TECHNICAL DATA SHEET (TDS)

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

1.1 Product Name Description

Commercial:	Hydromx
Chemical name:	Solution
Formula:	Solution
CAS No:	Solution
EINECS No:	Solution

1.2 Use of Product

A solution composed of various organic fluids in different proportion and used as 50% Hydromx 50% water in closed circuit cooling and heating systems as a heat transfer fluid.

1.3 Manufacturer Information

Company name: Hydromx Inc

Address: 58-75 57th Road, Maspeth NY 11378 USA

Phone: +1 (718) 381 0351

1.4 Emergency Telephone Number

In case of emergency endangering health or the environment involving this product, Professionals should contact local National Poison Information Service Members of the Territory.

1.5 Standard Availability

Bulk

22.5 kg net drums.

1000 kg net IBC Tanks.

1.6 Storage Conditions

Keep packaging unopened and undamaged.

Keep the product in a dry place away from humidity and sunlight.

1.7 Quality Management Standard

The Manufacturer of HYDROMX® has been certified to;

ISO 9001:2008	Quality Management System
ISO 14001:2004	Environmental Management System
ISO 22000:2005	Food Safety Management System - Requirements for any organization in the food chain
OHSAS 18001:2007	Occupational Health and Safety System

*Please visit our website at hydromx.com for the documents

2. PHYSICAL PROPERTIES (INDICATIVE VALUES)

In Table 2, the physical characteristics of the Hydromx and the Hydromx Solution (50%) with tap water* (50%), are shown.

Table 2. Physical properties of the Hydromx (100%) and the Hydromx Solution (50%) with tap water* (50%)

Hydromx Measurement Parameters	Method	Hydromx (100%)	Hydromx Solution with tap water* (50%) (Use of Product)
Colour (at 20° C)	ASTM D 1500	Red	Red
Odour (at 20° C)		Intrinsic	Intrinsic
pH (at 20° C)	ASTM D1287	9.00 - 9.20	8.20-8.80
Concentration (at 20°C)	Refractometric measurement		1.36
Total Suspended Solid (TSS)	TS 9546 EN 12880	<0.1	
Dissolved oxygen (mg/lt)	SM-4500 OG		8.46
Humidity Weight	TS 9546 EN 12880		%100
Freezing Point	Potential differences reading by multimeter, under application of liquid nitrogen.	-73°C	-61°C
Boiling Point	Heating in atmospheric conditions and, temperature measurement by thermocouple	200°C	118°C
Vapor Pressure (at 25°C)	ASTM d6378 (at 25°C)		DVPE : 2.9 kPA ASVP : 3.8 kPA
Vapor Pressure (at 50°C)	ASTM d6378 (at 50°C)		DVPE : 8.3 kPA ASVP : 9.6 kPA
Vapor Pressure (at 80°C)	ASTM d6378 (80°C)	RVPE : 6.7 kPA ASVP : 10.1 kPA	RVPE : 36.4 kPA, ASVP : 39.0 kPA
Density (g/cm³)	Pycnometer (at 25°C)	1.122	1.065
Electrical Conductivity (City Water 401(µS))	Conductometer (Hanna Branded) (at 25°C)	90	570
Total Fe (ppm) (City Water: 0.069)	Atomic Absorbtion Spectrometer	0.169	0.0565
Dynamic Viscosity (Pa.s) (at 20°C)	Malvern Bohlin Gemini II Rotational Rheometer	$2.5\ 10^{-2}$	$7.2\ 10^{-3}$
Kinematic Viscosity (Pa.s) (at 20°C)	Dynamic viscosity divided by density	$2.228\ 10^{-2}$	$6.76\ 10^{-3}$

* The physical parameters of the tap water sample are as follows; **pH** 7.35, **electrical conductivity** 401(µS), **total Fe (ppm)** 0.069.

3. VAPOR PRESSURE
TEMPERATURE RELATIONSHIP FOR THE SOLUTION OF HYDROMX WITH TAP WATER (50%)

In Table 3, measured temperatures and pressures of the Hydromx Solution, are shown.

Table 3. Measurements of the Vapor Pressures as a function of temperature

Temperature °C	Pressure (atm)	Temperature °C	Pressure (atm)
10	0.0168786	90	0.545474
20	0.0290577	100	0.7580317
25	0.0375031	110	1.0354644
30	0.034524	120	1.392164
40	0.07678	130	1.8444479
50	0.1193004	140	2.4105863
60	0.1805279	150	3.110893
70	0.266657	160	3.967634
80	0.385274		

In Figure 3, measured values from Table 3 for the vapor pressure of Hydromx Solution as a function of temperature are shown.

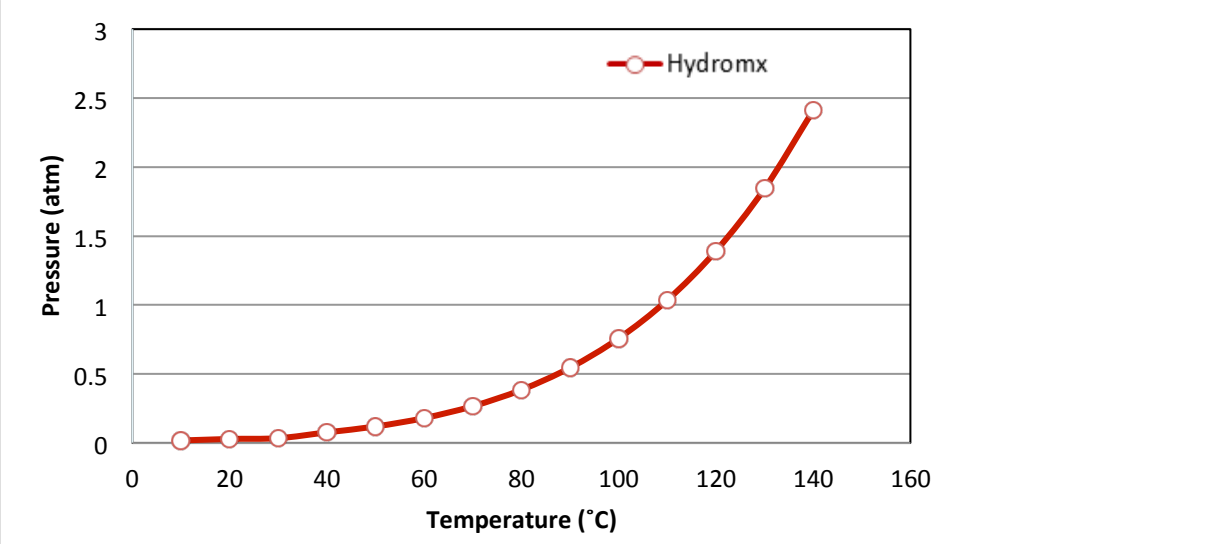

Figure 3. The Graph of Hydromx Solution Pressure-Temperature

4.DENSITY MEASUREMENT

Sample: Hydromx (50% v/v diluted with distilled water)

The density was measured by filling a glass volumetric flask of known volume (100 mL), and placing it in a temperature controlled bath. Every time temperature stability was achieved, the extra liquid Hydromx was removed and the remaining 100 mL were weighted very accurately.

The measurements of the density of Hydromx are shown in Table 4.

Table 4. Measurements of the Density as a function of temperature

Temperature		Density (kg m^{-3})		Deviations
(˚C)	(K)	measured	fitted	(%)
-17.30	255.85	1088.5	1089.1	-0.06
3.20	276.35	1078.3	1076.7	0.14
11.00	284.15	1071.3	1072.0	-0.07
14.40	287.55	1070.2	1070.0	0.02
18.40	291.55	1067.4	1067.6	-0.02
30.40	303.55	1061.1	1060.4	0.07
42.60	315.75	1053.4	1053.0	0.04
53.90	327.05	1046.7	1046.2	0.05
62.70	335.85	1040.8	1040.9	-0.01
71.30	344.45	1035.1	1035.7	-0.06
79.80	352.95	1030.5	1030.6	-0.01

The measurements were fitted to the equation

$\rho = 1243.3 - 0.6027T.$

In the above equation, ρ (kg/m^{-3}), is the density, and T (K), is the temperature. In Table 4, values calculated by this equation are also shown. The percentage deviations of using this equation are less than 0.2%. In Figure 4, the measured densities of Hydromx are shown. For comparison reason, typical literature values of the density of water and ethylene glycol 50%, is also shown.

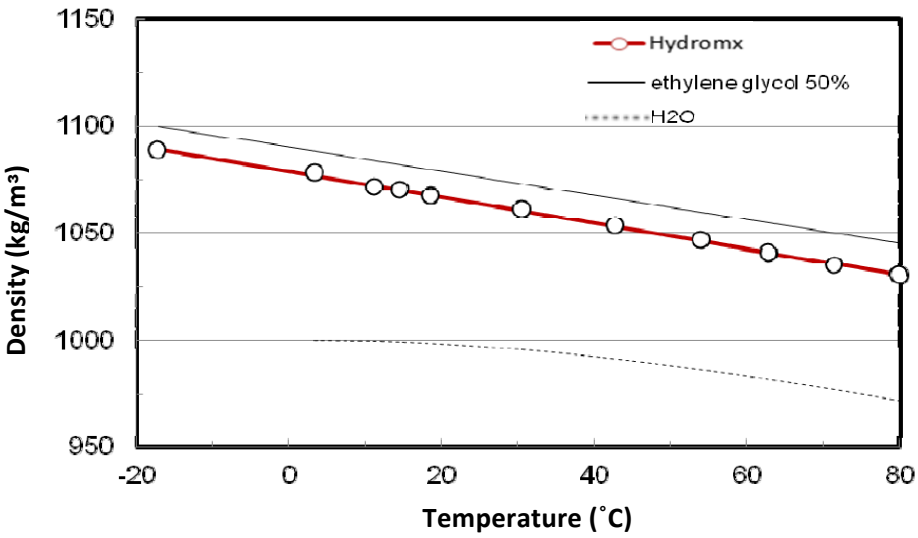

Figure 4. Measurements of the density of Hydromx as a function of temperature.

5. VISCOSITY MEASUREMENT

Sample: Hydromx (50% v/v diluted with distilled water)

Vibrating-Wire Viscometer, employing a 150-µm diameter tungsten wire. The method is characterized by high precision, the availability of a full theoretical background in interpreting the results, and an uncertainty of better than ±1%.

In Table 5, the actual measurements of the viscosity of Hydromx as a function of the temperature are shown.

Table 5. Measurements of the Viscosity as a function of temperature

Temperature ('C)	(K)	Density (kg m^{-3})	Viscosity (µPa s) measured	fitted	Deviations (%)
-18.52	254.63	1089.8	17250.2	17357.3	-0.62
-7.91	265.24	1083.4	9752.5	9728.7	0.24
-7.71	265.44	1083.3	9669.6	9633.6	0.37
1.57	274.72	1077.7	6320.4	6358.0	-0.59
1.75	274.90	1077.6	6307.0	6311.2	-0.07
20.22	293.37	1066.5	3303.7	3291.4	0.37
20.25	293.40	1066.5	3284.6	3287.8	-0.10
39.71	312.86	1054.7	1958.9	1966.8	-0.40
39.71	312.86	1054.7	1969.1	1966.8	0.12
59.27	332.42	1043.0	1316.5	1320.3	-0.28
59.25	332.40	1043.0	1326.5	1320.9	0.42
78.12	351.27	1031.6	969.2	971.9	-0.28

The measurements were fitted to the equation

$$\eta = 60.4 \exp\left(\frac{527.26}{T-161.49}\right).$$

In the above equation, η (µPa s), is the viscosity, and T (K), is the temperature. In Table 5, values calculated by this equation are also shown. The percentage deviations of using this equation are less than 0.7%. In Figure 5, the measured viscosities of Hydromx are shown. For comparison reason, typical literature values for the viscosity of water and ethylene glycol 50%, is also shown.

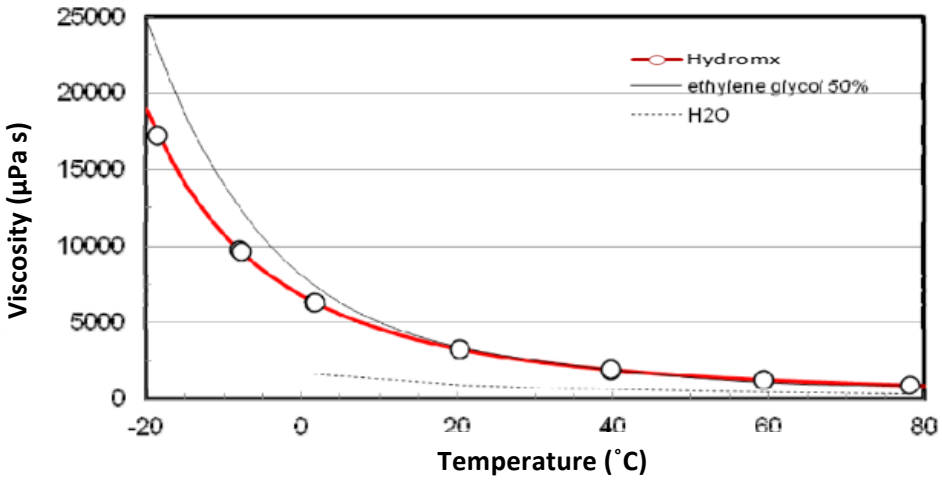

Figure 5. Measurements of the viscosity of Hydromx as a function of temperature.

NOTICE TO THE READER

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. This information is based on the chemicals used in the product and their known data in respect of risks and toxic effects.

It is the responsibility of any person who buys this product to sell to the third parties to advise them of the risks. Employers are to explain the risks involved in the handling and use of this product to their employees.

The manufacturer (HYDROMX®) shall not be responsible for any damages or injury resulting from the misuse of this product by second or third parties.

Under no circumstances should waste Hydromx be allowed to enter the storm water system. Recycling of waste HYDROMX® should be provided. Where this is not possible, waste HYDROMX® should be disposed of.