

2025-02-21

Hanwha Vision Co Ltd
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Gyeonggi-do 13488, Republic of Korea

Our Reference: File R41651 / Project 4791585878

Subject: UL Standard 2043, Fifth Edition, dated September 14, 2023.
"Fire Test for Heat and Visible Smoke Release for Discrete Products and Their
Accessories Installed in Air-Handling Spaces".

Dear Customer:

This Report summarizes the data developed on the samples you provided which were subjected to the flame test described in UL Standard 2043, Fifth Edition, including revisions through September 14, 2023. Testing was conducted at UL LLC (UL) on Feb 1st, 2025 at our Northbrook testing facility.

The purpose of this test is to determine the rate of heat release and the rate of smoke release of the burning product samples as they relate to the requirements for the fire-resistant and low smoke producing characteristics in accordance with the provisions of the following codes: National electric Code, NFPA 70; International Mechanical Code, NFPA 5000; Standard for the installation of Air Conditioning and Ventilating Systems, NFPA 90A.

GENERAL:

It should be understood that these results apply only to the particular sample submitted for testing. The test results indicated in this Report are not intended to imply Listing, Classification or Recognition of any product or materials.

It is important to understand that authorities having jurisdiction may require that products such as covered by this report, intended for installation in a building plenum, be listed and labeled for such use in accordance with UL2043, based on current model building and electrical codes. Accordingly, you may wish to consider undergoing a Listing program with UL on your product(s) to address this possible need.

The Classification Marking or Listing Mark of UL on the product is the only method provided by UL to identify products that have been produced under its Classification or Listing and Follow-Up Service.

In no event shall UL be responsible to anyone for whatever use or nonuse is made of the information contained in this Report and in no event shall UL, its employees, or its agents incur any obligation or liability for damages, including, but not limited to, consequential damages, arising out of or in connection with the use, or inability to use, the information contained in this Report.

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TEST RECORD

SAMPLES:

The model NHP-P100 and NHP-P200 evaluated are described in Table 1. UL did not witness the production of the test sample nor were we provided with information relative to the formulation or identification of component materials used in the manufacture of the test samples. For the model difference, the material of enclosure case, PCB cover, LED guide plate are all identical in 2 models and NHP-P200 is with more components on it. Therefore, model NHP-P200 is selected as test representative model.

Table 1 - Sample Description

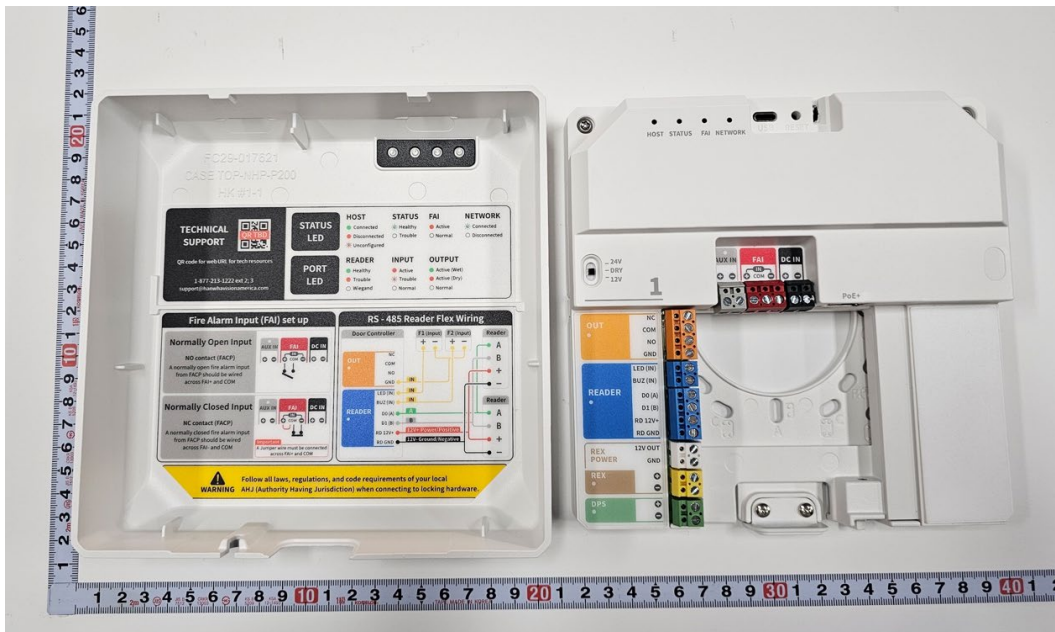
Sample Reference	Description
A	● Product Name: IP Controller. ● Model Name: NHP-P100, NHP-P200. ● Material of Enclosure: Enclosure: Metal (Aluminum). PCB Cover: HN-1068(f1), Lotte Chemical Corporation (E115797). LED Guide Plate: HI855M, LX MMA Corp. (E194507).

Model NHP-P100:



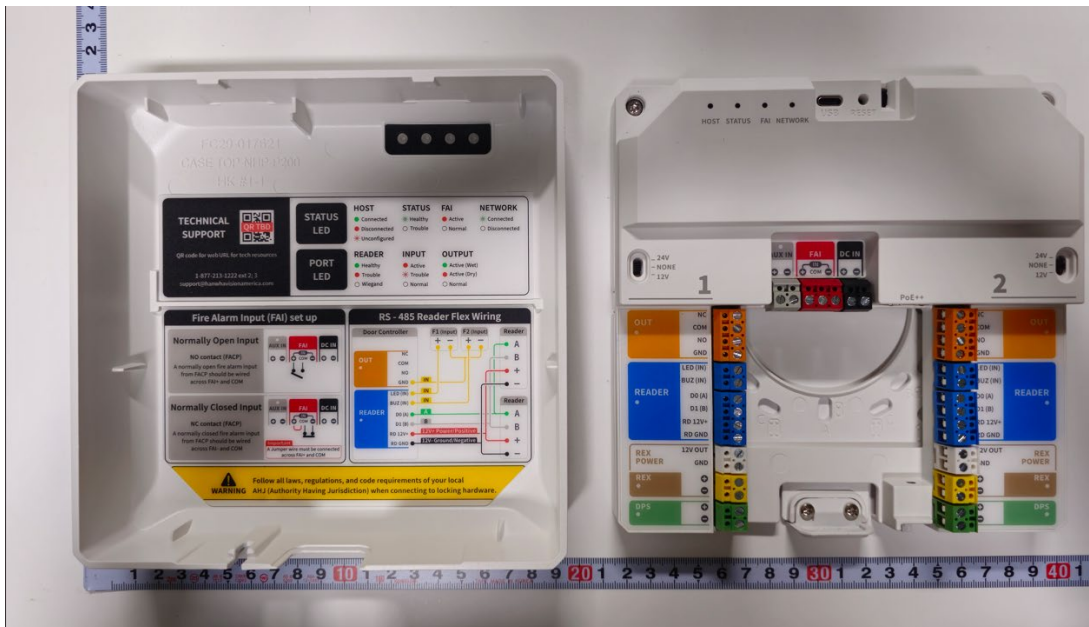
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Model NHP-P200:



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**METHOD:**

The tests were conducted in accordance with the test procedure described in UL Standard 2043, Fifth Edition, dated September 14, 2023. ("Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces"). This test method is used to determine the heat release rate, smoke release and optical density of the samples. The test samples were positioned and installed in the test enclosure as described in Appendix A.

ACCEPTANCE CRITERIA:

Each product specimen shall have the following properties when tested as described herein:

- a) The peak rate of heat release measured during each test shall be 100 kilowatts or less, HRRs.
- b) The peak smoke release rate measured during each test shall be 0.21 m²/s or less, SRRs.
- c) The total smoke released (10 minute test duration) shall be 75 m² or less, TSR.

Note: The above criteria do not include the contribution of the propane ignition burner.

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RESULTS:

The summary of test results is tabulated in Table 2 below. Graphs of heat release rate, smoke release rate, and normalized optical density are given in Appendix B. Pre and post-test photographs for each test are given in Appendix A. In addition, a videotape of each test was made and provided.

Table 2 - Test Results

Sample - Test Ref.	Peak Heat Release Rate (kW)	Peak Normalized Optical Density	Average Normalized Optical Density	Peak Smoke Release Rate (m²/s)	Total Smoke Released (m²)
A-1	6	0.20	0.02	0.08	11.2
A-2	6	0.08	0.01	0.04	3.4
A-3	6	0.08	0.01	0.03	3.7

Please note that the values in Table 2 above as well as the graphs in Appendix B omit the heat and smoke contribution from the propane ignition burner.

CONCLUSION:

The product, identified by the test sponsor as shown in Table 1 - Sample Description, in the form it was submitted to UL LLC, was evaluated in accordance with UL2043 standard and it was found compliant with standard's requirements.

COMPLETION OF INVESTIGATION

Since this completes the anticipated work, we have instructed our Accounting Department to terminate the investigation and invoice you for the charges incurred to date.

If you have any questions, please do not hesitate to contact the undersigned.

Very truly yours

Reviewed by:

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Built Environment
Quincy.Chang@ul.com

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Daniel.Bogdan@ul.com

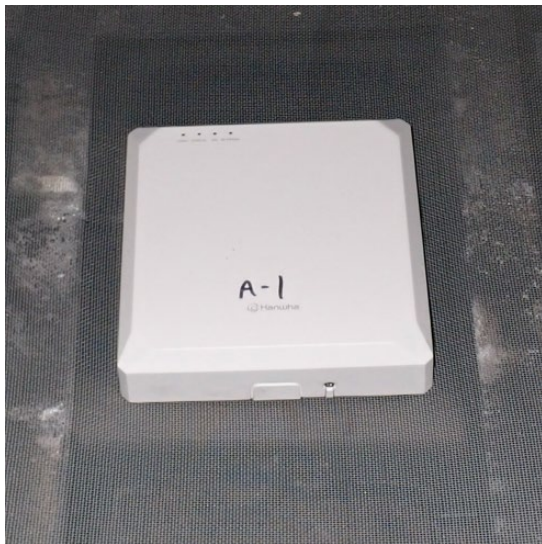
APPENDIX A**TEST NOTES:****File TBD, Project 4791585878****TEST A-1**

02012505

Sample Description: NHP-P200

Test Notes: The sample was positioned on fine wire mesh and situated above the center of the test burner. The sample was placed Face up.

Post Test Observations: The sample was still burning with light smoke at the conclusion of the test.

Photos:**Pre-Test****Post-Test**

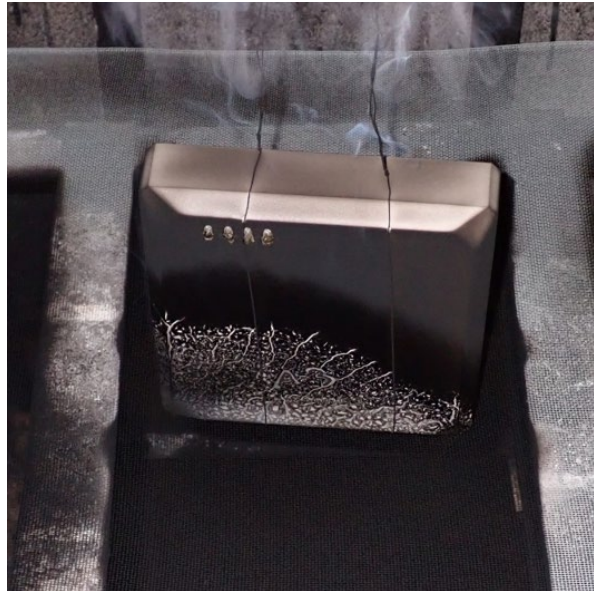
TEST A-2

02012506

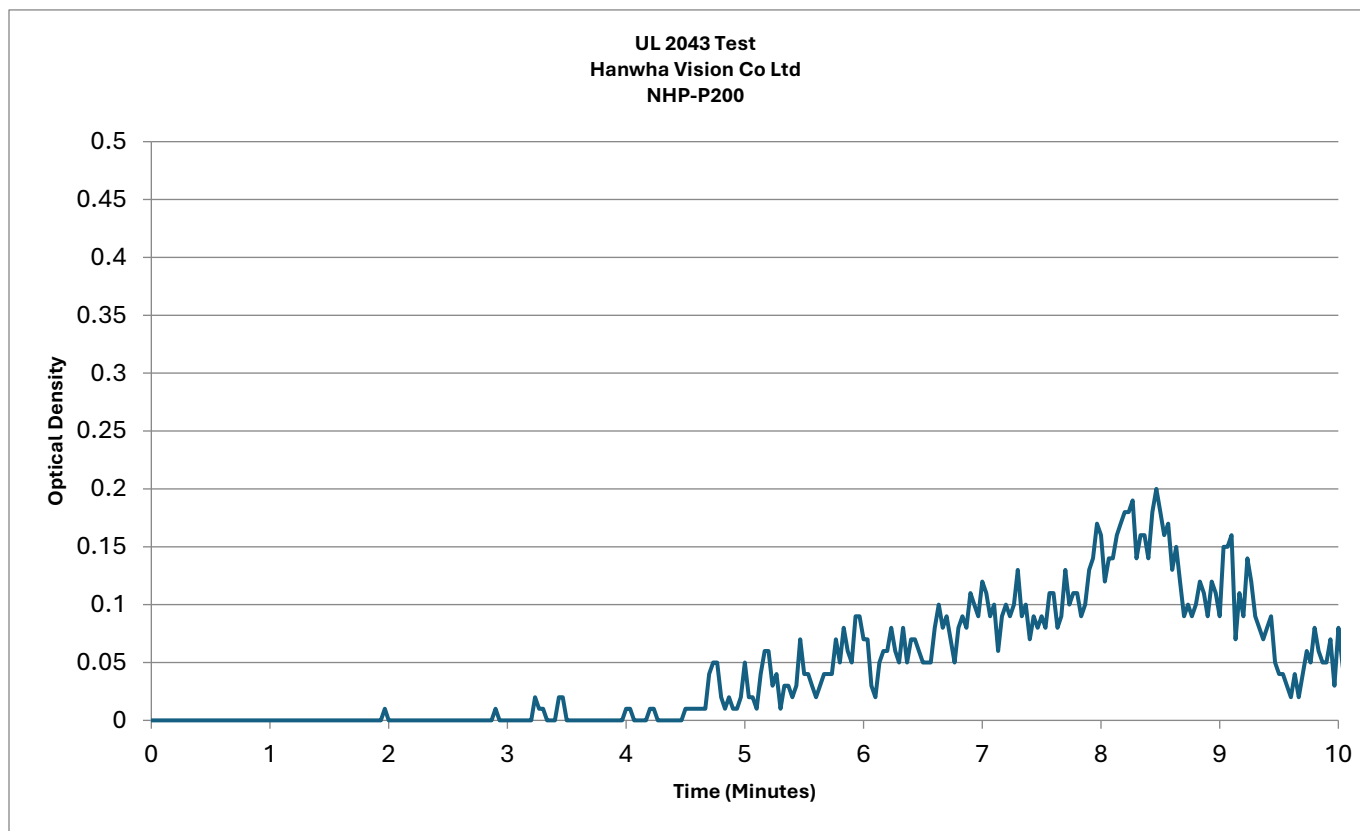
Sample Description: NHP-P200**Test Notes:** The sample was positioned on fine wire mesh and situated above the center of the test burner. The sample was placed Face down.**Post Test Observations:** The sample was still burning with light smoke at the conclusion of the test.**Photos:****Pre-Test****Post-Test**

TEST A-3

02012507

Sample Description: NHP-P200**Test Notes:** The sample was positioned on fine wire mesh and situated above the center of the test burner. The sample was placed Vertical.**Post Test Observations:** The sample was not still burning with light smoke at the conclusion of the test.**Photos:****Pre-Test****Post-Test**

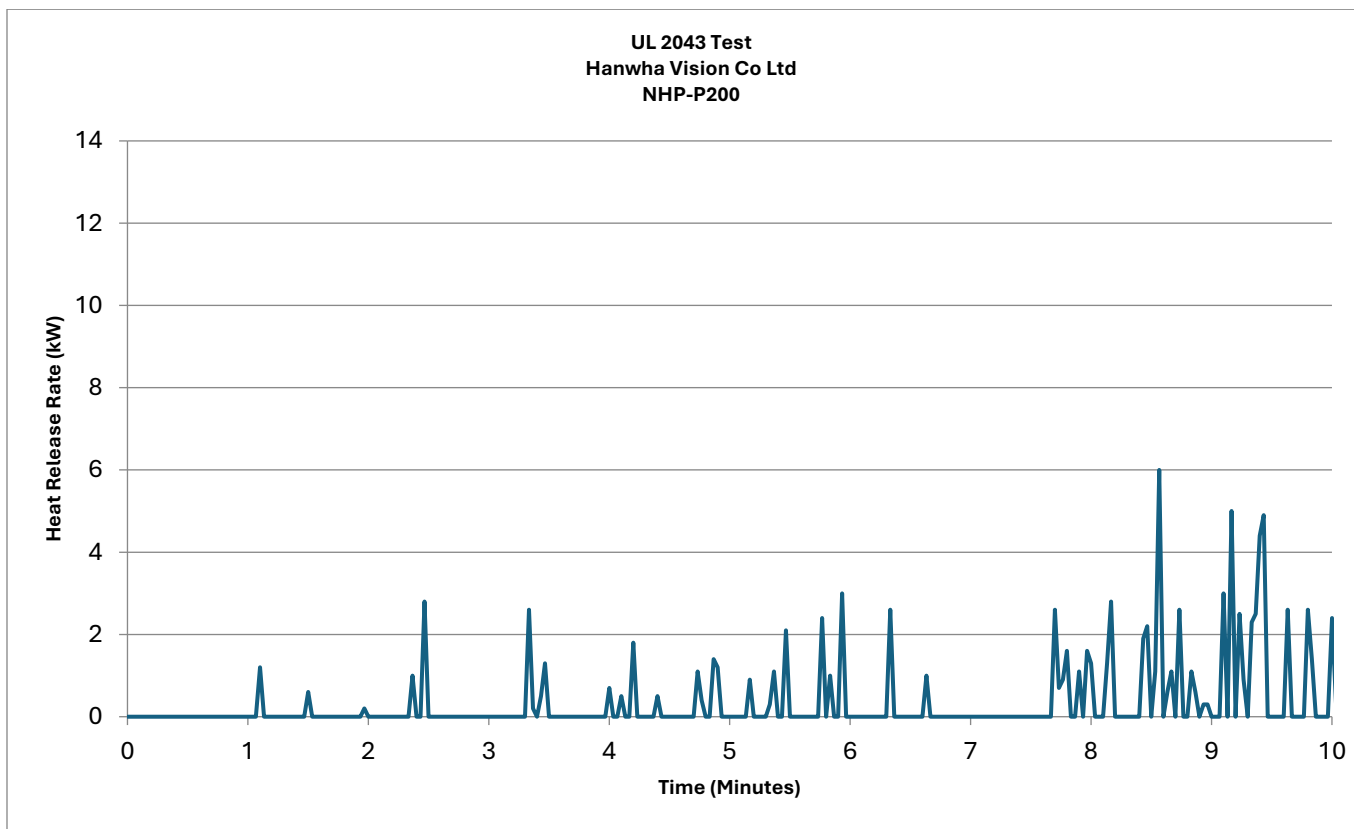
APPENDIX B**GRAPHICAL DATA****File R41651, Project 4791585878**



Test Number	Test Code	Description	Peak Normalized Optical Density	Average Normalized Optical Density
A-1	02012505	NHP-P200	0.20	0.02

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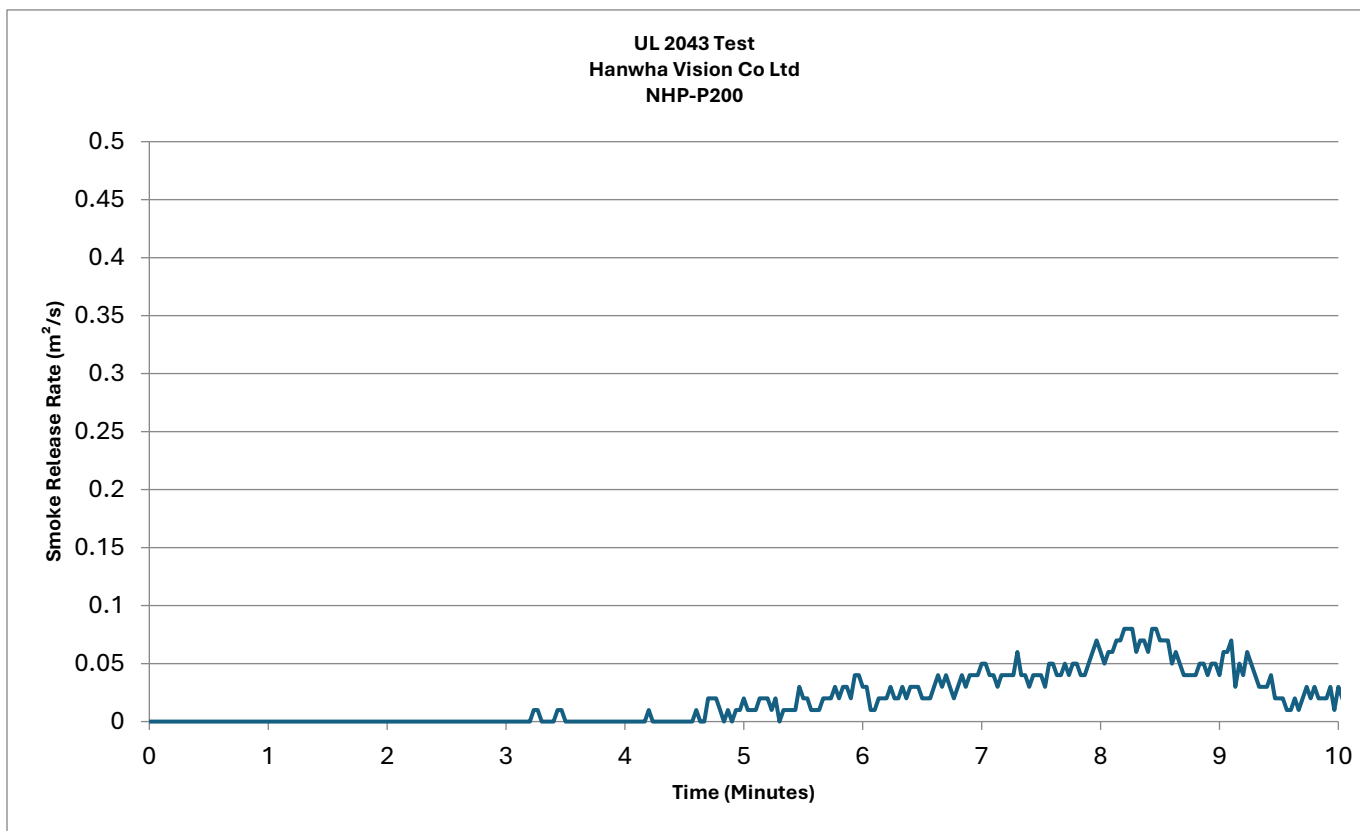
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Test Number	Test Code	Description	Peak Heat Release Rate (kW)
A-1	02012505	NHP-P200	6

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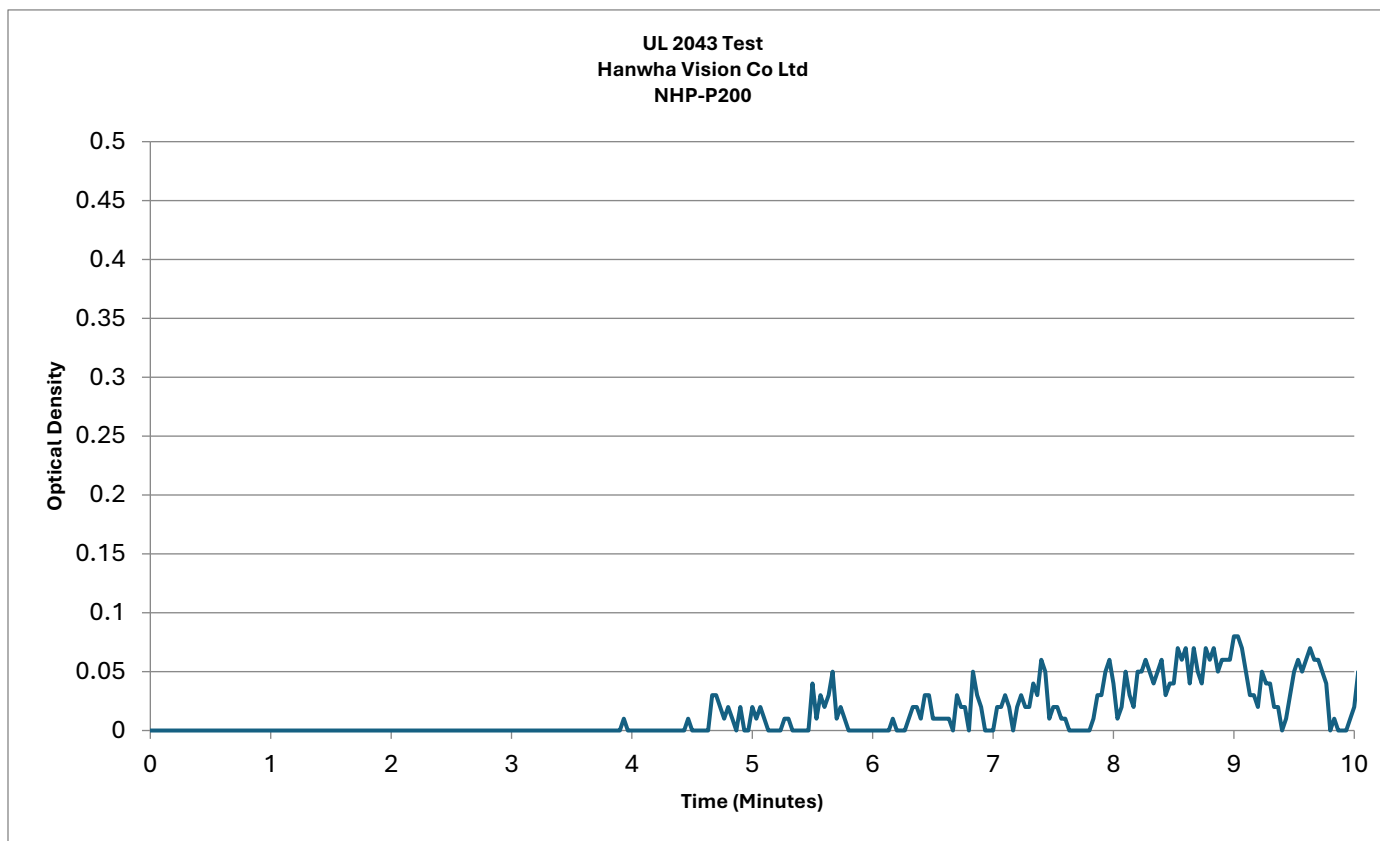
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Test Number	Test Code	Description	Peak Smoke Release Rate (m ² /s)	Total Smoke Released (m ²)
A-1	02012505	NHP-P200	0.08	11.2

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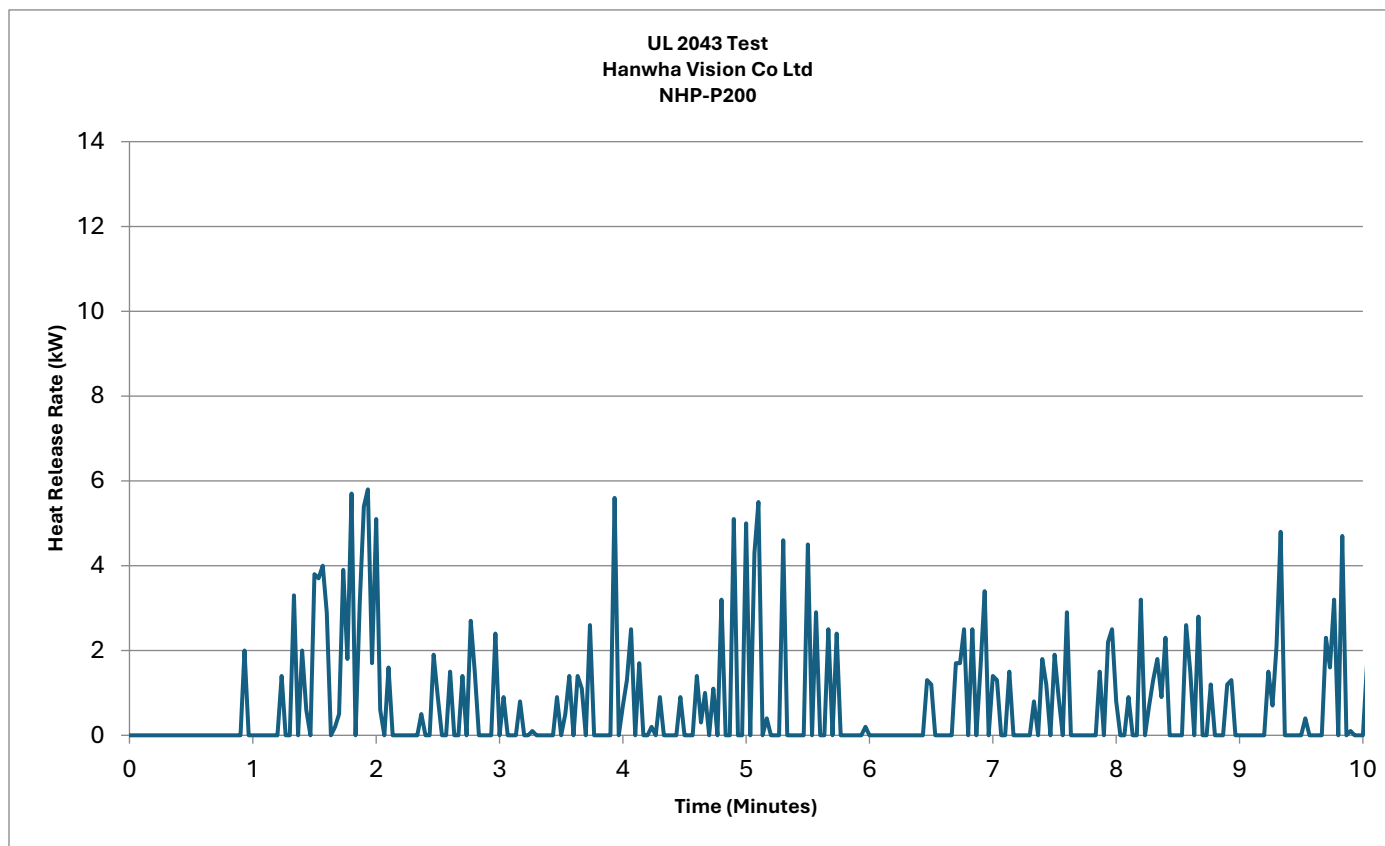
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Test Number	Test Code	Description	Peak Normalized Optical Density	Average Normalized Optical Density
A-2	02012506	NHP-P200	0.08	0.01

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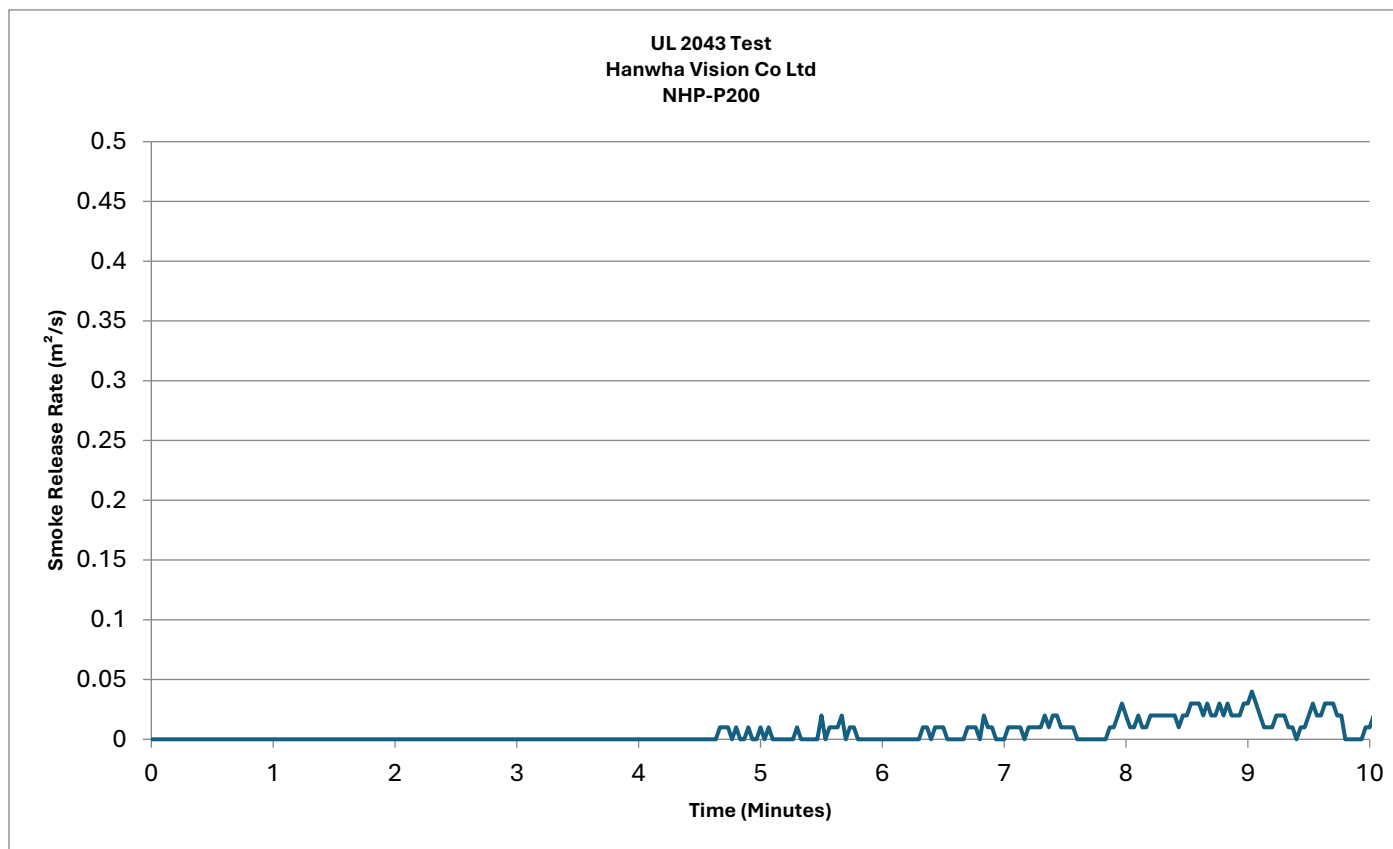


Test Number	Test Code	Description	Peak Heat Release Rate (kW)
A-2	02012506	NHP-P200	6

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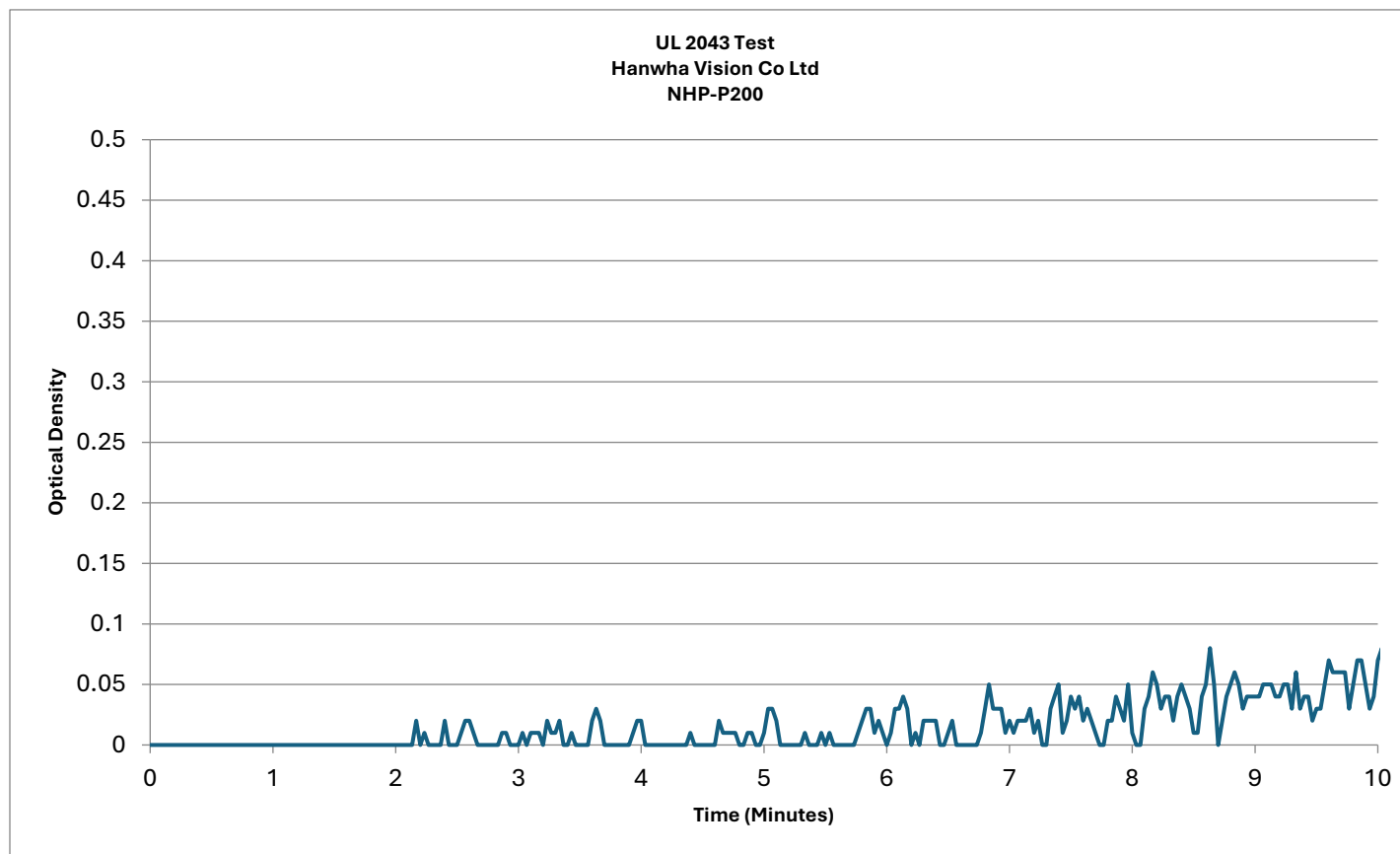
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Test Number	Test Code	Description	Peak Smoke Release Rate (m²/s)	Total Smoke Released (m²)
A-2	02012506	NHP-P200	0.04	3.4

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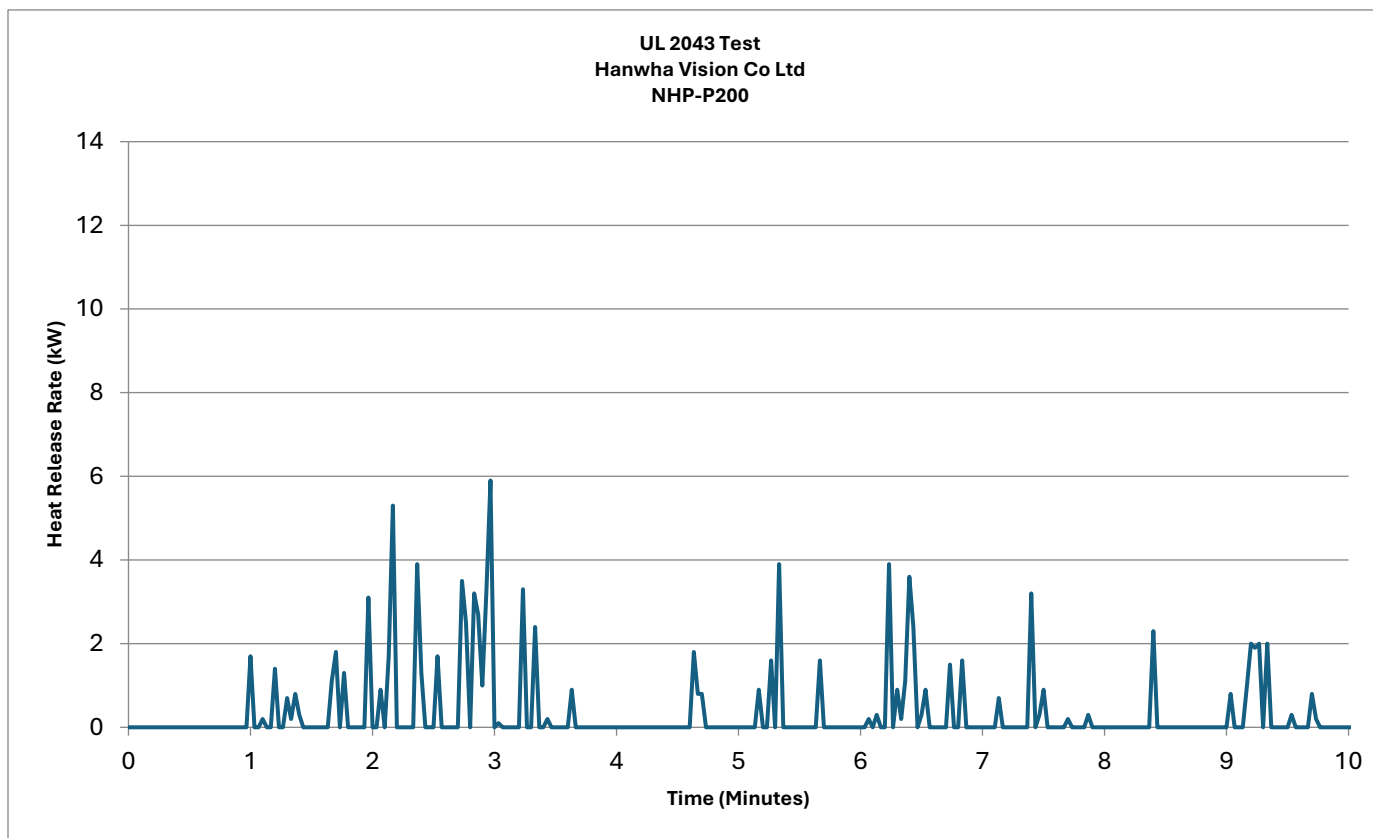
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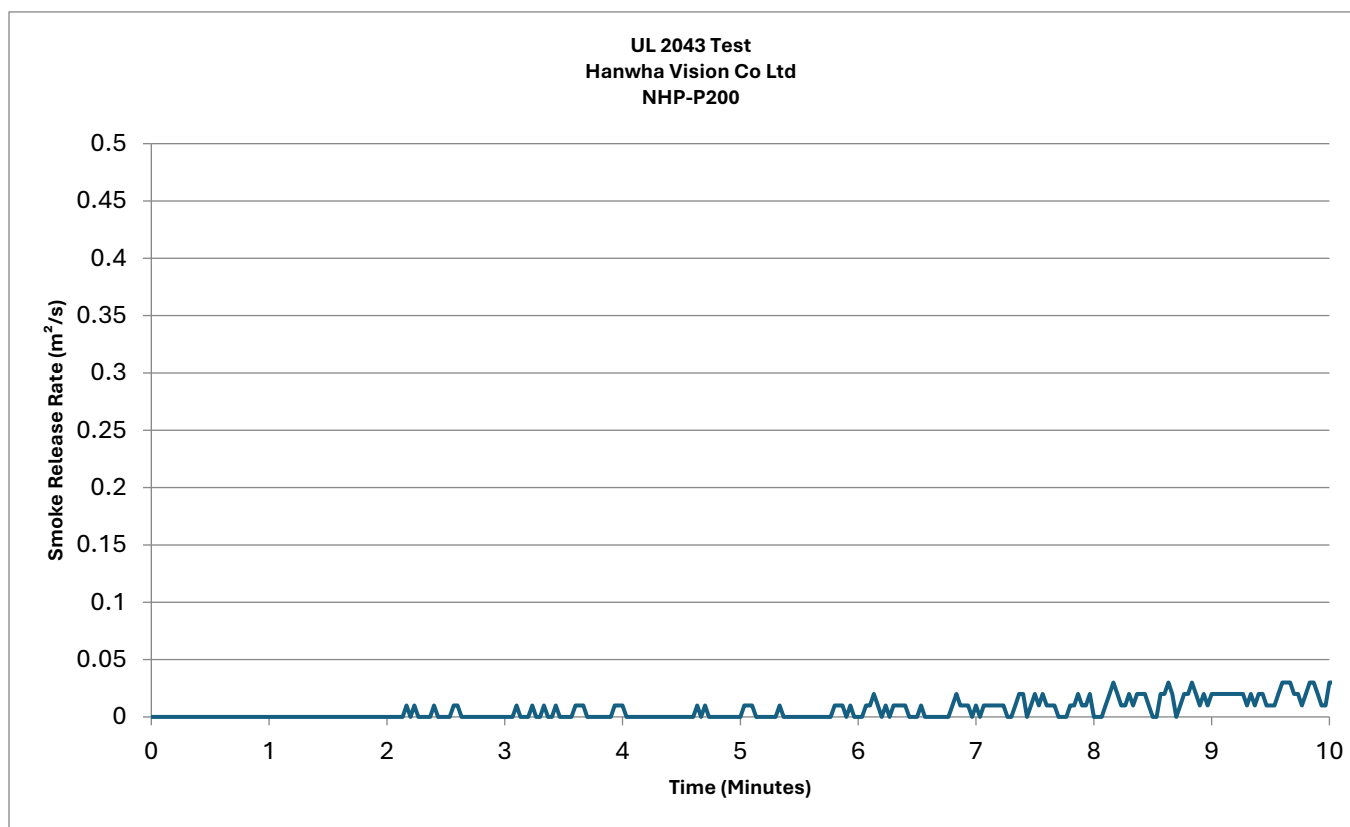
Test Number	Test Code	Description	Peak Normalized Optical Density	Average Normalized Optical Density
A-3	02012507	NHP-P200	0.08	0.01

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Test Number	Test Code	Description	Peak Heat Release Rate (kW)
A-3	02012507	NHP-P200	6



Test Number	Test Code	Description	Peak Smoke Release Rate (m ² /s)	Total Smoke Released (m ²)
A-3	02012507	NHP-P200	0.03	3.7