# ENERGY STAR Supplement to ANSI/ASHRAE Standard 72-2005 for Laboratory Grade Refrigerators and Freezers
# Data Collection Form
# December 30, 2009

Please note, including this Instructions worksheet, there are four total worksheets in this data collection form. For each equipment tested, please complete this data collection form with all relevant fields filled out in the Data and Measurements worksheets. Please add additional rows to the Measurements worksheet if there are more than 50 thermocouples used for one test. Also please include measurements taken during the energy consumption and temperature uniformity tests. ENERGY STAR also asks that you also provide a schematic showing where the thermocouples are placed in the tested equipment in the Probe Location Schematic worksheet.

Please submit non-qualified product data to ENERGY STAR at LabGradeRefrigeration@energystar.gov by 03/31/2010. If you have any questions concerning this data collection form, please contact Bijit Kundu at bkundu@icfi.com and (202) 862-1157. Thank you!

| | | |
|---|---|---|
| ***Product Description*** | | |
| 1 | Manufacturer | |
| 2 | Brand | |
| | Equipment (Refrigerator or Freezer) | |
| 3 | Product Type (General Purpose Refrigerator, Blood Bank Refrigerator, Pharmacy/Chromatography Refrigerator, General Purpose Freezer, -30 Freezer, -20 Freezer, Other [specify]) | |
| 4 | Model Number Tested | |
| 5 | Dates Tested | |
| 6 | Size, H x W x D, in. | |
| 7 | # Outer Doors | |
| 8 | Door Type (Glass, Solid, Other [specify]) | |
| 9 | Measured Interior Volume, Cubic Feet (AHAM Volume) | |
| 10 | Method of Access to Refrigerated Compartment (from above, from front, from front and back, other [specify]) | |
| 11 | Illumination (Type and Watts) | |
| 12 | Refrigerant | |
| 13 | Please List Options of Tested Equipment | |
| ***Electrical Rating*** | | |
| 14 | Voltage | |
| 15 | Frequency | |
| 16 | Phase | |
| 17 | Current | |
| ***Door Openings During Test Period*** | | |
| 18 | Every X Minutes for Y Hours | |
| 19 | Total Number of Openings | |

| | | |
|---|---|---|
| ***Steady State*** | | |
| 20 | Steady State as defined by ANSI/ASHRAE 72 reached (i.e., average temperature of all Thermocouples changes less than 0.2 degrees C from one 24-hour period or refrigeration cycle to the next)? (Y/N) | |
| 21 | If No to question above, please describe average temperature change of all Thermocouples after 5 hours with no door openings (± degrees C) | |
| ***Supply Power*** | | |
| 22 | Voltage | |
| 23 | Frequency | |
| ***Test Data*** | | |
| 24 | Thermostat Setting | |
| 25 | Energy Input During Refrigerating Time, kWh/day | |
| 26 | Total Energy Input, kWh/day | |
| 27 | Total Time Test Period, Min | |
| 28 | Percent Compressor Running Time, % | |
| ***Ambient Temperatures*** | | |
| 29 | Minimum Dry Bulb, Degrees F | |
| 30 | Maximum Dry Bulb, Degrees F | |
| 31 | Average Dry Bulb, Degrees F | |
| 32 | Minimum Wet Bulb, Degrees F | |
| 33 | Maximum Wet Bulb, Degrees F | |
| 34 | Average Wet Bulb, Degrees F | |
| ***Thermocouple Data: Energy Consumption Test*** | | |
| 35 | Average Temperature of All Thermocouples, Degrees F | |
| 36 | Average Standard Deviation of All Thermocouples, Degrees F | |

| | | |
|---|---|---|
| 37 | Coldest Thermocouple Average Temperature, Degrees F | |
| 38 | Warmest Thermocouple Average Temperature, Degrees F | |
| 39 | Coldest Thermocouple Temperature, Degrees F | |
| 40 | Warmest Thermocouple Temperature, Degrees F | |
| ***Thermocouple Data: Temperature Uniformity Test*** | | |
| 41 | Average Temperature of All Thermocouples during Defrost Cycle, Degrees F | |
| 42 | Average Standard Deviation of All Thermocouples during Defrost Cycle, Degrees F | |
| 43 | Average Temperature of All Thermocouples during Steady State, Degrees F | |
| 44 | Average Standard Deviation of All Thermocouples during Steady State, Degrees F | |

| *Measurements: Energy Consumption Test* | | | | | |
|---|---|---|---|---|---|
| | Location | Min Temp Over Test Period, Degrees F | Max Temp Over Test Period, Degrees F | Average Temp Over Test Period, Degrees F | Average Standard Deviation Over Test Period, Degrees F |
| Energy Consumption Test - Thermocouple1 | | | | | |
| Energy Consumption Test - Thermocouple2 | | | | | |
| Energy Consumption Test - Thermocouple3 | | | | | |
| Energy Consumption Test - Thermocouple4 | | | | | |
| Energy Consumption Test - Thermocouple5 | | | | | |
| Energy Consumption Test - Thermocouple6 | | | | | |
| Energy Consumption Test - Thermocouple7 | | | | | |
| Energy Consumption Test - Thermocouple8 | | | | | |
| Energy Consumption Test - Thermocouple9 | | | | | |
| Energy Consumption Test - Thermocouple10 | | | | | |
| Energy Consumption Test - Thermocouple11 | | | | | |
| Energy Consumption Test - Thermocouple12 | | | | | |
| Energy Consumption Test - Thermocouple13 | | | | | |
| Energy Consumption Test - Thermocouple14 | | | | | |
| Energy Consumption Test - Thermocouple15 | | | | | |
| Energy Consumption Test - Thermocouple16 | | | | | |
| Energy Consumption Test - Thermocouple17 | | | | | |
| Energy Consumption Test - Thermocouple18 | | | | | |
| Energy Consumption Test - Thermocouple19 | | | | | |
| Energy Consumption Test - Thermocouple20 | | | | | |
| Energy Consumption Test - Thermocouple21 | | | | | |
| Energy Consumption Test - Thermocouple22 | | | | | |
| Energy Consumption Test - Thermocouple23 | | | | | |
| Energy Consumption Test - Thermocouple24 | | | | | |
| Energy Consumption Test - Thermocouple25 | | | | | |
| Energy Consumption Test - Thermocouple26 | | | | | |
| Energy Consumption Test - Thermocouple27 | | | | | |
| Energy Consumption Test - Thermocouple28 | | | | | |
| Energy Consumption Test - Thermocouple29 | | | | | |
| Energy Consumption Test - Thermocouple30 | | | | | |
| Energy Consumption Test - Thermocouple31 | | | | | |
| Energy Consumption Test - Thermocouple32 | | | | | |
| Energy Consumption Test - Thermocouple33 | | | | | |
| Energy Consumption Test - Thermocouple34 | | | | | |
| Energy Consumption Test - Thermocouple35 | | | | | |

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|---|---|---|---|---|---|
| Energy Consumption Test - Thermocouple36 | | | | | |
| Energy Consumption Test - Thermocouple37 | | | | | |
| Energy Consumption Test - Thermocouple38 | | | | | |
| Energy Consumption Test - Thermocouple39 | | | | | |
| Energy Consumption Test - Thermocouple40 | | | | | |
| Energy Consumption Test - Thermocouple41 | | | | | |
| Energy Consumption Test - Thermocouple42 | | | | | |
| Energy Consumption Test - Thermocouple43 | | | | | |
| Energy Consumption Test - Thermocouple44 | | | | | |
| Energy Consumption Test - Thermocouple45 | | | | | |
| Energy Consumption Test - Thermocouple46 | | | | | |
| Energy Consumption Test - Thermocouple47 | | | | | |
| Energy Consumption Test - Thermocouple48 | | | | | |
| Energy Consumption Test - Thermocouple49 | | | | | |
| Energy Consumption Test - Thermocouple50 | | | | | |

***Measurements: Temperature Uniformity Test***

| | | *Defrost Cycle* | | | | *Steady State* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Location | Min Temp Over 3 Hour Period, Degrees F | Max Temp Over 3 Hour Period, Degrees F | Average Temp Over 3 Hour Period, Degrees F | Average Standard Deviation Over 3 Hour Period, Degrees F | Min Temp Over 3 Hour Period, Degrees F | Max Temp Over 3 Hour Period, Degrees F | Average Temp Over 3 Hour Period, Degrees F | Average Standard Deviation Over 3 Hour Period, Degrees F |
| Temp Uniformity Test - Thermocouple1 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple2 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple3 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple4 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple5 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple6 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple7 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple8 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple9 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple10 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple11 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple12 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple13 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple14 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple15 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple16 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple17 | | | | | | | | | |
| Temp Uniformity Test - Thermocouple18 | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **Temp Uniformity Test - Thermocouple19** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple20** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple21** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple22** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple23** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple24** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple25** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple26** | | | | | | | | | |
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| **Temp Uniformity Test - Thermocouple30** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple31** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple32** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple33** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple34** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple35** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple36** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple37** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple38** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple39** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple40** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple41** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple42** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple43** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple44** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple45** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple46** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple47** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple48** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple49** | | | | | | | | | |
| **Temp Uniformity Test - Thermocouple50** | | | | | | | | | |
| ***Equipment Used (e.g., thermocouple types, data acquisition system, etc.)*** | | | | | | | | | |
| **Equipment1:** | | | | | | | | | |
| **Equipment2:** | | | | | | | | | |
| **Equipment3:** | | | | | | | | | |
| **Equipment4:** | | | | | | | | | |
| **Equipment5:** | | | | | | | | | |
| **Equipment6:** | | | | | | | | | |

**Note: Include a schematic showing the thermocouple locations in equipment with shelves.**