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FLOIXEM® N

Monoethylene glycol base antifreeze
Concentrated , to dilute before use
Biodegradable.

Description and applications:

Concentrated monoethylene glycol based antifreeze, must be diluted before use, for applications where there is no possibility of contact with food material. Biodegradable.
100% organic formulation (OAT) to guarantee the best protection for all types of metals and compatible with plastics and elastomers normally present in circuits. Aluminium and its alloys are protected from corrosion.
Additives that are not consumed in action, there is no need to replenish with supplementary packs or to check residuals.
Free of hazardous additives such as nitrites, amines, nitrates, borates, benzoates, 2EH.

Technical Data:

Appearance	Transparent Liquid
Colour	Fluorescent yellow
pH 35% in water at 20°C	8.0-9.0

Data has been gathered in specific bibliography and proprietary test. It is not part necessarily of the technical data.

Protection against corrosion:

Results according to standard ASTM D1384

Metal	Floixem® N 33%	Limit
Copper	1.9	10
Soft Solder	0.3	30
Brass	0.1	10
Carbon Steel	0.2	10
Cast Iron	-0.7	10
Aluminium	6,3	30

Results in mg per control after 336 hours at 88°C with forced aeration and corrosive water. Negative results indicate a weight gain in the control due to the formation of a stable protective layer.

Mode of use:

Floixem® N is available in concentrated form, to dilute with water according to the desired protection temperature.

% volume Floixem® N	Freezing Temperature °C	Protection Temperature °C	Burst Temperature °C
20%	-9	-11	-13
25%	-12	-15	-17
30%	-16	-19	-22
35%	-20	-24	-27
40%	-25	-29	-32
45%	-31	-33	-37
50%	-38	-41	-45
55%	-45	-49	-53

The freezing temperature is the temperature at which the first ice crystal appears and coincides with those displayed by a refractometer. The burst temperature is the temperature at which the entire product is frozen and there is an increase in volume and pressure that endangers the integrity of the system. Between the two temperatures above, there is a mixture of ice crystals and unfrozen glycol that flows without increasing in volume; the mid-point between the freezing and breaking temperatures is called the protection temperature.

A minimal proportion of 20% is required to ensure the additives are in an adequate proportion for protecting the system. Dilutions above 55% are not recommended.

In new installations it is recommended to rinse with water to remove particles, grease and flux residues (especially if they contain borax, chlorides or fluorides).

It is recommended to purge the circuit to avoid air pockets.

Teflon tape or hemp is recommended for sealing the threaded joints. Check the compatibility of other products with mono ethylene glycol before use.

Monoethylene glycol and its dilutions are not compatible with zinc as it dissolves it. If galvanized pipe is present in the system, a whitish solid will appear at the beginning of the operation. Once removed, the resulting carbon steel will be protected by Floixem® N and no further precautions are necessary.

The mixing water must be drinking water with a maximum salt content of 100 ppm chloride.

Temperatures of use:

The maximum recommended temperature for closed circuits is 180°C.

Prolonged periods of time at temperatures above 180°C may shorten the lifetime of the product due to the degradation of monoethylene glycol.

In open circuits or where there is oxygen inlet (valves, automatic filling, etc.) the maximum temperature is lower, in case of doubt consult with the technical department.

Precautions:

Harmful if swallowed.

Handle in accordance with good chemical practice. In case of doubt, consult the safety data sheet.

No transport or storage restrictions.

Keep in original tightly closed containers out of direct sunlight. Avoid freezing and quick heating.

Homologations:

Presentation :

		
5Kg.	4	128
11Kg.	-	60
22Kg.	-	36
230 Kg.	-	2
1100 Kg	-	1

Physical-chemical properties

Dilution20% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m^3)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm^2/s)		β (*10^{-5} 1/K)
-9	1038,1	3,816	0,491	4,87	4,69	37,59	16,61
0	1036,2	3,823	0,500	3,38	3,26	25,73	23,33
10	1033,4	3,834	0,509	2,38	2,30	17,87	29,28
20	1030,2	3,848	0,517	1,75	1,70	13,06	33,95
30	1026,5	3,863	0,525	1,35	1,32	9,97	37,61
40	1022,5	3,880	0,531	1,08	1,05	7,90	40,44
50	1018,2	3,898	0,536	0,89	0,87	6,46	42,61
60	1013,8	3,917	0,541	0,75	0,74	5,43	44,24
70	1009,3	3,937	0,546	0,65	0,64	4,67	45,43
80	1004,7	3,956	0,550	0,57	0,57	4,11	46,26
90	1000,0	3,976	0,553	0,51	0,51	3,67	46,80
100	995,3	3,997	0,557	0,46	0,47	3,34	47,09

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Dilution 25% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m³)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm²/s)		β (*10⁻⁵ 1/K)
-12	1048,0	3,711	0,475	6,63	6,33	51,35	18,35
0	1045,1	3,726	0,485	3,98	3,81	30,42	27,21
10	1041,9	3,742	0,493	2,77	2,66	21,03	32,85
20	1038,3	3,760	0,499	2,03	1,95	15,31	37,25
30	1034,2	3,780	0,504	1,55	1,50	11,64	40,67
40	1029,9	3,801	0,509	1,22	1,19	9,18	43,30
50	1025,3	3,822	0,513	1,00	0,97	7,48	45,28
60	1020,6	3,845	0,517	0,84	0,82	6,27	46,75
70	1015,8	3,867	0,520	0,72	0,71	5,38	47,79
80	1010,9	3,890	0,523	0,63	0,62	4,71	48,49
90	1006,0	3,913	0,525	0,56	0,56	4,20	48,91
100	1001,1	3,936	0,527	0,51	0,51	3,81	49,10

Dilution 30% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m³)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm²/s)		β (*10⁻⁵ 1/K)
-16	1058,3	3,601	0,460	9,62	9,09	74,55	19,19
-10	1056,9	3,611	0,464	7,20	6,81	55,54	24,18
0	1054,0	3,629	0,470	4,68	4,44	35,97	31,02
10	1050,4	3,650	0,476	3,23	3,07	24,75	36,36
20	1046,4	3,672	0,480	2,34	2,24	17,93	40,50
30	1042,0	3,696	0,484	1,77	1,70	13,58	43,69
40	1037,3	3,721	0,487	1,39	1,34	10,67	46,11
50	1032,4	3,746	0,490	1,13	1,09	8,67	47,92
60	1027,4	3,772	0,492	0,94	0,91	7,23	49,23
70	1022,3	3,798	0,494	0,80	0,78	6,19	50,13
80	1017,2	3,824	0,496	0,70	0,68	5,41	50,70
90	1012,0	3,850	0,497	0,62	0,61	4,81	51,00
100	1006,9	3,876	0,498	0,56	0,55	4,35	51,09

Dilution 35% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m³)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm²/s)		β (*10⁻⁵ 1/K)
-20	1068,8	3,488	0,446	14,26	13,34	110,09	19,92
-10	1066,2	3,509	0,451	8,56	8,03	65,99	28,27
0	1062,9	3,532	0,456	5,51	5,18	42,52	34,77
10	1058,9	3,557	0,459	3,76	3,55	29,13	39,81
20	1054,5	3,584	0,462	2,71	2,57	21,01	43,69
30	1049,7	3,612	0,464	2,03	1,93	15,84	46,66
40	1044,7	3,641	0,465	1,58	1,51	12,41	48,89
50	1039,5	3,670	0,467	1,27	1,22	10,04	50,52
60	1034,2	3,699	0,467	1,05	1,02	8,35	51,67
70	1028,9	3,729	0,468	0,89	0,87	7,12	52,43
80	1023,4	3,758	0,468	0,77	0,75	6,20	52,88
90	1018,0	3,787	0,469	0,68	0,67	5,50	53,07
100	1012,6	3,815	0,469	0,61	0,60	4,96	53,05

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Dilution 40% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m^3)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm^2/s)		β (*10^{-5} 1/K)
-25	1079,8	3,368	0,434	22,95	21,25	175,78	19,54
-20	1078,6	3,380	0,435	17,15	15,90	131,52	24,34
-10	1075,6	3,406	0,438	10,17	9,46	78,42	32,29
0	1071,8	3,435	0,441	6,48	6,05	50,28	38,45
10	1067,4	3,465	0,442	4,39	4,11	34,28	43,21
20	1062,6	3,497	0,443	3,13	2,94	24,62	46,84
30	1057,5	3,529	0,443	2,33	2,20	18,49	49,59
40	1052,1	3,561	0,444	1,80	1,71	14,42	51,62
50	1046,6	3,594	0,443	1,44	1,37	11,63	53,09
60	1041,0	3,627	0,443	1,18	1,13	9,64	54,09
70	1035,4	3,659	0,442	0,99	0,96	8,19	54,71
80	1029,7	3,691	0,441	0,85	0,83	7,12	55,03
90	1024,0	3,723	0,440	0,75	0,73	6,29	55,11
100	1018,4	3,754	0,439	0,67	0,65	5,66	54,99

Dilution 45% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m^3)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm^2/s)		β (*10^{-5} 1/K)
-31	1091,3	3,240	0,423	40,91	37,49	308,87	17,76
-20	1088,5	3,272	0,425	20,61	18,94	157,13	28,68
-10	1084,9	3,304	0,425	12,10	11,15	93,18	36,25
0	1080,7	3,338	0,426	7,63	7,06	59,44	42,08
10	1075,9	3,373	0,425	5,12	4,75	40,33	46,55
20	1070,7	3,409	0,424	3,61	3,37	28,84	49,94
30	1065,2	3,445	0,423	2,67	2,50	21,57	52,48
40	1059,5	3,482	0,422	2,05	1,93	16,76	54,32
50	1053,7	3,518	0,420	1,62	1,54	13,47	55,62
60	1047,8	3,554	0,418	1,32	1,26	11,13	56,47
70	1041,9	3,590	0,416	1,11	1,06	9,43	56,96
80	1036,0	3,625	0,414	0,94	0,91	8,16	57,16
90	1030,1	3,660	0,412	0,82	0,80	7,20	57,13
100	1024,2	3,694	0,410	0,73	0,71	6,46	56,91

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Dilution 50% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal Expansion Coefficient
°C	ρ (Kg/m^3)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm^2/s)		β (*10^{-5} 1/K)
-38	1103,1	3,103	0,415	82,94	75,19	612,09	14,14
-30	1101,4	3,129	0,415	46,55	42,26	347,35	23,59
-20	1098,3	3,164	0,414	24,78	22,56	187,72	32,94
-10	1094,3	3,201	0,413	14,38	13,15	110,71	40,13
0	1089,6	3,240	0,411	8,98	8,24	70,27	45,65
10	1084,4	3,280	0,408	5,96	5,50	47,46	49,84
20	1078,8	3,321	0,406	4,17	3,87	33,79	53,00
30	1073,0	3,361	0,403	3,06	2,85	25,17	55,32
40	1066,9	3,402	0,400	2,33	2,18	19,49	56,98
50	1060,8	3,442	0,397	1,83	1,72	15,60	58,11
60	1054,6	3,482	0,394	1,48	1,41	12,85	58,82
70	1048,4	3,521	0,390	1,23	1,17	10,85	59,18
80	1042,2	3,559	0,387	1,05	1,00	9,37	59,26
90	1036,1	3,597	0,384	0,91	0,87	8,24	59,13
100	1030,0	3,633	0,380	0,80	0,77	7,37	58,81

Dilution 55% by volume

Temperature	Density	Heat Capacity	Thermal conductivity	Dynamic viscosity	Kinematic viscosity	Prandtl number	Thermal coefficient
°C	ρ (Kg/m^3)	Cp (KJ/KgK)	λ (W/mK)	μ (mPas)	υ (mm^2/s)		β (*10^{-5} 1/K)
-45	1115,0	2,959	0,410	181,61	162,88	1298,89	9,52
-40	1114,3	2,977	0,409	119,49	107,24	862,91	16,59
-30	1111,7	3,015	0,407	56,64	50,95	417,42	28,21
-20	1108,1	3,056	0,403	29,80	26,89	224,27	37,12
-10	1103,6	3,099	0,400	17,10	15,50	131,55	43,95
0	1098,4	3,143	0,396	10,57	9,62	83,08	49,15
10	1092,8	3,188	0,391	6,95	6,36	55,85	53,08
20	1086,9	3,233	0,387	4,82	4,44	39,59	56,00
30	1080,7	3,278	0,383	3,50	3,24	29,37	58,12
40	1074,3	3,322	0,378	2,64	2,46	22,65	59,61
50	1067,9	3,366	0,373	2,07	1,93	18,07	60,58
60	1061,4	3,409	0,369	1,66	1,57	14,83	61,14
70	1054,9	3,451	0,364	1,37	1,30	12,49	61,37
80	1048,5	3,493	0,360	1,16	1,10	10,75	61,34
90	1042,1	3,533	0,355	1,00	0,96	9,43	61,10
100	1035,8	3,573	0,351	0,87	0,84	8,41	60,68