

Flame Test Report—Ethylene Glycol

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1 Introduction

We are conducting these FlameGard® 5 UV/IR and FlameGard 5 MSIR Flame Detector Ethylene Glycol fire response tests to make sure our flame detectors are capable to detect fires with Ethylene Glycol as fuel.

The National Fire Protection Association has assigned a flammability rating of 1 (slight fire hazard) to Ethylene Glycol.

2 Equipment

- 2 Gallons of Ethylene Glycol, 99% concentration
- One FlameGard 5 UV/IR Flame detector mounted on a cart on wheels
- One FlameGard 5 MSIR Flame detector mounted on a cart on wheels
- One 120 VAC to 24 VDC power supply
- One propane fire torch to ignite the Ethylene Glycol combustion
- 1 sq ft x 1 sq ft fire pan and support cart on wheels
- 150 ft electrical cable
- Distance measurement wheel and marker
- Fire extinguisher

3 Procedure

- Ethylene Glycol liquid is consider a slight fire hazard. Toxic gases such as carbon monoxide will release in a fire from burning Ethylene Glycol. A propane torch is used to heat up the fuel to its flash point to ignite this fuel into fire. After we pour a cup of Ethylene Glycol into the 1x1 square ft fire pan (no water added), it takes 2 minutes of propane torch heat treatment for the fire to continue to burn on its own. The Ethylene Glycol fire is not visible; this fire emits a very light smoke. We have to make sure that there are no other bodies present around 50 ft of the radius from the fire. The tester should stay at least 20 ft away from this fire.
(Note: Water will dilute Ethylene Glycol to non-combustible mixtures)
- Ethylene Glycol fuel is continuously burning on a 1x1 sq ft fire pan, and it is stationed at a fixed spot.
- The FlameGard 5 UV/IR and FlameGard 5 MSIR are mounted on a moving cart (on wheels) with 10 ft initial distance from fire.
- Slowly move the flame detector away from fire in 10 ft increments. At every distance rotate clockwise the horizontal angle until alarm is no longer seen, then rotate counter clockwise 5 degrees. Block the vision path until alarm buzzer goes off, then remove the block and start timing until the alarm buzzer comes on. Write down the distance, angle, and time (in seconds).
- Both flame detectors (FlameGard 5 UV/IR and FlameGard 5 MSIR) are configured to High, Mid and Low sensitivities for data logging.



Because every life has a **purpose...**

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4 Test Results

Logged data

4.1 Table 1 FlameGard 5 UV/IR Responses with Ethylene Glycol Fuel

6 to 12 second response time

ITEM#	High Sensitivity				Mid Sensitivity				Low Sensitivity			
	No	Distance ft	Angle Degree	Time (s)	No	Distance ft	Angle Degree	Time (s)	No	Distance ft	Angle Degree	Time (s)
1	1	10	60	7	1	10	60	6	1	10	60	12
2	2	10	60	8	2	10	60	7	2	10	60	5
3	3	10	60	7	3	10	60	8	3	10	60	12
4	1	20	48	8	1	20	40	16	1	20	0	15
5	2	20	48	7	2	20	35	8	2	20	0	20
6	3	20	48	6	3	20	35	8	3	20	0	20
7	1	30	45	8	1	30	15	19	1	30		
8	2	30	45	8	2	30	10	30	2	30		
9	3	30	45	8	3	30	0	20	3	30		
10	1	35	0	9	1	35			1	35		
11	2	35	0	9	2	35			2	35		
12	3	35	0	10	3	35			3	35		
13	1	40			1	40			1	40		
14	2	40			2	40			2	40		
15	3	40			3	40			3	40		
16	1	45			1	45			1	45		
17	2	45			2	45			2	45		
18	3	45			3	45			3	45		
19	1	50			1	50			1	50		
20	2	50			2	50			2	50		
21	3	50			3	50			3	50		

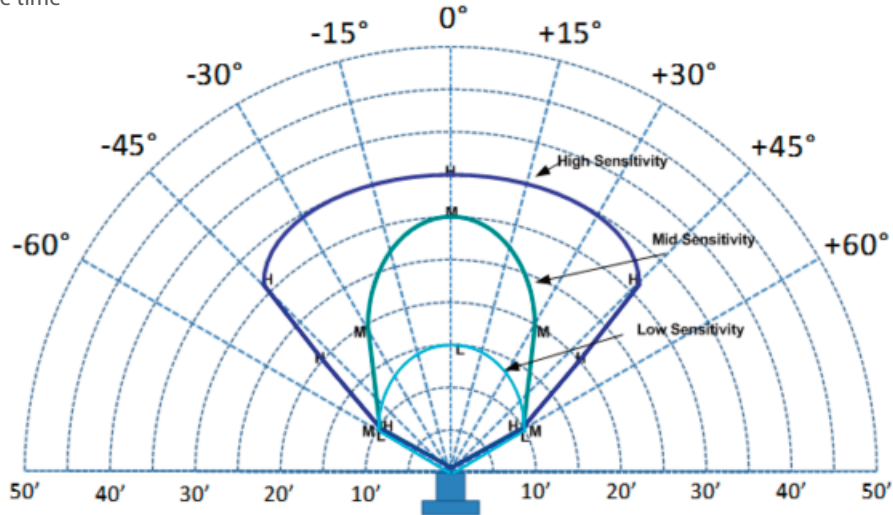
4.2 Table 2 FlameGard 5 MSIR Responses with Ethylene Glycol Fuel

6 to 12 second response time

ITEM#	High Sensitivity				Mid Sensitivity				Low Sensitivity			
	No	Distance ft	Angle Degree	Time (s)	No	Distance ft	Angle Degree	Time (s)	No	Distance ft	Angle Degree	Time (s)
1	1	10	50	7	1	10	50	8	1	10	50	14
2	2	10	50	7	2	10	50	7	2	10	50	15
3	3	10	50	7	3	10	50	6	3	10	50	13
4	1	20	50	7	1	20	50	7	1	20	50	8
5	2	20	50	7	2	20	50	8	2	20	50	7
6	3	20	50	7	3	20	50	8	3	20	50	6
7	1	30	50	7	1	30	50	8	1	30	48	7
8	2	30	50	7	2	30	50	8	2	30	48	8
9	3	30	50	7	3	30	50	6	3	30	48	17
10	1	40	50	9	1	40	45	10	1	40	40	19
11	2	40	50	9	2	40	45	17	2	40	40	29
12	3	40	50	13	3	40	45	17	3	40	40	15
13	1	50	50	6	1	50	40	13	1	50	30	10
14	2	50	50	8	2	50	40	12	2	50	30	10
15	3	50	50	7	3	50	40	12	3	50	30	10
16	1	60	45	9	1	60	35	7	1	60	30	9
17	2	60	45	9	2	60	35	7	2	60	30	9
18	3	60	45	17	3	60	40	9	3	60	30	10
19	1	70	40	7	1	70	35	12	1	70	30	8
20	2	70	40	8	2	70	35	10	2	70	30	7
21	3	70	40	9	3	70	35	10	3	70	30	7
22	1	80	40	9	1	80	35	10	1	80	30	8
23	2	80	40	9	2	80	35	20	2	80	30	10
24	3	80	40	10	3	80	35	12	3	80	30	8
25	1	90	34	9	1	90	25	8	1	90	30	7
26	2	90	20	10	2	90	25	10	2	90	30	14
27	3	90	30	10	3	90	30	10	3	90	30	9
28	1	100	30	10	1	100	30	12	1	100	25	10
29	2	100	30	10	2	100	30	12	2	100	25	10
30	3	100	30	10	3	100	30	12	3	100	25	15
31	1	110	25	10	1	110	18	10	1	110	15	9
32	2	110	25	10	2	110	18	10	2	110	15	12
33	3	110	25	10	3	110	18	10	3	110	15	6
34	1	120	10	10	1	120	15	10	1	120	5	7
35	2	120	10	11	2	120	15	10	2	120	5	10
36	3	120	10	12	3	120	15	10	3	120	5	5
37	1	130	10	10	1	130	10	15	1	130	0	10
38	2	130	10	10	2	130	10	15	2	130	0	20
39	3	130	10	10	3	130	10	10	3	130	0	6
40	1	140	0	10	1	140	0	14	1	140	0	30
41	2	140	0	10	2	140	0	13	2	140		
42	3	140	0	15	3	140	0	15	3	140		
43	1	150	0	35	1	150	0	40	1	150		
44	2	150			2	150			2	150		
45	3	150			3	150			3	150		
46	1	160			1	160			1	160		
47	2	160			2	160			2	160		
48	3	160			3	160			3	160		

4.3 Radial Plot FlameGard 5 UV/IR

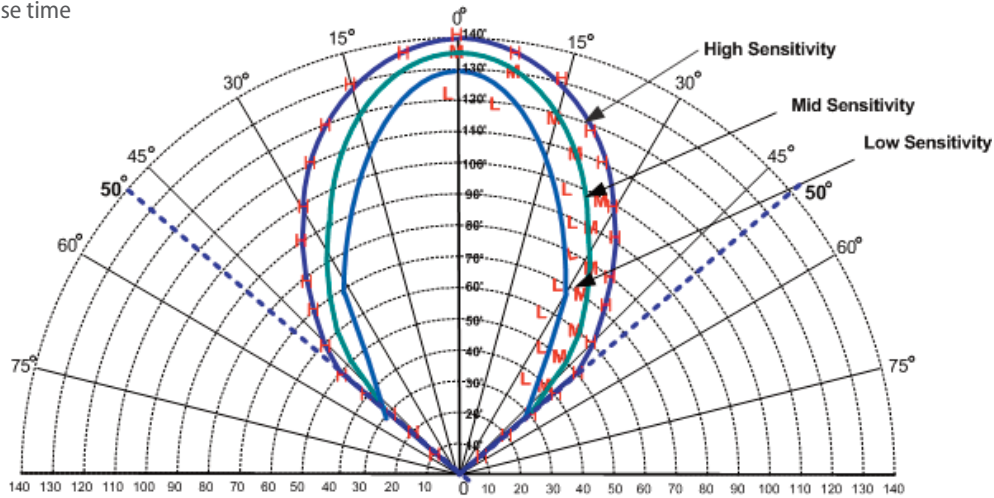
6 to 12 second response time



FlameGard 5 UV/IR Ethylene Glycol

4.4 Radial Plot FlameGard 5 MSIR

6 to 12 second response time



FlameGard 5 MSIR Ethylene Glycol

Note: FlameGard 5 MSIR can have up to 60 degree Field of View at 125' with longer response time (12 to 25 seconds).

Note: This Bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.



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