HT MATERIALS SCIENCE

SMARTER
HEAT
TRANSFER
FLUIDS™

MAXWELL™ PG | TECHNICAL DATA

MAXWELL™ PG

PHYSICAL AND CHEMICAL CHARACTERISTICS

Maxwell™ PG (Propylene Glycol) is an aluminum oxide based nanofluid that dramatically increases thermal conductivity and convective heat transfer, and is engineered for use in closed-loop hydronic systems where no phase change occurs.

Maxwell PG delivers:

- Efficient, reliable and consistent performance over a wide temperature range.
- Increased cooling and/or heating capacity when compared to systems using water and PG only. Maxwell removes the "glycol penalty".
- Lower first cost, equipment and MER sizing, and electrical power requirements.
- Savings in energy, operating and maintenance costs, and capital expenditures.

The fluid life in any system is dependent on the system design, operation and maintenance, and can vary by heat transfer fluid chemistry. Therefore, it is important to properly maintain fluid chemistry regarding pH, corrosion inhibitors and biocides. Fluid contamination will accelerate decomposition and may result in increased solids concentrations. Excess solids can and should be filtered and removed.

Maxwell will not reduce existing fluid life expectancy. It is important to note that Maxwell will not restore or reduce the effects of corrosion that may be present in systems that have not been properly maintained.

Maxwell has been tested using strict ASTM guidelines for metals and synthetic materials commonly used in the construction of heat transfer systems.

Maxwell has little effect on viscosity, therefore, no appreciable effect on system fluid pumping energy.

TYPICAL PROPERTIES*

COMPOSITION (% BY WEIGHT)				
Propylene Glycol			37	
Performance Additives			9	
Water			54	
Colour			White	
Odour			Odourless	
pH			10	
Density @ 20°C (68°F)	kg/m³	(lb/ft³)	1,078	(67)
Operating Range	°C	(°F)	-22 to 180	(-8 to 324)
Freeze Point	°C	(°F)	-22	(-8)
Burst Point	°C	(°F)	-51	(-60)
Boiling Point	°C	(°F)	105	(221)
Flash Point	°C	(°F)	104	(219)

**Typical properties for Maxwell PG (40%), not to be construed as specifications. Complete product specifications are available on request.*

CORROSION TEST RESULTS*

Metal	Drinking Water	Maxwell PG
Solder	3.10	0.01
Aluminum	13.2	0.01
Copper	0.08	0.01
Brass	0.22	0.01
Greycast Iron	21.1	0.02
Carbon Steel	9.69	0.01

**Based on corrosion tests ASTM D1384, in mils per year (mpy).*

Synthetic	Drinking Water	Maxwell PG
EPDM	0.0000061	0.0000057
VMQ	0.0000037	0.0000033
FKM	0.0000020	0.0000019
AEM	0.0000312	0.0000241
CR	0.0000125	0.0000104
HNBR	0.0000015	0.0000015

**Based on corrosion tests ASTM D471, in mils per year (mpy).*

MAXWELL™ PG

MAXWELL WITH 40% PG CONCENTRATION IN WATER						40% PG CONCENTRATION IN WATER ONLY			
TEMPERATURE		THERM. COND.	SPECIFIC HEAT	DENSITY	VISCOSITY	THERM. COND.	SPECIFIC HEAT	DENSITY	VISCOSITY
°C	°F	W/m K	kj/kg K	kg/m³	mPa-s	W/m K	kj/kg K	kg/m³	mPa-s
10	50	0.461	3.44	1,088	7.57	0.398	3.40	1,020	7.25
20	68	0.471	3.51	1,078	4.74	0.407	3.44	1,018	4.08
40	104	0.487	3.63	1,058	2.50	0.415	3.49	1,015	2.20
65	149	0.531	3.86	1,036	1.33	0.461	3.71	1,010	1.13

SATURATION PROPERTIES OF MAXWELL PG AT 30% PROPYLENE GLYCOL CONCENTRATION BY VOLUME									
TEMPERATURE		THERM. COND.		SPECIFIC HEAT		DENSITY		VISCOSITY	
°C	°F	W/m K	Btu/hr ft² (°F/ft)	kJ/kg K	Btu/lb°F	kg/m³	lb/ft³	mPa-s	cps
10	50	0.498	0.288	3.58	0.85	1,083	67.61	4.98	4.98
20	68	0.507	0.293	3.64	0.87	1,074	67.05	3.84	3.84
40	104	0.530	0.306	3.78	0.90	1,055	65.86	1.94	1.94
65	149	0.561	0.324	3.97	0.95	1,027	64.11	1.05	1.05

SATURATION PROPERTIES OF MAXWELL PG AT 40% PROPYLENE GLYCOL CONCENTRATION BY VOLUME									
TEMPERATURE		THERM. COND.		SPECIFIC HEAT		DENSITY		VISCOSITY	
°C	°F	W/m K	Btu/hr ft² (°F/ft)	kJ/kg K	Btu/lb°F	kg/m³	lb/ft³	mPa-s	cps
10	50	0.461	0.266	3.44	0.82	1,088	67.92	7.57	7.57
20	68	0.471	0.272	3.51	0.84	1,078	67.30	4.74	4.74
40	104	0.487	0.281	3.63	0.87	1,058	66.05	2.50	2.50
65	149	0.531	0.307	3.86	0.92	1,036	64.67	1.33	1.33

SATURATION PROPERTIES OF MAXWELL PG AT 50% PROPYLENE GLYCOL CONCENTRATION BY VOLUME									
TEMPERATURE		THERM. COND.		SPECIFIC HEAT		DENSITY		VISCOSITY	
°C	°F	W/m K	Btu/hr ft² (°F/ft)	kJ/kg K	Btu/lb°F	kg/m³	lb/ft³	mPa-s	cps
10	50	0.410	0.237	3.23	0.77	1,090	68.04	11.62	11.62
20	68	0.423	0.244	3.31	0.79	1,082	67.55	8.01	8.01
40	104	0.445	0.257	3.46	0.83	1,062	66.30	3.47	3.47
65	149	0.480	0.277	3.66	0.87	1,042	65.05	1.70	1.70

MAXWELL™ PG

Our Total Lifecycle Care program is designed to support Maxwell™ customers throughout their system's lifecycle.

IN-SERVICE HEAT TRANSFER FLUID SAMPLE ANALYSIS

When Maxwell is used and maintained as advised, it will provide years of trouble-free service. To help users get maximum life, we offer regular testing of our in-service heat transfer fluids.

TECHNICAL SERVICE

Our experienced technical service specialists can help answer your questions regarding heat transfer fluid selection, system start-up and operational issues.

OPERATIONAL TRAINING

We believe that by sharing our experience with customers, we can help improve system design, promote safety and reduce overall cost. Customers can take advantage of our heat transfer system operation and product training programs.

SAFETY AWARENESS TRAINING

We consider safety a priority and offer our customers safety awareness training that focuses on installation, operation and maintenance of heat transfer fluid systems. Also, please refer to the Maxwell Operating Guide.

INSTALLATION ASSISTANCE

We provide installation assistance by reviewing procedures and offering suggestions to reduce typical problems.

FLUSH FLUID AND FLUID REFILL

We recommend cleaning your systems prior to installing Maxwell.

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