance test to provide the published roof drain flow rates.

What does this mean? With no prescribed test standard, manufacturers' data cannot be verified or provide an apples to apples comparison.

Issue #2: Gravity Roof Drains can't handle the GPM flow rates being required through traditional sizing methods.

What does this mean? According to the chart below, a 10,066sq ft area with a 3" rainfall rate would require a 6" roof drain; however, that would require 314GPM to flow through the drain to be properly sized. Looking at a sample 6" drain from the study it can be seen that (1) 6" roof drain would not be able to handle the 314GPM needed according to the sizing table; in reality (2) 6" roof drains would be needed.

TABLE 1106.3
SIZE OF HORIZONTAL STORM DRAINAGE PIPING

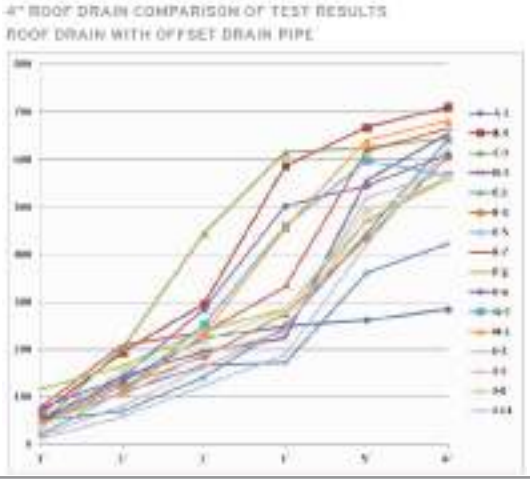
SIZE OF HORIZONTAL PIPING (inches)	HORIZONTALLY PROJECTED ROOF AREA (square feet) Rainfall rate (inches per hour)					
	1	2	3	4	5	6
¼ unit vertical in 12 units horizontal (1 percent slope)						
3	3,288	1,644	1,096	822	657	548
4	7,520	3,760	2,506	1,880	1,504	1,253
5	13,360	6,680	4,453	3,340	2,672	2,227
6	21,400	10,700	7,133	5,350	4,280	3,566
8	46,000	23,000	15,330	11,500	9,200	7,666
10	82,800	41,400	27,600	20,700	16,560	13,800
12	133,200	66,600	44,400	33,300	26,650	22,200
15	218,000	109,000	72,800	59,500	47,600	39,650
½ unit vertical in 12 units horizontal (2-percent slope)						
3	4,640	2,320	1,546	1,160	928	773
4	10,600	5,300	3,533	2,650	2,120	1,766
5	18,880	9,440	6,293	4,720	3,776	3,146
6	30,200	15,100	10,066	7,550	6,040	5,033
8	65,200	32,600	21,733	16,300	13,040	10,866

Test No.	Model No.	Description	Type of Strainer	Flow Rate (gpm) Based on Head Height					
				1"	2"	3"	4"	5"	6"
5	A-5	6" cast iron drain	cast iron dome	10	185	199	238	267	218

Issue #3: All Gravity Drains have different GPM flow capacities .

What does this mean? GPM flow rate matters. When selecting a drain based only on diameter, there is no way to guarantee it can handle the needed flow rate through the drain.

Test No.	Model No.	Description	Type of Strainer	Flow Rate (gpm) Based on Head Height					
				1"	1½"	3"	4"	5"	6"
3	A-3	4" cast iron drain	cast iron dome	49	134	225	250	262	285
8	B-3	4" cast iron drain	cast iron dome	67	195	296	587	668	710
12	C-3	4" cast iron drain	poly dome	45	203	445	615	625	645
17	D-3	4" cast iron drain	aluminum dome	52	144	196	225	556	655
20	E-2	4" PVC drain	poly dome	51	70	142	250	445	640
21	E-3	4" PVC drain	aluminum dome	44	125	186	276	434	606
23	E-5	4" cast iron drain	poly dome	47	110	168	172	362	423
25	E-7	4" cast iron drain	cast iron dome	80	210	235	332	618	665
28	F-2	4" cast iron drain	cast iron dome	118	166	239	286	470	558
32	F-6	4" cast iron drain	cast iron dome	78	142	285	503	545	611
37	G-3	4" PVC drain	ABS dome	22	113	253	460	598	567
41	H-3	4" cast iron drain	cast iron dome	46	111	234	456	640	682
46	I-3	4" PVC drain	poly dome	14	50	125	190	422	622
49	J-3	4" cast iron drain	cast iron dome	21	81	163	244	472	564
54	J-8	4" cast iron drain	brass dome	35	158	217	284	491	562
59	J-14	4" cast iron drain	brass dome	66	103	192	235	520	574



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2019 List of MIFAB® HydroMax® Preferred Installers

To be verified as a **preferred installer** by MIFAB®, a contractor must meet the following criteria:

1. Complete a pre-install call checklist lead by MIFAB®
2. Finish 3 projects working with our software/design assist team
3. Install over $250,000 worth of HydroMax® Siphonic Drainage

JESCO, Inc.
Construction

THE WALDINGER CORPORATION

Pre-Install Call Checklist

MIFAB® HydroMax® is the **only** siphonic manufacturer that holds a pre-install call before shipping any project to make sure the contractor understands 3 things:
1. How HydroMax® functions, **2.** That the system must be installed as designed, and
3. Who to contact for any design changes needed during install.

- ☐ CONTACT ENGINEER OF RECORD **PRIOR** TO ANY DIMENSIONAL CHANGES OR ROUTE DEVIATION
  - ☐ These changes will be quickly resolved, but must be identified by the contractor prior to pipe insulation
- ☐ How does Siphonic drainage work
- ☐ Horizontal piping installed with No Pitch
- ☐ Reduction in vertical & increase in horizontal permitted
- ☐ **PIPE RESTRAINT IS CRITICAL** (Improperly restrained pipe will move):
  - ☐ Pipe restraints located 1' from fitting on each change of direction (i.e. a wye branch to have 3 restraints)
  - ☐ Sway bracing needed every 30 foot
  - ☐ PVC pipe hangers support per local code
  - ☐ Cast Iron pipe hangers support per local code/CISPI
  - ☐ Pipe bracing in vertical every 10 foot
- ☐ Tail pipe connections enter horizontal pipe on the side, not drop-in from the top
- ☐ Concentric vs. Eccentric Reducers: Pipe crown stays flat in eccentric; Concentric is measured to centerline of pipe
- ☐ Pipe measurement lengths in HydroTechnic program are center of fitting to center of fitting
- ☐ Cleanouts ARE NOT REQUIRED. If used, they should be removable spool pieces DWV style, no extended T branches
- ☐ Outside dimension of the roof hole opening is critical on deck mount installations (install sheets available)
- ☐ Trim roof membrane to fit inside of clamping ring
- ☐ Venting is required where Siphonic system breaks to gravity. Manhole to have slotted grate, not solid.
  - ☐ Review location of manhole relative to footprint of the building
- ☐ Clean construction debris from drain pipe work; make sure baffle plates are installed
- ☐ CONTACT ENGINEER OF RECORD **PRIOR** TO ANY DIMENSIONAL CHANGES OR ROUTE DEVIATION

"Working with HydroMax and MIFAB, is incredibly easy and convenient. You can layout your siphonic piping design as you would traditionally, send your routing to them, and they will size the system for you! They are an email or phone call away from getting me the answers I need when I need them, and they train the contractors prior to installation. I would recommend HydroMax and MIFAB Siphonic Roof Drains systems for all sorts of projects." -Genaine Bailey, PD, OCI Associates, Inc. (Orlando, FL)

Cost Savings Case Study: Gravity Drainage vs. Siphonic Drainage

Brennan,

Without releasing our labor, overhead or profit to go Siphonic vs a Conventional Storm System on a Warehouse, Private Wage Project, below are the values we had on the Distribution Project.

Conventional Storm Installation (Cast Iron) with Labor and Materials Installed Turn Key the cost would be **$240,956.00**

Siphonic Storm Installation (PVC) with Labor and Materials Installed Turn Key the cost would be **$148,357.00**

Total Savings to utilize Siphonic Storm Drain System (PVC) Turn Key is a Savings of **$92,599.00**

Keep in mind that this is a traditional storm drain system in cast iron and the Siphonic approach utilizing PVC. If you wanted an idea on the impact to go to Cast Iron Pipe you could use a R.O.M Figure of 35% Impact in pipe and Fittings.

So assume in this case our pipe and fittings (PVC) were about $27,500.00 in the Siphonic piping design x 35% = $9,625.00. Assume some mark up, profit and overhead @ $3,000.00 for a total impact of $12,625.00 to got to cast iron in lieu of PVC.
$12,625.00 would be your Impact to your savings above off the $92,599.00.

If were to be piped in cast iron in lieu of PVC the Value Engineering would now be a R.O.M of **$79,974.00**

I hope this helps and please keep these values private as far as where you got them. They are however factual and from the actual Project…. :) If you have any questions please feel free to call or email me.

			Pipe PVC Schedule 40 2"	40
			Pipe PVC Schedule 40 3"	140
			Pipe PVC Schedule 40 4"	160
			Pipe PVC Schedule 40 6"	1400
No-Hub Cast Iron Soil Pipe 8"	2139		Pipe PVC Schedule 40 8"	1260
No-Hub Cast Iron Soil Pipe 10"	1035		Pipe PVC Schedule 40 10"	120
No-Hub Cast Iron Soil Pipe 12"	351			
Totals	**3525**		**Totals**	**3120**

Other Areas of Savings

- Gravity design had 5 discharge points vs. 1 discharge point with Siphonic design
- Gravity design required excavation inside of the building vs. complete elimination of internal excavation with Siphonic design
- Smaller diameter pipe created requirement for smaller fittings, couplings, and hangers
- Less pipe requires less labor to perform install

MIFAB® Inc. HydroMax®, 1321 West 119th Street, Chicago, Illinois 60643-5109, USA
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TULSA, OK

BOEING 737 MURRAY PARK
WINNIPEG, MB, CANADA

CAPITOL DISTRICT APARTMENTS
OMAHA, NE

MERCEDES BENZ
WOODSTOCK, AL

MERCEDES BENZ PIPEWORK
WOODSTOCK, AL

COSTCO
MULTIPLE LOCATIONS

"We chose to use a siphonic drainage system on a recent warehouse project because the client wanted all piping to be above the bottom of the roof joists. The Mifab team were very helpful with the design process and were very easy to work with."
-Frank Westhoff, PE, Owner, Westhoff Engineering (Plano, TX)

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COMPLETE MIFAB BINDER
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NH-2019
Lit # 044

CLPB-2019
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AD-2020-USA
Lit # 043

TSP-2017
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TD-2020
Lit # 046

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Lit # 095

HYDROMAX-2020
Lit # 082

FILCOTEN-2017
Lit # 076

ROOFGUARD-2018
Lit # 058

LINE CARD
Lit # 081

"Walmart uses Hydromax siphonic roof drains and continues to use Hydromax roof drains as a part of our building prototype construction documents." In general, Walmart just states the obvious and let's others draw their conclusions, which would be if the World's largest retailer uses this system it must work." - Todd Franke, Sr. Architect, Walmart Stores, Inc (Bentonville, AR)

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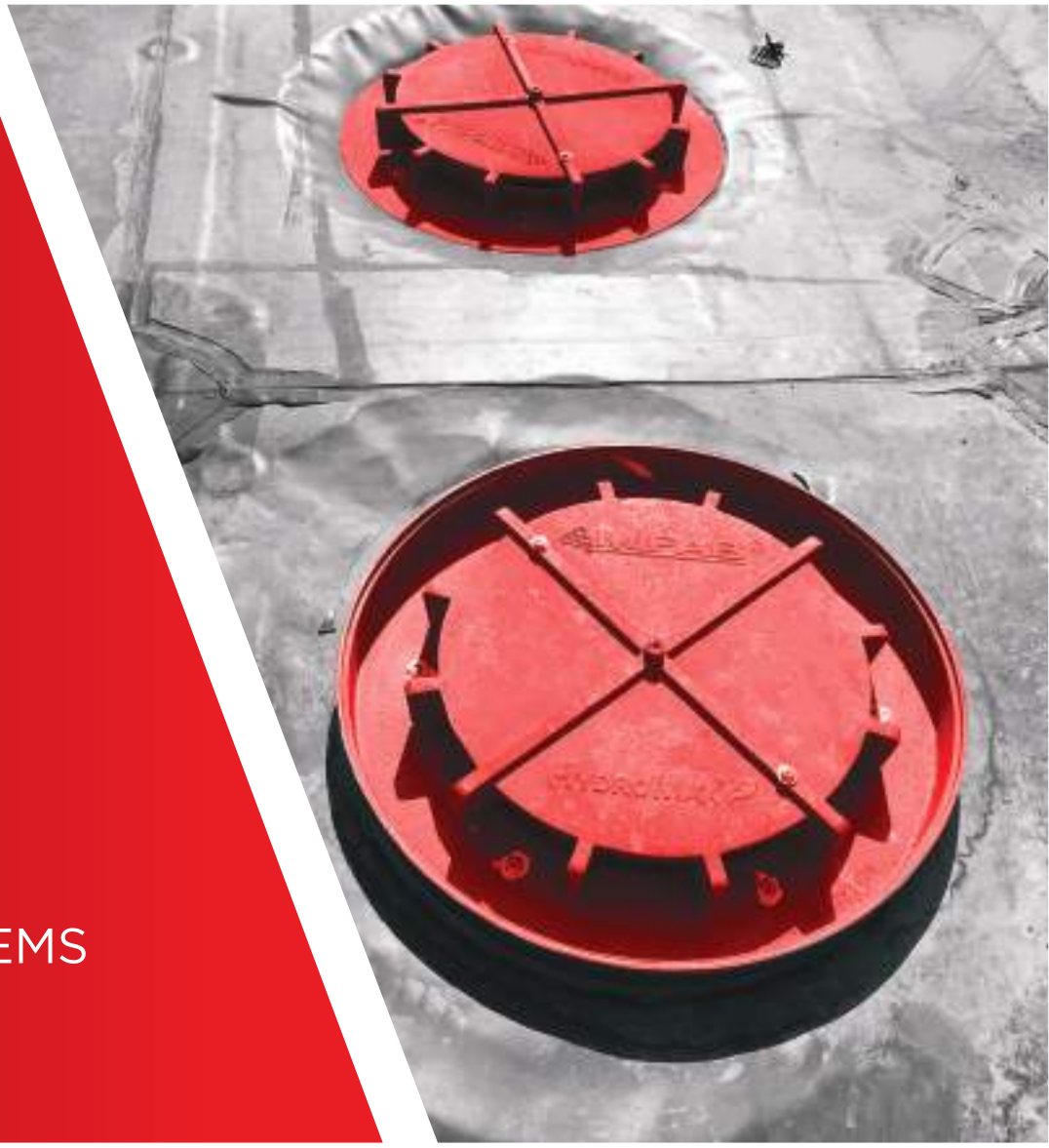
SIPHONIC ROOF DRAINAGE SYSTEMS



PRIMARY - OVERFLOW - GUTTER

FOR ANY DESIGN ASSISTANCE CONTACT:
HYDROMAX@MIFAB.COM

LIT-082