be quiet!

# be quiet! Light Wings 140mm

Serial Number

Lab ID  BQ14000042

Certification ID  FN25042

Test Result Report ID: 25FN42A

Certificate Issue Date: Sep 28, 2023

Scheme: PHI

Airflow Rating







Static Pressure Rating



Aristeidis Bitziopoulos, Certification Body General Manager

## SECTION A: Noise Testing Equipment

| | |
|---|---|
| Test Environment | Hemi-Anechoic Chamber with 6 dB(A) noise floor |
| Conditions | 25(±2) degrees Celsius, 40-50% humidity |
| Sound Analyzer | Bruel & Kjaer 2270-S G4 & 2250-L G4 |
| Microphone | Bruel & Kjaer Type 4955-A |
| Mic Calibrator | Bruel & Kjaer Type 4231 |
| Data Logger | Picoscope TC-08 |
| Testing Methodology | Cybenetics Phi Fan Performance Standard |

## SECTION B: Fan Testing Instrument Technical Specifications

| | |
|---|---|
| Manufacturer | Long Win Science & Technology Corporation |
| Model Number | LW-9266 |
| Air Flow Rate | 2.4 – 250 CFM |
| Accuracy of Air Flow Rate | < 3.5% INFS |
| Repeatability error | < 2% |
| Static pressure | 0-20mmAq (100mmAq with the high static pressure throttle device) |
| Overall Dimensions | 0.7 (W) x 2.2 (L) x 1.6 (H) m |
| Power Source | 220VAC, 5A, Single Phase, 50/60Hz |
| Based on Standards | ISO 5801-2007, AMCA 210-0, ASHRAE 51-2007, IEC 61591-2005, GB/T 1236-200 |

## SECTION C: PHI Performance Levels

| | | |
|---|---|---|
| Pressure at 25 dB(A) | P (mmAq) | 1.36 |
| Airflow at 25 dB(A) | Q (CFM) | 57.31 |

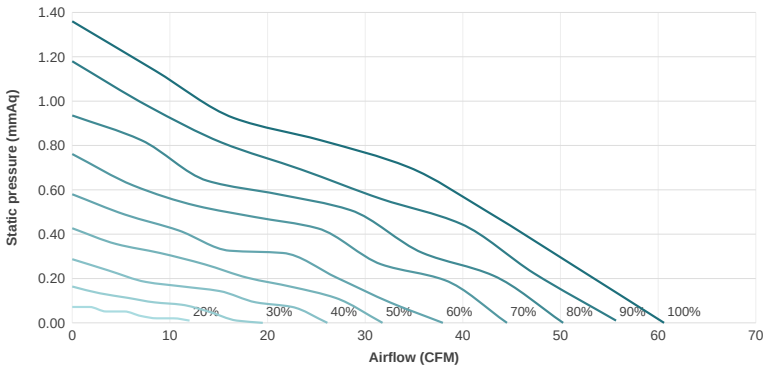
## SECTION D: Information about DUT

| | |
|---|---|
| Product Identification Details | |
| Brand | be quiet! |
| Model | Light Wings 140mm |
| Serial Number | - |
| Product Specifications | |
| Manufacturer-Provided Information | |
| Bearing | Rifle |
| Connector | PWM |
| Cable length (mm) | 500 |
| Daisy-chain | Cable |
| RGB Connector | None |
| RGB Daisy-chain | None |
| Cybenetics Measurements | |
| Max Speed (RPM) | 1530 |
| Max Airflow (CFM) | 60.60 |
| Max Static Pressure (mmAq) | 1.36 |
| Max Fan Noise Level (dBA) | 26.10 |
| Fan Max Current (A) | 0.09 |
| Fan Weight (gr) | 241 |
| Dimensions (W x H x D) | 140mm x 140mm x 25mm |
| Cybenetics Testing Information | |
| Lab ID | BQ14000042 |
| Date of receipt | - |
| Testing Date | - |
| Report Issued Date | Sep 28, 2023 |
| Engineer Name | Georgios Theodoros Sarimpalas |

## SECTION E: Long Win LW-9266 - Pressure and Airflow

### PQ Chart - All Speeds

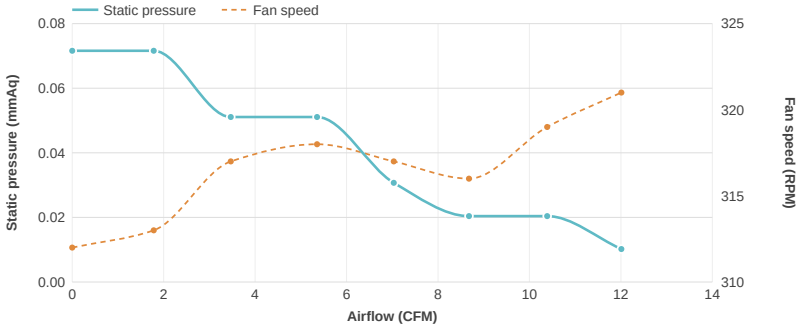
Static pressure against airflow, one curve per speed step




| Speed Setting | Max Airflow (CFM) | Max Static Pressure (mmAq) | Fan Speed (RPM) | Max Power (W) |
|---|---|---|---|---|
| 20% | 12.01 | 0.07 | 312 - 321 | 0.10 |
| 30% | 19.51 | 0.16 | 485 - 517 | 0.16 |
| 40% | 26.13 | 0.29 | 639 - 691 | 0.24 |
| 50% | 31.78 | 0.43 | 774 - 854 | 0.34 |
| 60% | 37.96 | 0.58 | 913 - 1001 | 0.46 |
| 70% | 44.52 | 0.76 | 1044 - 1163 | 0.60 |
| 80% | 50.28 | 0.94 | 1160 - 1300 | 0.76 |
| 90% | 55.69 | 1.18 | 1264 - 1422 | 0.92 |
| 100% | 60.60 | 1.36 | 1359 - 1568 | 1.12 |

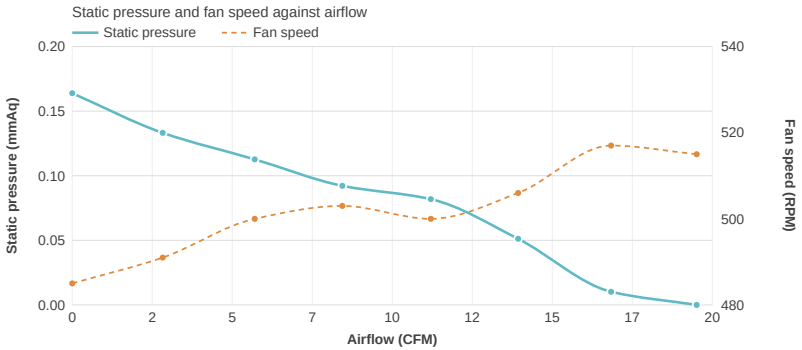
### PQ Chart 20%

Static pressure and fan speed against airflow



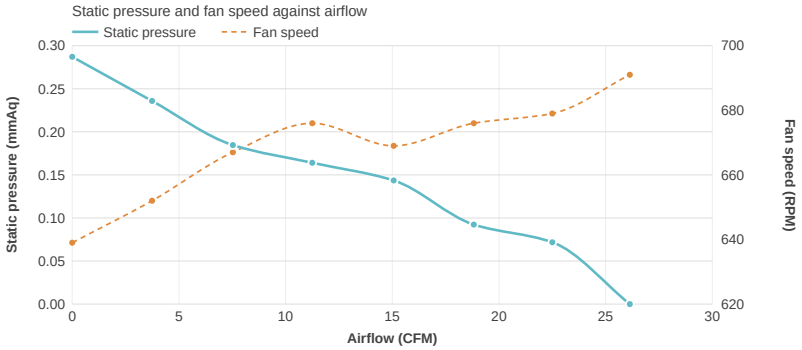

| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.07 | 312 | 0.008 | 0.10 |
| 1.78 | 0.07 | 313 | 0.008 | 0.10 |
| 3.47 | 0.05 | 317 | 0.008 | 0.10 |
| 5.35 | 0.05 | 318 | 0.007 | 0.08 |
| 7.03 | 0.03 | 317 | 0.007 | 0.08 |
| 8.68 | 0.02 | 316 | 0.007 | 0.08 |
| 10.39 | 0.02 | 319 | 0.007 | 0.08 |
| 12.01 | 0.01 | 321 | 0.007 | 0.08 |

## PQ Chart 30%



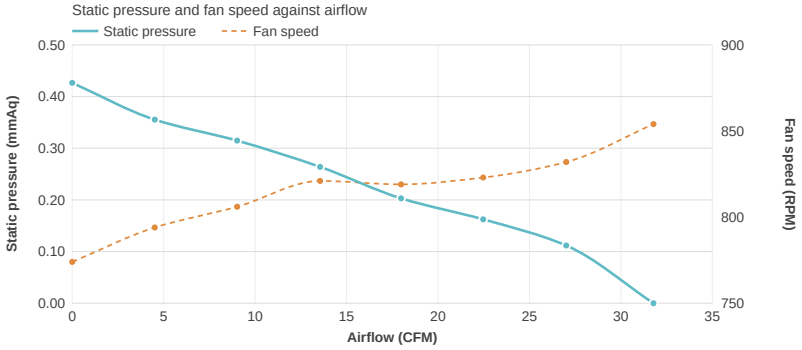

| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.16 | 485 | 0.013 | 0.16 |
| 2.83 | 0.13 | 491 | 0.013 | 0.16 |
| 5.70 | 0.11 | 500 | 0.013 | 0.16 |
| 8.44 | 0.09 | 503 | 0.013 | 0.16 |
| 11.21 | 0.08 | 500 | 0.013 | 0.16 |
| 13.93 | 0.05 | 506 | 0.012 | 0.14 |
| 16.84 | 0.01 | 517 | 0.012 | 0.14 |
| 19.51 | -0.01 | 515 | 0.012 | 0.14 |

## PQ Chart 40%



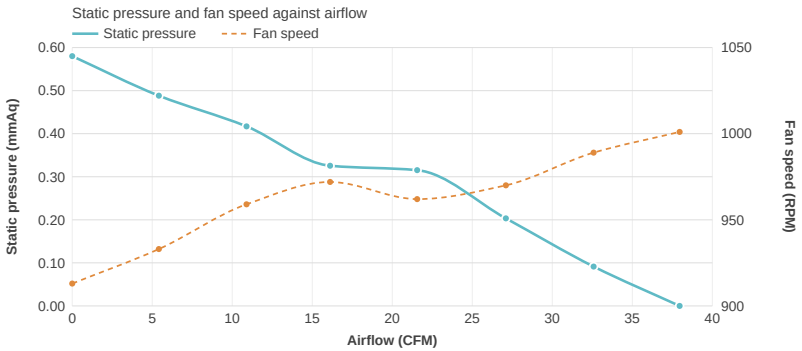

| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.29 | 639 | 0.020 | 0.24 |
| 3.74 | 0.24 | 652 | 0.020 | 0.24 |
| 7.53 | 0.18 | 667 | 0.019 | 0.23 |
| 11.25 | 0.16 | 676 | 0.019 | 0.23 |
| 15.07 | 0.14 | 669 | 0.019 | 0.23 |
| 18.82 | 0.09 | 676 | 0.019 | 0.23 |
| 22.50 | 0.07 | 679 | 0.019 | 0.23 |
| 26.13 | 0.00 | 691 | 0.018 | 0.22 |

## PQ Chart 50%



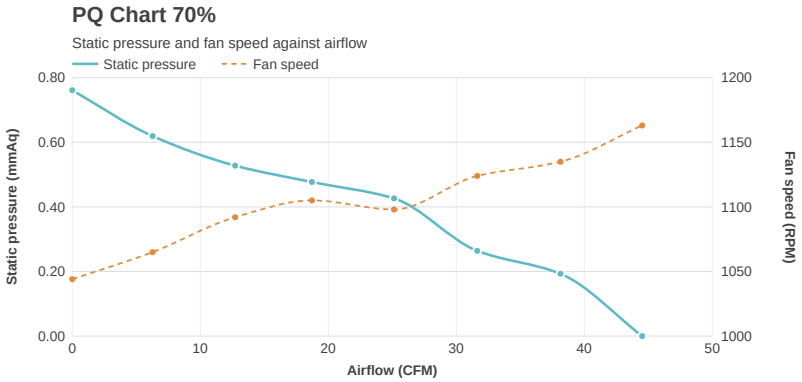

| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.43 | 774 | 0.028 | 0.34 |
| 4.51 | 0.36 | 794 | 0.028 | 0.34 |
| 9.02 | 0.31 | 806 | 0.027 | 0.32 |
| 13.56 | 0.26 | 821 | 0.027 | 0.32 |
| 17.98 | 0.20 | 819 | 0.027 | 0.32 |
| 22.47 | 0.16 | 823 | 0.026 | 0.31 |
| 27.01 | 0.11 | 832 | 0.026 | 0.31 |
| 31.78 | -0.02 | 854 | 0.026 | 0.31 |

## PQ Chart 60%



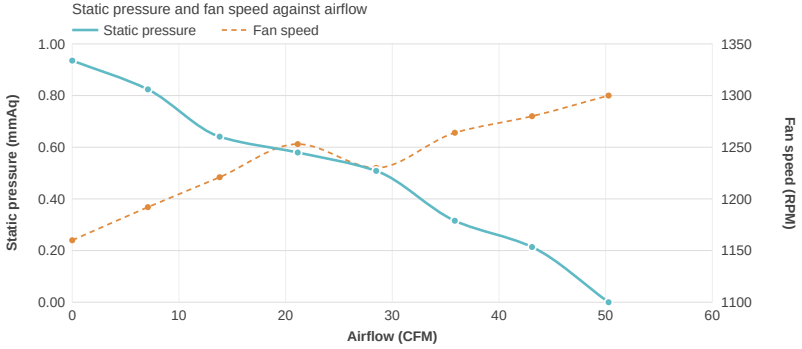

| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.58 | 913 | 0.038 | 0.46 |
| 5.41 | 0.49 | 933 | 0.038 | 0.46 |
| 10.89 | 0.42 | 959 | 0.037 | 0.44 |
| 16.11 | 0.33 | 972 | 0.036 | 0.43 |
| 21.56 | 0.32 | 962 | 0.036 | 0.43 |
| 27.10 | 0.20 | 970 | 0.036 | 0.43 |
| 32.58 | 0.09 | 989 | 0.035 | 0.42 |
| 37.96 | -0.01 | 1001 | 0.035 | 0.42 |

## PQ Chart 70%

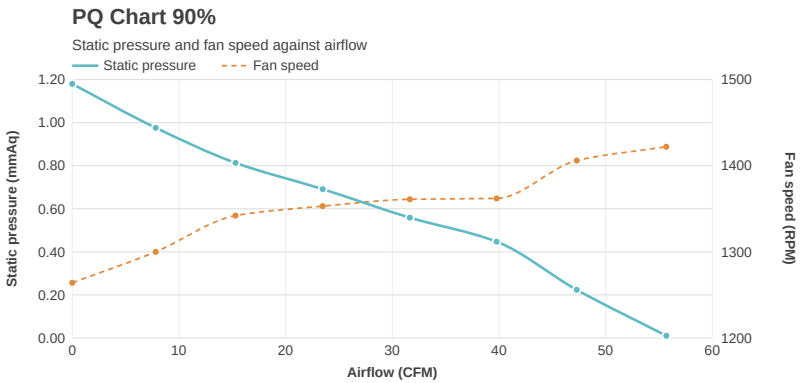



| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.76 | 1044 | 0.050 | 0.60 |
| 6.28 | 0.62 | 1065 | 0.049 | 0.59 |
| 12.72 | 0.53 | 1092 | 0.047 | 0.56 |
| 18.72 | 0.48 | 1105 | 0.047 | 0.56 |
| 25.14 | 0.43 | 1098 | 0.047 | 0.56 |
| 31.64 | 0.26 | 1124 | 0.046 | 0.55 |
| 38.14 | 0.19 | 1135 | 0.046 | 0.55 |
| 44.52 | -0.01 | 1163 | 0.044 | 0.53 |

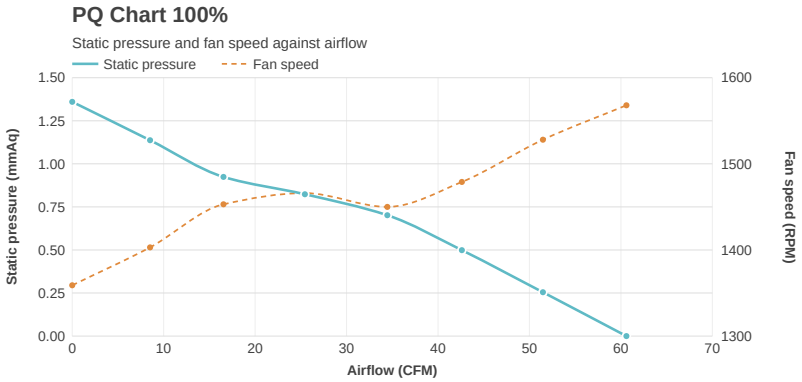
## PQ Chart 80%




| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 0.94 | 1160 | 0.063 | 0.76 |
| 7.09 | 0.82 | 1192 | 0.061 | 0.73 |
| 13.82 | 0.64 | 1221 | 0.060 | 0.72 |
| 21.14 | 0.58 | 1253 | 0.058 | 0.70 |
| 28.49 | 0.51 | 1230 | 0.059 | 0.71 |
| 35.86 | 0.32 | 1264 | 0.058 | 0.70 |
| 43.10 | 0.21 | 1280 | 0.057 | 0.68 |
| 50.28 | -0.01 | 1300 | 0.055 | 0.66 |




| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 1.18 | 1264 | 0.077 | 0.92 |
| 7.82 | 0.98 | 1300 | 0.075 | 0.90 |
| 15.31 | 0.81 | 1342 | 0.072 | 0.86 |
| 23.48 | 0.69 | 1353 | 0.072 | 0.86 |
| 31.65 | 0.56 | 1361 | 0.071 | 0.85 |
| 39.79 | 0.45 | 1362 | 0.072 | 0.86 |
| 47.29 | 0.22 | 1406 | 0.069 | 0.83 |
| 55.69 | 0.01 | 1422 | 0.069 | 0.83 |



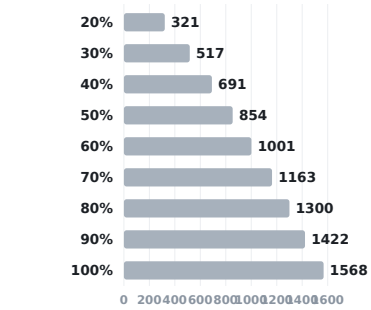

| Airflow (CFM) | Static Pressure (mmAq) | Fan Speed (RPM) | Current (A) | Power (W) |
|---|---|---|---|---|
| 0.00 | 1.36 | 1359 | 0.093 | 1.12 |
| 8.51 | 1.14 | 1403 | 0.090 | 1.08 |
| 16.54 | 0.92 | 1453 | 0.087 | 1.04 |
| 25.44 | 0.82 | 1466 | 0.086 | 1.03 |
| 34.46 | 0.70 | 1450 | 0.088 | 1.06 |
| 42.61 | 0.50 | 1479 | 0.086 | 1.03 |
| 51.47 | 0.25 | 1528 | 0.083 | 1.00 |
| 60.60 | -0.01 | 1568 | 0.080 | 0.96 |

## SECTION F: General Performance

RPM

### Fan Speed

be quiet! Light Wings 140mm

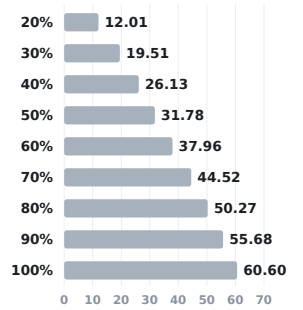



RPM · cybenetics.com

CFM Higher is better

### Airflow

be quiet! Light Wings 140mm

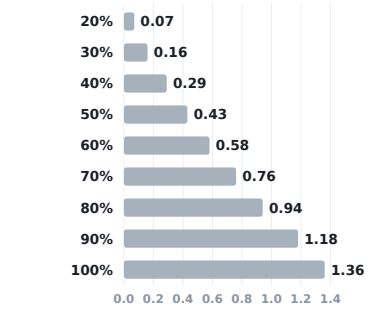



CFM · cybenetics.com

mmAq Higher is better

### Static Pressure

be quiet! Light Wings 140mm

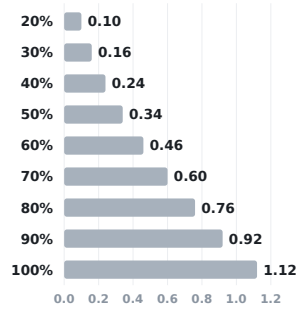



mmAq · cybenetics.com

W Lower is better

### Power Consumption

be quiet! Light Wings 140mm

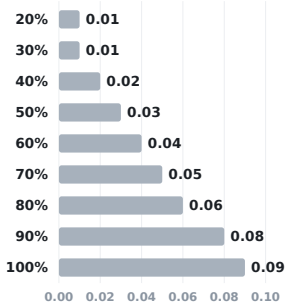



W · cybenetics.com

A Lower is better

## Current

be quiet! Light Wings 140mm

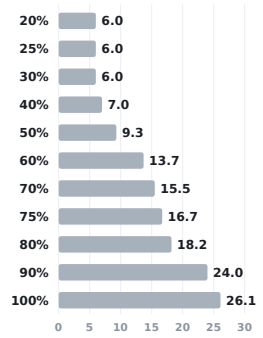



A · cybenetics.com

dB(A) Lower is better

## Noise Output

be quiet! Light Wings 140mm

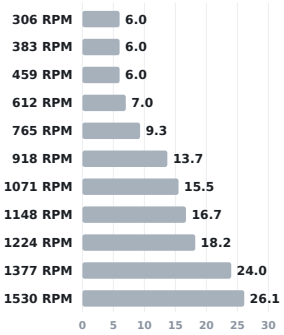



dB(A) · cybenetics.com

dB(A) Lower is better

## Noise at Each Fan Speed

be quiet! Light Wings 140mm

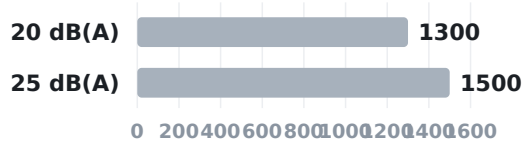



dB(A) · cybenetics.com

RPM

# Fan Speed at Fixed Noise Levels

be quiet! Light Wings 140mm




RPM · cybenetics.com

# SECTION G: Uncertainty

**Fan Performance Uncertainty Estimation**

### General Statement

Measurement uncertainty associated with the reported results was evaluated and estimated in accordance with JCGM 100:2008 (Guide to the Expression of Uncertainty in Measurement — GUM) and ISO/IEC 17025:2017, Clauses 7.6 and 7.2.

The uncertainty budget accounts for all significant identified contributors arising from the measurement process, instrumentation, test conditions, and operator interaction.

The reported expanded uncertainty U is obtained by multiplying the combined standard uncertainty uc by a coverage factor k = 2, corresponding to a confidence level of approximately 95 %, assuming a normal probability distribution.

Unless otherwise stated, the reported uncertainty applies only to the specific measurements performed and does not include long-term drift, aging effects, or future environmental changes.

### Expanded Measurement Uncertainty by Measurement Type

| Measurement | Expanded Uncertainty U (k=2, norm) |
|---|---|
| Fan Air Flow | ±1.23176 % of reading (k=2) — e.g. ±3.69 CFM at 25 CFM, ±4.29 at 92 CFM, ±7.15 at 250 CFM |
| Fan Static Pressure | ±0.6727 Pa |

Air flow uncertainty is relative to the reading: $U(Q) = 2 \cdot \sqrt{[(1.8200)^2 + (0.0123176 \cdot Q)^2]}$ CFM, valid over the declared measuring range 2.4 – 250 CFM.

The reported static pressure uncertainty applies over the 0 – 20 mmAq (0 – 196.1 Pa) measuring range of the Long Win LW-9266 apparatus. The apparatus can be extended to 100 mmAq (981 Pa) with the high static pressure throttle device; the uncertainty of that extended range has not been separately verified and the value stated above does not apply to it.

## be quiet! Light Wings 140mm




Front




Rear

Cybenetics □□□□□□□□□□□□□□□□□□ ETA□□□□ LAMBDA□□□□ SAFE□□□□□□□□□□□□□□□□ DELTA□□□□□□□ PHI□□□□□□□□

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