CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814

Main website: www.energy.ca.gov

In the matter of,	)	Docket No. 10-RADB-01
	)	
Informal Proceeding to Decertify Appliance	)	
Turbo Air commercial refrigerator models	)	
	)	

Notice of Informal Proceeding to Decertify Appliance

The Efficiency Committee of the California Energy Commission will conduct an informal public proceeding to remove Turbo Air commercial refrigerator models #TSR-23SD and TUR-28SD from the Energy Commission's database of certified appliances. Commissioner Anthony Eggert is the Presiding Member, and Commissioner Jeffrey D. Byron is the Associate Member, of the Committee.

The hearing will be held:

MONDAY, APRIL 26, 2010
9:30 a.m.
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
First Floor, Hearing Room B
Sacramento, California
(Wheelchair Accessible)

Purpose

The hearing will be undertaken according to Section 1608, subdivision (e)(2)(C) of Title 20 of the California Code of Regulations[1] for the purpose of determining whether the mean energy consumption of two separate units of commercial refrigerator models TSR-23SD and TUR-28SD, manufactured by Turbo Air, Inc., exceed the applicable maximum daily energy consumption standard set forth in Section 1605.3, Table A-9. If the Committee determines that such models do exceed the applicable standards, the matter will be placed on the agenda of an Energy Commission Business Meeting, requesting that the Energy Commission authorize the Executive Director to remove the appliances from the Energy Commission's database of certified appliances. Per Section 1605.3, subdivision (e)(2)(C), the Energy Commission has elected to utilize the informal hearing procedure set forth in Sections 11445.10 – 11445.60 of the California Government Code.

[1] All references to section numbers are to Title 20 of the California Code of Regulations.

Background

Section 1608, subdivision (a), prohibits the sale or offer for sale in California of an appliance that does not appear in the Energy Commission's appliance database (paragraph (1)) or does not comply with the applicable standard under Section 1605.3 (paragraph (4)). Subdivision (e) of Section 1608 authorizes the Executive Director to periodically test appliances sold or offered for sale in the state. If the initial test result indicates that the energy consumption of the tested unit is greater than that permitted by an applicable standard in Section 1605.3, a second test on a second unit is performed. If the results of the first and second tests show a mean energy consumption that is greater than that allowed by an applicable standard in Section 1605.3, the Energy Commission shall undertake an informal proceeding to confirm that determination. Upon that confirmation, the Executive Director shall remove the appliance from the database.

In December of 2009, Staff, pursuant to delegation from the Executive Director, had BR Laboratories, Inc., test three models of reach-in commercial refrigerators manufactured by Turbo Air, Inc. The maximum daily energy consumption standard (in kilowatt hours or kWh) for such appliances, manufactured between January 1, 2007 and January 1, 2010, is found in Section 1605.3, Table A-9, and is 0.10 x measured volume (V) + 2.04. The results of those tests are reflected below:

Model #	Month/Year Manufactured	Measured volume (Cu Ft)	Tested Daily Energy Use (kWh per day)	Maximum energy consumption	Pass / Fail
TSR-23SD	July 2008	19.3	5.105	3.97	Fail
TSR-49SD	July 2009	44.0	5.179	6.44	Pass
TUR-28SD	June 2009	7.0	3.612	2.74	Fail

Staff informed Turbo Air of the results and instructed BR Labs to conduct a second test on second units of models TSR-23SD and TUR-28SD. Those tests were done in February of 2010, and the results are reflected below:

Model #	Month/Year Manufactured	Measured volume (Cu Ft)	Tested Daily Energy Use (kWh per day)	Maximum energy consumption	Pass / Fail
TSR-23SD	May 2009	19.3	3.132	3.97	Pass
TUR-28SD	June 2009	7.0	3.465	2.74	Fail

The mean of the two tests for TSR-23SD and TUR-28SD were calculated, and the results are reflected below, as well as the energy consumption reported by Turbo Air in their certification:

Model#	Mean of tested daily energy use	Maximum energy consumption	Pass / Fail	Energy use as certified by Turbo Air	
TSR-23SD	4.1185	3.97	FAIL	3.58	12/16/2002
TUR-28SD	3.5385	2.74	FAIL	1.46	1/9/2003

Turbo Air was informed of the results of the second test and calculated mean, and that a proceeding would be commenced to remove the two models from the Energy Commission's database of appliances.

Public Participation

The Energy Commission's Public Adviser's Office provides public assistance in participating in Energy Commission activities. If you want information on how to participate in this forum, please contact the Public Adviser's Office at (916) 654-4489 or toll free at (800) 822-6228, by FAX at (916) 654-4493, or by e-mail at PublicAdviser@energy.state.ca.us. If you have a disability and require assistance to participate, please contact Lou Quiroz at (916) 654-5146 at least five days in advance.

Please direct all news media inquiries to the Media and Public Communications Office at (916) 654-4989, or by e-mail at mediaoffice@energy.state.ca.us .

Inquiries may also be made to Tovah Ealey at (916) 651-3003, or by e-mail at tealey@energy.state.ca.us.

Remote Attendance

You can participate in this meeting through WebEx, the Energy Commission's online meeting service. Presentations will appear on your computer screen, and you may listen to the audio via your telephone. Please be aware that the meeting's WebEx audio and on-screen activity may be recorded.

Computer Log-on with Telephone Audio:

1. Please go to https://energy.webex.com and enter the unique meeting number: **923 314 437**

2. When prompted, enter your name other information as directed and the meeting password: **meeting@930**

3. After you log-in, a prompt will ask for your phone number. If you wish to have WebEx call you back, enter your phone number. This will add your name to the WebEx log so that we know who is connected and have a record of your participation by WebEx.

   If you do not wish to do that, click cancel, and go to step 4. Or, if your company uses an older switchboard-type of phone system where your line is an extension, click cancel and go to step 4.

4. If you don't want WebEx to call you back, then call 1-866-469-3239 (toll-free in the U.S. and Canada). When prompted, enter the meeting number above and your unique Attendee ID number, which is listed in the top left area of your screen after you login via computer. International callers can dial in using the "Show all global call-in numbers" link (also in the top left area).

Telephone Only (No Computer Access):

1. Call 1-866-469-3239 (toll-free in the U.S. and Canada) and when prompted enter the unique meeting number above. International callers can select their number from https://energy.webex.com/energy/globalcallin.php

If you have difficulty joining the meeting, please call the WebEx Technical Support number at 1-866-229-3239.

Date: April 12, 2010

ANTHONY EGGERT
Commissioner and Presiding Member
Efficiency Committee

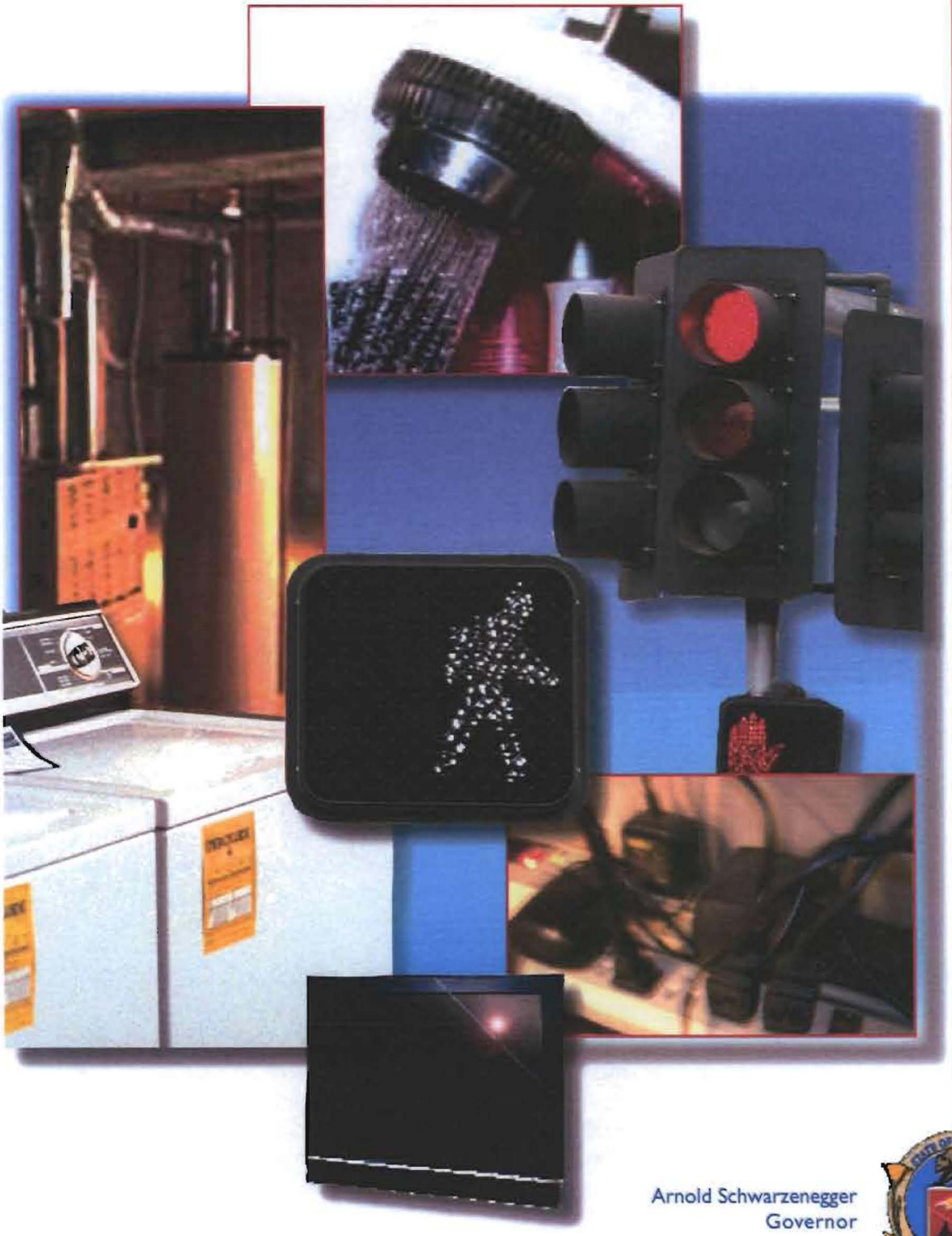
JEFFREY D. BYRON
Commissioner and Associate Member
Efficiency Committee

Appliance Mailing List: 423

2009 APPLIANCE EFFICIENCY REGULATIONS

CALIFORNIA ENERGY COMMISSION

REGULATIONS



August 2009
CEC-400-2009-013

Arnold Schwarzenegger
Governor

(d) Inspection by the Executive Director of Appliances Subject to Energy Design and Water Design Standards, and Marking Requirements.

(1) The Executive Director shall periodically inspect appliances sold or offered for sale in the state, to determine whether they conform with the applicable energy design and water design standards of Sections 1605.1, 1605.2, and 1605.3, and with the applicable marking requirements of Section 1607.

(2) Inspection of an appliance shall consist of inspection of one unit.

(A) If the inspection indicates that the unit complies with the applicable energy or water design standards and marking requirements, the matter shall be closed.

(B) If the inspection indicates that the unit does not comply with an applicable energy or water design standard or as applicable marking requirement, the Commission shall undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the manufacturer's option, pursuant to Sections 11425.10-11425.60 of the California Government Code). If the Commission confirms the Executive Director's determination, then he or she shall remove the appliance from the database.

(e) Executive Director's Enforcement Testing of Appliances Subject to Energy Efficiency, Energy Consumption, Water Efficiency, and Water Consumption Standards.

The Executive Director shall periodically cause, at laboratories meeting the criteria of Section 1603(a), the testing of appliance units sold or offered for sale in the state, to determine whether the appliances conform with the applicable standards in Sections 1605.1, 1605.2, and 1605.3, and to determine whether their performance is as reported or certified by the manufacturer pursuant to Section 1606(a). Testing shall be performed as follows:

(1) **Initial Test.** The Executive Director shall perform an initial test on one unit, using the applicable test procedure specified in Section 1604. Upon completion of the initial test, the Executive Director shall make a determination as follows:

(A) **Performance Is No Worse Than Required by Standards and Is No Worse Than as Certified by Manufacturer.** If the initial test result indicates that the energy and water consumption of the unit is no greater than, and the energy and water efficiency of the unit is no less than, the consumption or efficiency that is permitted and required by all applicable standards in Section 1605.1, 1605.2, or 1605.3, and that was certified by the manufacturer pursuant to Section 1606(a), the matter shall be closed.

(B) **Performance Is Worse Than Required by Standard or Is Worse Than as Certified by Manufacturer.** If the initial test result indicates that the energy or water consumption of the unit is greater, or the energy or water efficiency of the unit is less, than the consumption or efficiency that is permitted or required by any applicable standard in Section 1605.1, 1605.2, or 1605.3, or that was certified by the manufacturer pursuant to Section 1606(a), the Executive Director shall perform a second test on a second unit, using the applicable test procedure specified in Section 1604.

(2) **Second Test; Mean of Results.** If a second test is performed, the Executive Director shall calculate the mean of the results of the initial test and the second test. Upon completion of the second test, the Executive Director shall inform the manufacturer of the results and shall make a determination as follows:

(A) **Performance Is No Worse Than Required by Standards and Is No Worse Than as Certified by Manufacturer.** If the two test results indicate that the mean energy and water consumption of the two units is no greater than, and the mean energy and water efficiency of the two units is no less than, the consumption and efficiency permitted or required by all applicable standards in Section 1605.1, 1605.2, or 1605.3, and that was certified by the manufacturer pursuant to Section 1606(a), the matter shall be closed.

(B) **Performance is As Required by Standard but is Worse Than as Certified by Manufacturer.** If the two test results indicate that the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than, the consumption or efficiency that was certified by the manufacturer pursuant to Section 1606(a), but that the mean result nevertheless complies with all applicable standards in Section 1605.1, 1605.2, or 1605.3, the Commission shall undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the manufacturer's option, pursuant to Sections 11425.10-11425.60 of the California Government Code). If the Commission determines that the two test results indicate that:

(1) the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than, the consumption or efficiency as reported or certified by the manufacturer pursuant to Section 1606(a), and

(2) the mean result nevertheless complies with all applicable standards in Section 1605.1, 1605.2, or 1605.3, then the Executive Director shall modify the listing of the appliance in the database to reflect accurately the Commission's determination.

(C) **Performance is Not As Required by Standard.** If the two test results indicate that the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than, any applicable standard in Section 1605.1, 1605.2, or 1605.3, the Commission shall undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the manufacturer's option, Sections 11425.10-11425.60 of the California Government Code). If the Commission determines that the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than any applicable standard, the Executive Director shall remove the appliance from the database established pursuant to Section 1606(c).

(3) **Optional Method of Determining Energy or Water Performance.** If, at any time before a Commission determination under Section 1608(e)(2)(B) or 1608(e)(2)(C), the manufacturer so chooses, instead of using the mean-of-two-units approach set forth in Sections 1608(e)(1) and 1608(e)(2), the Executive Director shall test the appliance using the sampling method set forth in 10 CFR Part 430, Appendix B to Subpart F (2008) or 10 CFR Part 431, Appendix A to Subpart K (2008), and shall make the determinations under Sections 1608(e)(1) and 1608(e)(2) based on those test results. The manufacturer shall pay for all such testing.

(f) Costs.

Except as otherwise provided in this Article, all costs of initial tests showing results as described in Section 1608(e)(1)(A) or Section 1608(e)(2)(A) shall be borne by the Commission. All costs of all other tests shall be paid by the manufacturer.

(g) Federally-Regulated Appliances.

If:

(1) the appliance tested is a federally-regulated consumer product or federally-regulated commercial and industrial equipment; and

(2) either:

(A) the test results show that the appliance does not comply with an applicable federal standard or other applicable federal requirement; or

(B) the test results are at variance with the results reported by the manufacturer to the U.S. Department of Energy or the U.S. Federal Trade Commission;

(d) Inspection by the Executive Director of Appliances Subject to Energy Design and Water Design Standards, and Marking Requirements.

(1) The Executive Director shall periodically inspect appliances sold or offered for sale in the state, to determine whether they conform with the applicable energy design and water design standards of Sections 1605.1, 1605.2, and 1605.3, and with the applicable marking requirements of Section 1607.

(2) Inspection of an appliance shall consist of inspection of one unit.

(A) If the inspection indicates that the unit complies with the applicable energy or water design standards and marking requirements, the matter shall be closed.

(B) If the inspection indicates that the unit does not comply with an applicable energy or water design standard or as applicable marking requirement, the Commission shall undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the manufacturer's option, pursuant to Sections 11425.10-11425.60 of the California Government Code). If the Commission confirms the Executive Director's determination, then he or she shall remove the appliance from the database.

(e) Executive Director's Enforcement Testing of Appliances Subject to Energy Efficiency, Energy Consumption, Water Efficiency, and Water Consumption Standards.

The Executive Director shall periodically cause, at laboratories meeting the criteria of Section 1603(a), the testing of appliance units sold or offered for sale in the state, to determine whether the appliances conform with the applicable standards in Sections 1605.1, 1605.2, and 1605.3, and to determine whether their performance is as reported or certified by the manufacturer pursuant to Section 1606(a). Testing shall be performed as follows:

(1) **Initial Test.** The Executive Director shall perform an initial test on one unit, using the applicable test procedure specified in Section 1604. Upon completion of the initial test, the Executive Director shall make a determination as follows:

(A) **Performance Is No Worse Than Required by Standards and Is No Worse Than as Certified by Manufacturer.** If the initial test result indicates that the energy and water consumption of the unit is no greater than, and the energy and water efficiency of the unit is no less than, the consumption or efficiency that is permitted and required by all applicable standards in Section 1605.1, 1605.2, or 1605.3, and that was certified by the manufacturer pursuant to Section 1606(a), the matter shall be closed.

(B) **Performance Is Worse Than Required by Standard or Is Worse Than as Certified by Manufacturer.** If the initial test result indicates that the energy or water consumption of the unit is greater, or the energy or water efficiency of the unit is less, than the consumption or efficiency that is permitted or required by any applicable standard in Section 1605.1, 1605.2, or 1605.3, or that was certified by the manufacturer pursuant to Section 1606(a), the Executive Director shall perform a second test on a second unit, using the applicable test procedure specified in Section 1604.

(2) **Second Test; Mean of Results.** If a second test is performed, the Executive Director shall calculate the mean of the results of the initial test and the second test. Upon completion of the second test, the Executive Director shall inform the manufacturer of the results and shall make a determination as follows:

(A) **Performance Is No Worse Than Required by Standards and Is No Worse Than as Certified by Manufacturer.** If the two test results indicate that the mean energy and water consumption of the two units is no greater than, and the mean energy and water efficiency of the two units is no less than, the consumption and efficiency permitted or required by all applicable standards in Section 1605.1, 1605.2, or 1605.3, and that was certified by the manufacturer pursuant to Section 1606(a), the matter shall be closed.

(B) **Performance is As Required by Standard but is Worse Than as Certified by Manufacturer.** If the two test results indicate that the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than, the consumption or efficiency that was certified by the manufacturer pursuant to Section 1606(a), but that the mean result nevertheless complies with all applicable standards in Section 1605.1, 1605.2, or 1605.3, the Commission shall undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the manufacturer's option, pursuant to Sections 11425.10-11425.60 of the California Government Code). If the Commission determines that the two test results indicate that:

(1) the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than, the consumption or efficiency as reported or certified by the manufacturer pursuant to Section 1606(a), and

(2) the mean result nevertheless complies with all applicable standards in Section 1605.1, 1605.2, or 1605.3, then the Executive Director shall modify the listing of the appliance in the database to reflect accurately the Commission's determination.

(C) **Performance is Not As Required by Standard.** If the two test results indicate that the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than, any applicable standard in Section 1605.1, 1605.2, or 1605.3, the Commission shall undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the manufacturer's option, Sections 11425.10-11425.60 of the California Government Code). If the Commission determines that the mean energy or water consumption of the two units is greater than, or the mean energy or water efficiency of the two units is less than any applicable standard, the Executive Director shall remove the appliance from the database established pursuant to Section 1606(c).

(3) **Optional Method of Determining Energy or Water Performance.** If, at any time before a Commission determination under Section 1608(e)(2)(B) or 1608(e)(2)(C), the manufacturer so chooses, instead of using the mean-of-two-units approach set forth in Sections 1608(e)(1) and 1608(e)(2), the Executive Director shall test the appliance using the sampling method set forth in 10 CFR Part 430, Appendix B to Subpart F (2008) or 10 CFR Part 431, Appendix A to Subpart K (2008), and shall make the determinations under Sections 1608(e)(1) and 1608(e)(2) based on those test results. The manufacturer shall pay for all such testing.

(f) Costs.

Except as otherwise provided in this Article, all costs of initial tests showing results as described in Section 1608(e)(1)(A) or Section 1608(e)(2)(A) shall be borne by the Commission. All costs of all other tests shall be paid by the manufacturer.

(g) Federally-Regulated Appliances.

If:

(1) the appliance tested is a federally-regulated consumer product or federally-regulated commercial and industrial equipment; and

(2) either:

(A) the test results show that the appliance does not comply with an applicable federal standard or other applicable federal requirement; or

(B) the test results are at variance with the results reported by the manufacturer to the U.S. Department of Energy or the U.S. Federal Trade Commission;

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

March 25, 2010

Turbo Air, Incorporated
Attn: Mr. Nelson Lee, Warranty Manager
1250 Victoria Street
Carson, CA 90746

Dear Mr. Lee:

The California Energy Commission instructed BR Laboratories, Inc., to purchase and perform a second test on Turbo Air commercial refrigerator models TSR-23SD and TUR-28SD pursuant to Section 1608(e)(2) of Title 20 of the California Code of Regulations (CCR), following the failure of these models to meet existing standards when tested in December of 2009 (refer to our enclosed letter of December 29, 2009). The test reports are enclosed and a summary of the results are listed below:

Mo. / Yr. of test	Model #	Mo. / Yr. of manufacture	Serial #	Measured volume (Cu Ft)	Maximum energy consumption	Tested daily energy use (kWh per day)[1]	Pass / Fail
Dec-09	TSR-23SD	Jul-08	DR23307063	19.3	3.97	5.105	FAIL
Feb-10	TSR-23SD	May-09	BM2R405003	19.3	3.97	3.132	PASS
Dec-09	TUR-28SD	Jun-09	U200406036	7	2.74	3.612	FAIL
Feb-10	TUR-28SD	Jun-09	U200406028	7	2.74	3.465	FAIL

The mean of the tested daily energy use of the first and second tests of these models was calculated, and appears in the table below:

Model#	Mean of tested daily energy use	Maximum energy consumption	Pass / Fail	Energy use as certified by Turbo Air	
TSR-23SD	4.1185	3.97	FAIL	3.58	12/16/2002
TUR-28SD	3.5385	2.74	FAIL	1.46	1/9/2003

The results indicate that the mean energy consumption is greater than the consumption that was certified by the manufacturer to the Energy Commission pursuant to Section 1606(a) of Title 20 of the CCR, and fails to comply with the existing standard for this appliance. Therefore, per Section 1608(e)(2)(C) of Title 20 of the CCR, the Energy Commission will undertake a proceeding pursuant to Sections 11445.10-11445.60 of the California Government Code for the purpose of removing the above listed models from the Energy Commission's appliance database. You will receive a notice of the proceeding when scheduled.

Please call Energy Commission Senior Staff Counsel Dennis Beck at (916) 654-3974 if you have any questions regarding this process.

[1] The Maximum Daily Energy Consumption standard for commercial reach-in refrigerators built between January 1, 2007 and January 1, 2010 is calculated as follows: 0.1 x Measured Volume. + 2.04

Section 1608(f) of Title 20 of the CCR states that for models that fail to meet applicable standards, the manufacturer is required to pay the costs of purchase and of testing. Enclosed is an invoice from BR Laboratories for the cost of the purchase and testing of the commercial refrigerators listed above. If you have any questions regarding this invoice, please contact Tovah Ealey at tealey@energy.state.ca.us or (916) 651-3003.

Sincerely,

Valerie Hall

VALERIE HALL
Deputy Director
Efficiency and Renewable Energy Division

Enclosures:
Letter of December 29, 2009
Test reports #1002-05 (TSR-23SD) and #1002-06 (TUR-28SD)
Invoice from BR Laboratories, Inc.

cc: Dennis Beck, Senior Legal Counsel, Office of the Chief Counsel
Paula David, Supervisor, Appliance Efficiency Program
Tovah Ealey, Program Manager, Appliance Standards Enforcement
Bodh Subherwal, BR Laboratories

CONTRACT NO.: 400-08-003

REPORT NUMBER: 1002-05
TOTAL PAGES: 8
(including Title and Table of Contents Pages)

TEST REPORT OF TURBO AIR COMMERCIAL REFRIGERATOR, AUTOMATIC DEFROST

MODEL NO. : TSR-23SD
SERIAL NO. : BM2R405003

FEBRUARY 2010

TEST PROCEDURE : Volume measured using ANSI/AHAM HRF-1-2004. Energy Consumption measured using 10CFR 431.64 (2008) [ANSI/ARI Standard 1200-2006, Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets, Section 4.4 (referring to ANSI/ASHRAE Standard 72-2005, Method of Testing Commercial Refrigerators and Freezers)].

PREPARED FOR :

CALIFORNIA ENERGY COMMISSION
1516 Ninth Street, MS 25
Sacramento, CA 95814-5512

Contract Manager : Ms. Tovah G. Ealey
PHONE : (916) 651-3003
FAX : (916) 654-4304

PREPARED BY :

BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- California Energy Commission instructed BR Laboratories to:

  a) purchase a TURBO AIR commercial refrigerator model TSR-23SD from a local warehouse/retail outlet.

  b) test the TURBO AIR TSR-23SD commercial refrigerator in accordance with ANSI/AHAM HRF-1-2004 and 10CFR Section 431.64 (2008). [ANSI/ARI Standard 1200-2006, Section 4 which refers to American National Standard ANSI/ASHRAE 72-2005, Method of Testing Commercial Refrigerators and Freezers (and establish its compliance with mean daily energy consumption requirements of the California Appliance Efficiency Regulations)].

II. APPLIANCE DATA

1. Appliance nameplate data included the following:

Appliance	:	Commercial Refrigerator, Automatic Defrost
Manufacturer	:	TURBO AIR Carson, CA (Made in Korean Plant: Incheon, R.O.K.)
Model No.	:	TSR-23SD
Serial No.	:	BM2R405003
Size, H ×W ×D, inch	:	83 × 27 × 34
Electrical	:	115 V, 1 Phase, 60 HZ, 5.5 Amps.
Refrigerant	:	R-134a, 10.2 oz.
Design Pressures	:	High Side = 312 PSIG Low Side = 140 PSIG
Listing	:	* ETL; Listed, #3091403 * CONFORMS TO UL STD. NO. 471 * CERTIFIED TO CSA STD. C22.2 NO. 120 * NSF®
Manufacturer Claim	:	Insulation is CFC free.
Door(s)	:	(1) Solid door, hinged type
Date of Manufacture	:	---
Markings	:	• DO NOT CLEAN LABEL WITH SOLVENT COMPRESSOR MADE IN KOREA COMPONENTS MADE IN KOREA ASSEMBLED/MADE IN CHINA

2. TURBO AIR commercial refrigerator model TSR-23SD was purchased from the local warehouse/retail outlet "Concord Equipment Co., 1125 S. Anaheim Blvd., Anaheim, CA 92805. Phone: (714) 520-7999." The carton/package carried the address "TURBO Air, 1250 Victoria Street, Carson, CA 91746."

III. TEST METHOD

A self-contained TURBO AIR Commercial Refrigerator, Model TSR-23SD, Serial Number: BM2R405003 was tested in accordance with ANSI/AHAM HRF-1-2004, and 10CFR Section 431.64 (2008) [ANSI/ARI Standard 1200-2006, Section 4.4 - ANSI/ASHRAE Standard 72-2005]. The ANSI/ASHRAE Standard 72-2005 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TSR-23SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TSR-23SD was tested at the thermostat temperature setting of 5/9.

Test Conditions	:	Door Opening every 10 minutes for 8 hours.
		Total = 48 openings
Ambient Temperature	:	75.2 ± 1.8 ºF dry bulb
		64.4 ± 1.8 ºF wet bulb

IV. TEST DATA

a) Measured Volume : 19.3 ft^3

b) Thermostat Setting : 5/9

c) Refrigerant : R-134a

d) Equipment : Refrigerator

- Test Package:
  Average Temp./Integrated Average Temperature (IAT), ^oF = 39.4
  Coldest Test Package Average (CTPA), ^oF = 37.9
  Warmest Test Package Average (WTPA), ^oF = 42.2
- Maximum of Warmest Test Sample, ^oF = 42.9
- Temperatures:
  Test Start, ^oF = 39.4
  Test End, ^oF = 39.4
- Energy Input During Refrigerating Time, kWh/day = 2.364
- Total Energy Input, kWh/day = 3.132
- Percent Compressor Running Time ≃ 26.71
- Ambient Temperatures:

		6" Above Ref.	Middle of Ref.
Dry Bulb, ^oF	:	74.4	74.2
Wet Bulb, ^oF	:	64.1	63.7

- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

- Appliance : Commercial Refrigerator, Automatic Defrost
- Manufacturer : TURBO AIR
- Size, H × W × D, in. : 83 × 27 × 34
- Model No. : TSR-23SD
- Serial No. : BM2R405003
- Style : Reach-in
- Door : (1) Solid door, hinged type
- Illumination Wattage : 40
- Efficacy, LPW : 2.88
- CFC Free : Refrigerant/Compressor Insulation (manufacturer claimed)
- Thermostat Setting : 5/9
- Measured Volume : 19.3 ft^3
- Integrated Average Temp., ºF : 39.4ºF
- Mean Daily Energy Consumption : 3.132 kWh
- CEC Allowed Mean Daily Energy Consumption : $0.1 \times 19.3 + 2.04 \simeq 3.97$ kWh
- Federally Regulated : Yes
- The tested commercial refrigerator met the marking requirements of Section 1607(b) of the California Appliance Efficiency Regulations.

  Comments : PASS

Respectfully Submitted,

Bodh R. Subherwal, P.E.
Technical Manager

Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:
   a) Time
   b) Refrigerator and/or Freezer Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water
   Dummy loads – wooden blocks

5. Type 'T' thermocouples

Note: Instruments are calibrated once a year.

CONTRACT NO.: 400-08-003

REPORT NUMBER: 1002-06
TOTAL PAGES: 8
(including Title and Table of Contents Pages)

TEST REPORT OF TURBO AIR COMMERCIAL UNDERCOUNTER REFRIGERATOR, AUTOMATIC DEFROST

MODEL NO. : TUR-28SD
SERIAL NO. : U200406028

FEBRUARY 2010

TEST PROCEDURE : Volume measured using ANSI/AHAM HRF-1-2004. Energy Consumption measured using 10CFR 431.64 (2008) [ANSI/ARI Standard 1200-2006, Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets, Section 4.4 (referring to ANSI/ASHRAE Standard 72-2005, Method of Testing Commercial Refrigerators and Freezers)].

PREPARED FOR :
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street, MS 25
Sacramento, CA 95814-5512

Contract Manager : Ms. Tovah G. Ealey
PHONE : (916) 651-3003
FAX : (916) 654-4304

PREPARED BY :
BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- California Energy Commission instructed BR Laboratories to:

  a) purchase a TURBO AIR commercial undercounter refrigerator model TUR-28SD from a local warehouse/retail outlet.

  b) test the TURBO AIR TUR-28SD commercial undercounter refrigerator in accordance with ANSI/AHAM HRF-1-2004 and 10CFR Section 431.64 (2008). [ANSI/ARI Standard 1200-2006, Section 4 which refers to American National Standard ANSI/ASHRAE 72-2005, Method of Testing Commercial Refrigerators and Freezers (and establish its compliance with mean daily energy consumption requirements of the California Appliance Efficiency Regulations)].

II. APPLIANCE DATA

1. Appliance nameplate data included the following:

Appliance	:	Commercial Undercounter Refrigerator, Automatic Defrost
Manufacturer	:	TURBO AIR Carson, CA (Made in China)
Model No.	:	TUR-28SD
Serial No.	:	U200406028
Size, H ×W ×D, inch	:	37 × 28 × 31
Electrical	:	115 V, 1 Phase, 60 HZ, 6.6 Amps.
Refrigerant	:	R-134a, 10.2 oz.
Design Pressures	:	High Side = 312 PSIG Low Side = 140 PSIG
Listing	:	* ETL Listed, #3091403 CONFIRMS TO UL STD. No. 471 CERTIFIED TO CSA STD. C22.2 No. 120 * NSF®
Manufacturer Claim	:	Insulation is CFC free.
Door(s)	:	(1) Solid door, hinged type
Date of Manufacture	:	---
Markings	:	• DO NOT CLEAN LABEL WITH SOLVENT • Compressor Made in Korea Components Made in Korea Assembled, Made in China

2. TURBO AIR commercial undercounter refrigerator model TUR-28SD was purchased from the local warehouse/retail outlet "Concord Equipment Co., 1125 S. Anaheim Blvd., Anaheim, CA 92805. Phone: (714) 520-7999." The carton/package carried the address "TURBO Air, 1250 Victoria Street, Carson, CA 91746."

III. TEST METHOD

A self-contained TURBO AIR Commercial Undercounter Refrigerator, Model TUR-28SD, Serial Number: U200406028 was tested in accordance with ANSI/AHAM HRF-1-2004, and 10CFR Section 431.64 (2008) [ANSI/ARI Standard 1200-2006, Section 4.4 - ANSI/ASHRAE Standard 72-2005]. The ANSI/ASHRAE Standard 72-2005 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TUR-28SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TUR-28SD was tested at the thermostat temperature setting of "NORMAL".

Test Conditions	:	Door Opening every 10 minutes for 8 hours.
		Total = 48 openings
Ambient Temperature	:	75.2 ± 1.8 ºF dry bulb
		64.4 ± 1.8 ºF wet bulb

IV. TEST DATA

a) Measured Volume : 7.0 ft^3

b) Thermostat Setting : NORMAL

c) Refrigerant : R-134a

d) Equipment : Refrigerator

- Test Package:
  Average Temp./Integrated Average Temperature (IAT), ^oF = 38.7
  Coldest Test Package Average (CTPA), ^oF = 37.0
  Warmest Test Package Average (WTPA), ^oF = 43.3
- Maximum of Warmest Test Sample, ^oF = 43.4
- Temperatures:
  Test Start, ^oF = 39.2
  Test End, ^oF = 38.6
- Energy Input During Refrigerating Time, kWh/day = 2.927
- Total Energy Input, kWh/day = 3.465
- Percent Compressor Running Time ≃ 36.94
- Ambient Temperatures:

		6" Above Ref.	Middle of Ref.
Dry Bulb, ^oF	:	74.3	73.9
Wet Bulb, ^oF	:	64.1	63.5

- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

- Appliance : Commercial Undercounter Refrigerator, Automatic Defrost
- Manufacturer : TURBO AIR
- Size, H × W × D, in. : 37 × 28 × 31
- Model No. : TUR-28SD
- Serial No. : U200406028
- Style : Undercounter
- Door : (1) Solid door, hinged type
- Illumination Wattage : None
- Efficacy, LPW : ---
- CFC Free : Refrigerant/Compressor Insulation (manufacturer claimed)
- Thermostat Setting : NORMAL
- Measured Volume : 7.0 ft^3
- Integrated Average Temp., ºF : 38.7ºF
- Mean Daily Energy Consumption : 3.465 kWh
- CEC Allowed Mean Daily Energy Consumption : $0.1 \times 7.0 + 2.04 \simeq 2.74$ kWh
- Federally Regulated : Yes
- The tested commercial refrigerator met the marking requirements of Section 1607(b) of the California Appliance Efficiency Regulations.

  Comments : FAIL

Respectfully Submitted,

Bodh R. Subherwal, P.E.
Project Manager

Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:
   a) Time
   b) Refrigerator and/or Freezer Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water
   Dummy loads – wooden blocks

5. Type 'T' thermocouples

Note: Instruments are calibrated once a year.

INVOICE

BR LABORATORIES, INC.

Research – Product Development – Consulting
Energy and Emission Analysis
P.O. Box 1249
Huntington Beach, CA 92647
Phone: (714) 891-0206
Fax: (714) 893-0818

INVOICE NO.	**1003-02 (TA/CEC)**
FEDERAL I.D. NO.	95-3526117

SOLD TO:

ACCOUNTS PAYABLE
TURBO AIR, INC.
1250 Victoria Street
Carson, CA 90746
ATTN: % California Energy Commission
Phone: (916) 651-3003

SHIP TO:

CUSTOMER P.O. #	SALESMAN	TERMS	DATE SHIPPED	SHIPPED VIA	F.O.B.	DATE
		Net 15				**03-20-10**

Quantity	SERVICES RENDERED/ITEMS	Rate/ Unit, Hour	TOTAL
	Professional Engineering Services for :		
	ANSI/ARI 1200-2006 Test of "TURBO AIR" Commercial Refrigerator and Refrigerator Comm. Undercounter: (SECOND TEST)		
	• **Model TUR-28SD . . . . . .**		**$ 2,110.00**
	• **Model TSR-23SD . . . . . .**		**$ 2,110.00**
	• **Equipment/Refrigerators Cost . . . . . .**		**$ 2,964.52**
	TOTAL DUE		**$ 7,184.52**
	RE: BRL Report Nos.: 1002-05 & 1002-06.		

WE APPRECIATE YOUR BUSINESS!

Concord Equipment Co.

1125 S. ANAHEIM
ANAHEIM, CA 92805
714.520.7999
714.520.8333

Work Order

Work Order #:	607
Account #:	714-891-0206
Page:	1 of 1
Date:	2/3/2010
Time:	2:07:00 PM
Cashier:	1
Register #:	1

Bill To: BODH SUBHERWAL
BR LABORATORIES INC.
P.O. BOX 1249
HUNTINGTON BEACH, CA 92647
714-891-0206

Ship To: BODH SUBHERWAL
BR LABORATORIES INC.
15161 TRITON LANE
HUNTINGTON BEACH, CA 92649
714-891-0206

PAID
CHECK # 5758

Reference: C.O.D.
Comment: CHECK ON DELIVERY

Rep	Item Lookup Code	Description	Quantity	Price	Extended
	143150	REFRIGERATOR UNDERCOUNTER 27"	1	$1,038.00	$1,038.00
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		
	143000	REFRIGERATOR 1 S/S DR S/D	1	$1,688.00	$1,688.00
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		
	002	STANDARD LOCAL DELIVERY	1	$55.00	$55.00
		Discount		($55.00)	($55.00)
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		

REC'D : 2-4-10

Thank you for shopping
Concord Equipment Co.
Please come again!
No Returns/Exchanges on
Special Order Items

Sub Total	$2,726.00
Sales Tax	$238.52
Total	$2,964.52
Deposit Payment	$0.00
Total Purchased	$0.00
Total Due	$0.00
Change Due	$0.00
Remaining Deposit	$0.00
New Balance	$2,964.52

607

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

December 29, 2009

Turbo Air, Incorporated
Attn: Mr. Nelson Lee, Warranty Manager
1250 Victoria Street
Carson, CA 90746

Dear Mr. Lee:

The Appliance Efficiency Regulations[1] state that the Executive Director of the California Energy Commission shall periodically cause, at laboratories meeting the criteria of Title 20, Section 1603(a), of the California Code of Regulations, the testing of regulated appliances sold or offered for sale in California, to determine whether the appliances conform with the applicable standards in Section 1605.3, and to determine whether their performance is as reported or certified by the manufacturer pursuant to Section 1606(a).

In April of 2009 it was brought to our attention that Turbo Air reported to three regulatory agencies (including the Energy Commission) wide variances in the measured volumes and tested daily energy usages of three of its commercial refrigerator models (TSR-23SD, TSR-49SD and TUR-28SD). Attached is our May 18, 2009 letter reporting to you those variances.

We instructed BR Laboratories, Inc. to purchase and test three new Turbo Air commercial refrigerators (models TSR-23SD, TSR-49SD, and TUR-28SD) in order to confirm the energy consumption that Turbo Air provided when certifying its models to the Energy Commission. The commercial refrigerator volume was measured utilizing ANSI/ARI HRF-1-2004. Energy consumption was measured using Title 10, Section 431.64 of the Code of Federal Regulations (CFR) (2008). The results of the testing are summarized below. Copies of the test reports are enclosed.

Model #	Month/Year Manufactured	Measured volume (Cu Ft)	Tested Daily Energy Use (kWh per day)	Maximum energy consumption	Pass / Fail
TSR-23SD	July 2008	19.3	5.105	3.97	Fail
TSR-49SD	July 2009	44.0	5.179	6.44	Pass
TUR-28SD	June 2009	7.0	3.612	2.74	Fail

Model TSR-49SD

The test indicates that this model's daily energy use is better than that listed for this model in the Energy Commission's database of certified appliances. If Turbo Air would like to update the information in the Energy Commission's database using the data from this test report, please follow the steps in the section entitled "Making Changes and Deletions" in the general certification instructions found at:
http://www.energy.ca.gov/appliances/database/CERTIFICATION_DATA_SUBMITTAL_GENERAL_INSTRUCTIONS.PDF

[1] Title 20, Sections 1601-1608, of the California Code of Regulations.

Models TSR-23SD and TUR-28SD

These commercial refrigerators exceed the maximum daily energy consumption rates for units of their size in measured volume and date of manufacture. Therefore, they failed to meet the current California standard.

Section 1608(e)(2) requires that a second test be performed on a second unit of each model whenever the performance of an initially tested model is worse than required by standard, or is worse than as certified by the manufacturer. Within 30 days we will instruct BR Laboratories to purchase and test new Turbo Air models TSR-23SD and TUR-28SD.

Section 1608(e)(3) allows you the alternative of requesting that we perform a test of these appliances using the sampling method set forth in 10 CFR Part 430 Appendix B to Subpart F (2008). Please let us know prior to January 26, 2010 if you want the Energy Commission to utilize this optional method of determining energy performance. Should the second tests confirm that these models do not meet the applicable standards, pursuant to Section 1608(f) Turbo Air will be required to pay for both the initial and second tests. Invoices for the initial tests are enclosed.

Please note that on January 1, 2010 these commercial refrigerators will become federally regulated, and the appropriate federal agency will be notified by the Energy Commission when commercial refrigerators are tested and found to be noncompliant. The federal standard taking effect on January 1, 2010 is identical to the California standard in effect since January 1, 2006.

If you have any questions about this matter, you may contact me at the number and e-mail address listed below.

Sincerely,

Tovah Ealey

Tovah Ealey, Program Manager
Appliance Standards Enforcement
Appliances and Process Energy Office
(916) 651-3003
tealey@energy.state.ca.us

Enclosures

cc: Valerie Hall, Deputy Director, Efficiency & Renewable Energy Division
Paula David, Supervisor, Appliance Efficiency Program
Dennis Beck, Senior Staff Counsel, Office of the Chief Counsel
Betty Chrisman, Program Manager, Compliance Unit
Bodh Subherwal, BR Laboratories

INVOICE

BR LABORATORIES, INC.

Research – Product Development – Consulting
Energy and Emission Analysis
P.O. Box 1249
Huntington Beach, CA 92647
Phone: (714) 891-0206
Fax: (714) 893-0818

INVOICE NO.	0912-03 (TA/CEC)
FEDERAL I.D. NO.	95-3526117

SOLD TO:

ACCOUNTS PAYABLE
TURBO AIR, INC.
1250 Victoria Street
Carson, CA 90746
ATTN: % California Energy Commission
Phone: (916) 651-3003

SHIP TO:

CUSTOMER P.O. #	SALESMAN	TERMS	DATE SHIPPED	SHIPPED VIA	F.O.B.	DATE
		Net 15				**12-20-09**

Quantity	SERVICES RENDERED/ITEMS	Rate/ Unit, Hour	TOTAL
	Professional Engineering Services for :		
	ANSI/ARI 1200-2006 Test of "TURBO AIR" Commercial Refrigerator and Refrigerator Comm. Undercounter:		
	• **Model TUR-28SD**		**$ 2,110.00**
	• **Model TSR-23SD**		**$ 2,110.00**
	• **Equipment/Refrigerators Cost**		**$ 2,964.52**
	TOTAL DUE		**$ 7,184.52**
	RE: BRL Report Nos.: 0912-08 & 0912-11, and BRL Letter dated January 13, 2009.		

WE APPRECIATE YOUR BUSINESS!

Concord Equipment Co.

INVOICE/**Work Order**

1125 S. ANAHEIM
ANAHEIM, CA 92805
714.520.7999
714.520.8333

Contact: Grace

Work Order #:	570
Account #:	714-891-0206
Page:	1 of 1
Date:	11/24/2009
Time:	9:43:57 AM
Cashier:	1
Register #:	1

Bill To: BODH SUBHERWAL
BR LABORATORIES INC.
P.O. BOX 1249
HUNTINGTON BEACH, CA 92647
714-891-0206

Ship To: BODH SUBHERWAL
BR LABORATORIES INC.
15161 TRITON LANE
HUNTINGTON BEACH, CA 92649
714-891-0206

Reference: C.O.D.
Comment: PLEASE MAKE CHECK PAYABLE TO: CONCORD EQUIPMENT

Rep	Item Lookup Code	Description	Quantity	Price	Extended
	143000	TSR-23SD REFRIGERATOR 1 S/S DR S/D	1	$1,688.00	$1,688.00
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		
	143010	REFRIGERATOR 2 S/S DR S/D	1	$2,458.00	$2,458.00
		Quantity RTD: TSR-49SD	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		
	143150	REFRIGERATOR UNDERCOUNTER 27" TUR-28SD	1	$1,038.00	$1,038.00
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		
	002	STANDARD LOCAL DELIVERY	1	$55.00	$55.00
		Discount		($55.00)	($55.00)
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		
		delivery tuesday approx. 11 a. 12/1/09	1	$0.00	$0.00
		Quantity RTD:	0		
		Quantity On Order:	1		
		Quantity Picked Up:	0		

CEC

TSR-49SD
$2,458.00
8.75% S.T. 215.08
$ 2,673.08

TSR-23SD+TUR-28SD
$1,688.00 + 1,038.00
= $ 2,726.00
8.75% S.T 238.52
2,964.52

← TURBO AIR

Thank you for shopping
Concord Equipment Co.
Please come again!
No Returns/Exchanges on
Special Order Items

Sub Total	$5,184.00
8.75% Sales Tax	$453.60
Total	$5,637.60
Deposit Payment	$0.00
Total Purchased	$0.00
Total Due	$0.00
Change Due	$0.00
Remaining Deposit	$0.00
New Balance	$5,637.60

570

Chk # 5604
12-1-09

CONTRACT NO.: 400-08-003

REPORT NUMBER: 0912-11
TOTAL PAGES: 8
(including Title and Table of Contents Pages)

TEST REPORT OF TURBO AIR COMMERCIAL REFRIGERATOR, AUTOMATIC DEFROST

MODEL NO. : TSR-23SD
SERIAL NO. : DR23307063

DECEMBER 2009

TEST PROCEDURE : Volume measured using ANSI/AHAM HRF-1-2004. Energy Consumption measured using 10CFR 431.64 (2008) [ANSI/ARI Standard 1200-2006, Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets, Section 4.4 (referring to ANSI/ASHRAE Standard 72-2005, Method of Testing Commercial Refrigerators and Freezers)].

PREPARED FOR :
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street, MS 25
Sacramento, CA 95814-5512

Contract Manager : Ms. Tovah G. Ealey
PHONE : (916) 651-3003
FAX : (916) 654-4304

PREPARED BY :
BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- California Energy Commission instructed BR Laboratories to:

  a) purchase a TURBO AIR commercial refrigerator model TSR-23SD from a local warehouse/retail outlet.

  b) test the TURBO AIR TSR-23SD commercial refrigerator in accordance with ANSI/AHAM HRF-1-2004 and 10CFR Section 431.64 (2008). [ANSI/ARI Standard 1200-2006, Section 4 which refers to American National Standard ANSI/ASHRAE 72-2005, Method of Testing Commercial Refrigerators and Freezers (and establish its compliance with mean daily energy consumption requirements of the California Appliance Efficiency Regulations)].

II. APPLIANCE DATA

1. Appliance nameplate data included the following:

Appliance	:	Commercial Refrigerator, Automatic Defrost
Manufacturer	:	TURBO AIR Carson, CA (Made in Korean Plant: Incheon, R.O.K.)
Model No.	:	TSR-23SD
Serial No.	:	DR23307063
Size, H ×W ×D, inch	:	83 × 27 × 34
Electrical	:	115 V, 1 Phase, 60 HZ, 5.5 Amps.
Refrigerant	:	R-134a, 7.76 oz.
Design Pressures	:	High Side = 256 PSIG Low Side = 92 PSIG
Listing	:	* UL; Listed Commercial Refrigerator and/or Freezer, 438K * NSF®
Manufacturer Claim	:	Insulation is CFC free.
Door(s)	:	(1) Solid door, hinged type
Date of Manufacture	:	---
Markings	:	• DO NOT CLEAN LABEL WITH SOLVENT

2. TURBO AIR commercial refrigerator model TSR-23SD was purchased from the local warehouse/retail outlet "Concord Equipment Co., 1125 S. Anaheim Blvd., Anaheim, CA 92805. Phone: (714) 520-7999." The carton/package carried the address "TURBO Air, 1250 Victoria Street, Carson, CA 91746."

III. TEST METHOD

A self-contained TURBO AIR Commercial Refrigerator, Model TSR-23SD, Serial Number: DR23307063 was tested in accordance with ANSI/AHAM HRF-1-2004, and 10CFR Section 431.64 (2008) [ANSI/ARI Standard 1200-2006, Section 4.4 - ANSI/ASHRAE Standard 72-2005]. The ANSI/ASHRAE Standard 72-2005 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TSR-23SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TSR-23SD was tested at the thermostat temperature setting of 5/9.

Test Conditions	:	Door Opening every 10 minutes for 8 hours.
		Total = 48 openings
Ambient Temperature	:	75.2 ± 1.8 ºF dry bulb
		64.4 ± 1.8 ºF wet bulb

IV. TEST DATA

a) Measured Volume : 19.3 ft^3

b) Thermostat Setting : 5/9

c) Refrigerant : R-134a

d) Equipment : Refrigerator

- Test Package:
  Average Temp./Integrated Average Temperature (IAT), ^oF = 39.5
  Coldest Test Package Average (CTPA), ^oF = 36.7
  Warmest Test Package Average (WTPA), ^oF = 44.0
- Maximum of Warmest Test Sample, ^oF = 44.3
- Temperatures:
  Test Start, ^oF = 39.6
  Test End, ^oF = 39.6
- Energy Input During Refrigerating Time, kWh/day = 3.910
- Total Energy Input, kWh/day = 5.105
- Percent Compressor Running Time ≃ 43.99
- Ambient Temperatures:

		6" Above Ref.	Middle of Ref.
Dry Bulb, ^oF	:	74.7	74.0
Wet Bulb, ^oF	:	63.1	63.6

- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

- Appliance : Commercial Refrigerator, Automatic Defrost
- Manufacturer : TURBO AIR
- Size, H × W × D, in. : 83 × 27 × 34
- Model No. : TSR-23SD
- Serial No. : DR23307063
- Style : Reach-in
- Door : (1) Solid door, hinged type
- Illumination Wattage : 40
- Efficacy, LPW : 2.80
- CFC Free : Refrigerant/Compressor Insulation (manufacturer claimed)
- Thermostat Setting : 5/9
- Measured Volume : 19.3 ft^3
- Integrated Average Temp., ºF : 39.5ºF
- Mean Daily Energy Consumption : 5.105 kWh
- CEC Allowed Mean Daily Energy Consumption : $0.1 \times 19.3 + 2.04 \simeq 3.97$ kWh
- Federally Regulated : No
- The tested commercial refrigerator met the marking requirements of Section 1607(b) of the California Appliance Efficiency Regulations.

  Comments : FAIL

Respectfully Submitted,

Bodh R. Subherwal, P.E.
Technical Manager

Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:
   a) Time
   b) Refrigerator and/or Freezer Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water
   Dummy loads – wooden blocks

5. Type 'T' thermocouples

Note: Instruments are calibrated once a year.

CONTRACT NO.: 400-08-003

REPORT NUMBER: 0912-09
TOTAL PAGES: 8
(including Title and Table of Contents Pages)

TEST REPORT OF TURBO AIR COMMERCIAL UNDERCOUNTER REFRIGERATOR, AUTOMATIC DEFROST

MODEL NO. : TUR-28SD
SERIAL NO. : U200406036

DECEMBER 2009

TEST PROCEDURE : Volume measured using ANSI/AHAM HRF-1-2004. Energy Consumption measured using 10CFR 431.64 (2008) [ANSI/ARI Standard 1200-2006, Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets, Section 4.4 (referring to ANSI/ASHRAE Standard 72-2005, Method of Testing Commercial Refrigerators and Freezers)].

PREPARED FOR :
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street, MS 25
Sacramento, CA 95814-5512

Contract Manager : Ms. Tovah G. Ealey
PHONE : (916) 651-3003
FAX : (916) 654-4304

PREPARED BY :
BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- California Energy Commission instructed BR Laboratories to:

  a) purchase a TURBO AIR commercial undercounter refrigerator model TUR-28SD from a local warehouse/retail outlet.

  b) test the TURBO AIR TUR-28SD commercial undercounter refrigerator in accordance with ANSI/AHAM HRF-1-2004 and 10CFR Section 431.64 (2008). [ANSI/ARI Standard 1200-2006, Section 4 which refers to American National Standard ANSI/ASHRAE 72-2005, Method of Testing Commercial Refrigerators and Freezers (and establish its compliance with mean daily energy consumption requirements of the California Appliance Efficiency Regulations)].

II. APPLIANCE DATA

1. Appliance nameplate data included the following:

Appliance	:	Commercial Undercounter Refrigerator, Automatic Defrost
Manufacturer	:	TURBO AIR Carson, CA (Made in China)
Model No.	:	TUR-28SD
Serial No.	:	U200406036
Size, H ×W ×D, inch	:	37 × 28 × 31
Electrical	:	115 V, 1 Phase, 60 HZ, 6.6 Amps.
Refrigerant	:	R-134a, 10.2 oz.
Design Pressures	:	High Side = 312 PSIG Low Side = 140 PSIG
Listing	:	* ETL Listed, Commercial Refrigerator, #3091403 CONFIRMS TO UL STD. No. 471 CERTIFIED TO CSA STD. C22.2 No. 120 * NSF®
Manufacturer Claim	:	Insulation is CFC free.
Door(s)	:	(1) Solid door, hinged type
Date of Manufacture	:	---
Markings	:	• DO NOT CLEAN LABEL WITH SOLVENT • Compressor Made in Korea Components Made in Korea Assembled, Made in China

2. TURBO AIR commercial undercounter refrigerator model TUR-28SD was purchased from the local warehouse/retail outlet "Concord Equipment Co., 1125 S. Anaheim Blvd., Anaheim, CA 92805. Phone: (714) 520-7999." The carton/package carried the address "TURBO Air, 1250 Victoria Street, Carson, CA 91746."

III. TEST METHOD

A self-contained TURBO AIR Commercial Undercounter Refrigerator, Model TUR-28SD, Serial Number: U200406036 was tested in accordance with ANSI/AHAM HRF-1-2004, and 10CFR Section 431.64 (2008) [ANSI/ARI Standard 1200-2006, Section 4.4 - ANSI/ASHRAE Standard 72-2005]. The ANSI/ASHRAE Standard 72-2005 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TUR-28SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TUR-28SD was tested at the thermostat temperature setting of "NORMAL".

Test Conditions	:	Door Opening every 10 minutes for 8 hours.
		Total = 48 openings
Ambient Temperature	:	75.2 ± 1.8 ºF dry bulb
		64.4 ± 1.8 ºF wet bulb

IV. TEST DATA

a) Measured Volume : 7.0 ft^3

b) Thermostat Setting : NORMAL

c) Refrigerant : R-134a

d) Equipment : Refrigerator

- Test Package:
  Average Temp./Integrated Average Temperature (IAT), ^oF = 38.8
  Coldest Test Package Average (CTPA), ^oF = 37.7
  Warmest Test Package Average (WTPA), ^oF = 41.0
- Maximum of Warmest Test Sample, ^oF = 41.7
- Temperatures:
  Test Start, ^oF = 38.9
  Test End, ^oF = 39.2
- Energy Input During Refrigerating Time, kWh/day = 3.204
- Total Energy Input, kWh/day = 3.612
- Percent Compressor Running Time ≃ 43.99
- Ambient Temperatures:

		6" Above Ref.	Middle of Ref.
Dry Bulb, ^oF	:	74.7	74.1
Wet Bulb, ^oF	:	63.2	63.6

- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

- Appliance : Commercial Undercounter Refrigerator, Automatic Defrost
- Manufacturer : TURBO AIR
- Size, H × W × D, in. : 37 × 28 × 31
- Model No. : TUR-28SD
- Serial No. : U200406036
- Style : Undercounter
- Door : (1) Solid door, hinged type
- Illumination Wattage : None
- Efficacy, LPW : ---
- CFC Free : Refrigerant/Compressor Insulation (manufacturer claimed)
- Thermostat Setting : NORMAL
- Measured Volume : 7.0 ft^3
- Integrated Average Temp., ºF : 38.8ºF
- Mean Daily Energy Consumption : 3.612 kWh
- CEC Allowed Mean Daily Energy Consumption : $0.1 \times 7.0 + 2.04 \simeq 2.74$ kWh
- Federally Regulated : No
- The tested commercial refrigerator met the marking requirements of Section 1607(b) of the California Appliance Efficiency Regulations.

  Comments : FAIL

Respectfully Submitted,

Bodh R. Subherwal, P.E.
Project Manager

Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:
   a) Time
   b) Refrigerator and/or Freezer Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water
   Dummy loads – wooden blocks

5. Type 'T' thermocouples

Note: Instruments are calibrated once a year.

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

May 18, 2009

Mr. Nelson Lee, Manager
Turbo Air, Inc.
Attn: Mr. Nelson Lee, Manager
1250 Victoria Street
Carson, CA 90746

Dear Mr. Lee:

It has come to our attention that there may be discrepancies in the total volume data and energy consumption values that Turbo Air, Inc. has reported to the California Energy Commission (Energy Commission) and to other agencies for three of its commercial refrigerators. Some of the reported energy consumption values for this type of appliance may not meet the standard found in Title 20 of the California Code of Regulations. These appliances are classified as commercial refrigerators with solid hinged doors and with automatic defrost. Appliances of this style that are manufactured on or after August 17, 1987 may not be sold or offered for sale in California unless the manufacturer has submitted specified data to the Energy Commission. Furthermore, these products must also meet applicable energy consumption standards that went into effect on March 1, 2003; and in all instances the appliance must appear in the Energy Commission's database of certified appliances before being sold or offered for sale.

The disparate values for the following models were reported to the Energy Commission, National Resources Canada (NRCan), the federal ENERGY STAR® program, and the Food Service Technology Center (FSTC).

Model #	Total volume (Cu Ft)	Daily Energy Use (KWH)	Where Reported	CA Daily Std (KWH)[1]
TSR-23SD	21.10	3.58	Energy Commission	4.15
	22.99	5.148	NRCan	
	---	---	ENERGY STAR®	
	---	---	FSTC	
TSR-49SD	46.00	6.12	Energy Commission	6.64
	49.00	7.652	NRCan	
	49.00	5.3	ENERGY STAR®	
	---	---	FSTC	
TUR-28SD	6.90	1.46	Energy Commission	2.73
	7.29	3.218	NRCan	
	---	---	ENERGY STAR®	
	6.9	1.46	FSTC	

[1] Based on volume as reported to the Energy Commission

Please contact me at (916) 651-3003 or tealey@energy.state.ca.us no later than June 3, 2009 to acknowledge receipt of this letter, and provide the following:

- The actual total tested volume (in cubic feet) and actual energy consumption values for the three models listed above.
- Copies of the latest test reports for these three models.
- A description of why the reported values above differ from this data.

Section 1608 of the *Appliance Efficiency Regulations* gives the Energy Commission the authority to periodically inspect and test appliances that are sold or offered for sale to determine whether the appliances conform to applicable standards. If the information that you submit is inconclusive or the discrepancies cannot be resolved, the Energy Commission will commence with such inspection and testing of these units.

Thank you for your cooperation. If you have any questions, please feel free to contact me at the phone number or e-mail address listed below.

Sincerely,

Tovah Ealey

TOVAH EALEY, Program Manager
Appliance Standards Enforcement
Appliances and Process Energy Office
(916) 651-3003
tealey@energy.state.ca.us

Cc: Dennis Beck, Senior Staff Counsel, Office of the Chief Counsel
Valerie Hall, Deputy Director, Energy Efficiency and Renewable Energy Division
Tim Tutt, Manager, Appliances and Process Energy Office
Betty Chrisman, Program Manager, Compliance Unit, Appliance Efficiency Program

From: "Nelson" <nelson@turboairinc.com>
To: TEaley@energy.state.ca.us
Date: 7/15/2009 5:25 PM
Subject: RE: Our letter of May 18, 2009 - Turbo Air
Attachments: Test Report(BR Lab) - TSR-23SD(Dec 2002).pdf; Test Report(BR Lab) - TSR-49S D(Nov 2002).pdf; Test Report(BR Lab) - TUR-28SD(Dec 2002).pdf; Test Report(QPS, Canada) - TSR-23SD(12-20-2007).pdf; Test Report(QPS, Canada) - TSR-49S D(April 14, 2008).pdf; Test Report(QPS, Canada) - TUR-28SD(April 14, 2008). pdf; Spec sheet - TSR-23 & 49SD(1).jpg; Spec sheet - TSR-23 & 49SD(2).jpg; Spec sheet - TUR-28SD(1).jpg; Spec sheet - TUR-28SD(2).jpg

Hi Tovah,
Thanks for the summary below.
1) Internal volume(Cu Ft)

	BR Lab	QPS(Canada)	Factory(Measured by Autocad)
- TUR-28SD	6.9	7.29	7.38
- TSR-23SD	21.1	22.99	20.55
- TSR-49SD	46	49	45.23

- Reason of Discrepancy : The factory had not informed any technical data to test labs above. It looks two test labs measured internal volume by their own way.

2) Daily energy use(Kwh)

	BR Lab	QPS(Canada)	Factory
- TUR-28SD	1.46	3.218	Under test
- TSR-23SD	3.58	5.148	Under test
- TSR-49SD	6.12	7.652	Under test

- Reason of Discrepancy : The factory had not informed any technical data to test labs above. And it looked two test labs got above results by their own way of test. Please find the test reports done by above two labs for these three units. And I also attached spec sheets.

Please let me know, if you have further questions.
Thanks and regards,
Nelson.

-----Original Message-----
From: Tovah Ealey [mailto:TEaley@energy.state.ca.us]
Sent: Tuesday, July 14, 2009 10:58 AM
To: Nelson
Subject: RE: Our letter of May 18, 2009

Mr. Lee:

This will confirm that I have received your e-mail message of 7/9/09. Per our phone conversation this morning, we agreed that you would send to me the following information:

1. Copies of the test reports upon which Turbo Air based its certification of commercial refrigerator models TSR-23SD, TSR-49SD, and TUR-28SD.
2. Specifications for the three models listed above.
3. A brief explanation of how the discrepancies noted in my letter of May 18th came about.

Please send this information as soon as possible, so that I may review them. Thank you.

Best regards,

Tovah G. Ealey
Energy Commission Specialist I
California Energy Commission
(916) 651-3003

>>> "Nelson" <nelson@turboairinc.com> 7/14/2009 10:12 AM >>>
Dear Tovah,
Did you receive my memo below? Can you please advise me regarding my questions below?
Thanks and have a good day.
Nelson.

-----Original Message-----
From: Nelson [mailto:nelson@turboairinc.com]
Sent: Thursday, July 09, 2009 3:49 PM
To: 'Tovah Ealey'
Subject: RE: Our letter of May 18, 2009

Hi Tovah,
First of all, sorry for the late reply. I have spoken to engineers in the factory in regards to the volume and power consumption difference on those 3 units. What I heard from them is that they had not informed those test labs any information prior to actual tests. I believe BR lab in CA and QUP in Canada measured internal volumes by their own way. And power consumptions as well.

I could say internal volume for those units could be different by measuring tool or person. And there are not that big differences. However as you pointed that power consumption is quite a different by test lab.

We do not have test reports from other test labs.

Can you please kindly advise me how I proceed this case? Do I need to hire another test lab or have our own engineers in the factory test those units to get correct numbers (Total volume and energy consumption)?
If we need to hire another test lab, can you please recommend another authorized test lab that you can trust? Or can you accept test reports done by our own factory?

Sorry for too many questions however we want to correct this discrepancy in right way.

Thanks and regards,

Nelson.

-----Original Message-----

From: Tovah Ealey [mailto:TEaley@energy.state.ca.us]
Sent: Wednesday, July 01, 2009 11:10 AM
To: Nelson
Subject: RE: Our letter of May 18, 2009

Mr. Lee:

Thank you for your response. What we need to know as soon as possible is:

- The actual total tested volume (in cubic fee) and actual energy consumption values for the three models.
- Copies of the latest test reports that you have on hand for the three models.
- A description explaining the disparity in the report values for the three models.

Is this information something that you can provide without retesting the units?

Tovah G. Ealey
Energy Commission Specialist I
California Energy Commission
(916) 651-3003

>>> "Nelson" <nelson@turboairinc.com> 6/29/2009 4:47 PM >>>
Dear Tovah,
Our factory is under testing those three units. As soon as I get positive result, I will send them to BR Lab to get a test under the new criteria. Can you please advise me whether you have dead line for the improvement?

Thanks and regards,

Nelson.

-----Original Message-----
From: Tovah Ealey [mailto:TEaley@energy.state.ca.us]
Sent: Monday, June 29, 2009 3:34 PM
To: nelson@turboairinc.com
Subject: Our letter of May 18, 2009

Good afternoon, Mr. Lee:

I am writing to follow up on my letter to you dated May 18, 2009 concerning the discrepancies in the reported daily energy use of three of Turbo Air's commercial refrigerator models. I've attached a copy of the original letter for your review.

Please advise me of the status of Turbo Air's response to our inquiry. Thank you.

Best regards,

Tovah G. Ealey
Energy Commission Specialist I
California Energy Commission
(916) 651-3003

BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647
(714) 891-0206
(714) 893-0818 FAX

REPORT NUMBER: 0212-03
TOTAL PAGES: 8
(Including Title Page and Table of Contents Page)

TEST REPORT ON "TURBO AIR" COMMERCIAL REFRIGERATOR AUTOMATIC DEFROST

Model No. : TSR-23SD
Serial No. : BC2R0185

DECEMBER 2002

TEST PROCEDURE : Standard ANSI/ASHRAE 117-1992 Method of Testing Self Service Closed Refrigerators for Food Stores.

PREPARED FOR :
TURBO AIR, INC.
3088 Walnut Avenue
Long Beach, CA 90807

CONTACT : Mr. Jay Lee
PHONE : (562) 981-0123 ext.108
FAX : (562) 988-8172

PREPARED BY :
BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA. 92649

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- BR Laboratories was supplied with and instructed by TURBO AIR, INC. to:

- Test the "TURBO AIR" TSR-23SD commercial refrigerator in accordance with American National Standard ANSI/ASHRAE 117-1992, Method of Testing Self-Service Closed Refrigerators for Food Stores.

II. COMMERCIAL REFRIGERATOR

1. Appliance nameplate data included the following:

Appliance	:	Commercial Refrigerator, Automatic Defrost.
Manufacturer	:	TURBO AIR, INC. 3088 Walnut Avenue Long Beach, CA 90807 (Made in Korea)
Model No.	:	TSR-23SD
Serial No.	:	BC2R0185
Size, H×W×D, inch	:	77.9 × 27.0 × 30.8
Electrical	:	115 V, 1 Phase, 60 HZ, 5.5 Amps
Refrigerant	:	R134a, 7.76 oz.
Design Pressures	:	High Side = 256 PSI Low Side = 92 PSI
Listing	:	* UL, 438K, NSF
Marking Label	:	* USE OF OTHER THAN SPECIFIED REFRIGERANT VOIDS WARRANTY
Manufacturer Claim	:	Insulation is CFC free.
Style	:	Reach-in (Single solid doors)

2. The manufacturer, "TURBO AIR", supplied a commercial refrigerator Model TSR-23SD. The contact person is Mr. Jay Lee, with phone no.: (568) 981-0123 ext.108. The package carried the address: "TURBO AIR", 3088 Walnut Avenue, Long Beach, CA 90807.

III. TEST PARAMETERS

A self-contained "TURBO AIR" commercial refrigerator, model TSR-23SD, serial number BC2R0185 was tested in accordance with ANSI/ASHRAE Standard 117-1992. The ANSI/ASHRAE Standard 117-1992 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TSR-23SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TSR-23SD was tested at the thermostat temperature 5/9.

Test Conditions	:	Door Opening every 10 minutes for 8 consecutive hours Total = 48 openings
Ambient Temp	:	75 ± 2 °F dry bulb 64 ± 2 °F wet bulb

IV. TEST DATA

a) Measured Volume : 21.1 ft³

b) Thermostat Setting : 5 (max. 9)

Refrigerant : R134a

- Equipment : Refrigerator
- Test Package :
  - Integrated Average Temperature (IAT), °F = 37.9
  - Coldest Test Package Average (CTPA), °F = 36.5
  - Warmest Test Package Average (WTPA), °F = 41.8
- Maximum of Warmest Test Sample, °F = 42.3
- Temperatures:
  - Test Start, °F = 36.9
  - Test End, °F = 37.0
- Energy Input During Refrigerating Time, kWh/day = 3.58
- Total Energy Input, kWh/day = 3.55
- Percent Compressor Running Time = 33.01
- Ambient Temperatures:
  - Dry Bulb, °F : 75.2
  - Wet Bulb, °F : 64.4
- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

- Appliance/Equipment : Commercial Refrigerator, Automatic Defrost
- Size, H x W x D, in. : 77.9 × 27.0 × 30.8
- Model No. : TSR-23SD
- Serial No. : BC2R0185
- Style : Reach in (Single Solid Door, Swing type)
- CFC Free : Refrigerant/Compressor Insulation (manufacturer claimed)
- Setting : 5 (Max. 9)
- Mean Daily Energy Consumption : 3.58 kWh
- Measured Volume : 21.1 ft^3
- Compliance with the marking requirements of the CEC Appliance Efficiency Regulations (February 2002):

  a) met the marking requirements of Sections 1607 (b) and (c).

Respectfully Submitted,

Bodh R. Subherwal, P.E.
Technical Manager

12-5-02
Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:

   a) Time
   b) Refrigerator Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water.
   Dummy loads - water filled plastic containers.

5. Type 'T' thermocouples

BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647
(714) 891-0206
(714) 893-0818 FAX

REPORT NUMBER: 0211-13
TOTAL PAGES: 8
(Including Title Page and Table of Contents Page)

TEST REPORT ON "TURBO AIR" COMMERCIAL REFRIGERATOR AUTOMATIC DEFROST

Model No. : TSR-49SD
Serial No. : BJ4R0021

NOVEMBER 2002

TEST PROCEDURE : Standard ANSI/ASHRAE 117-1992 Method of Testing Self Service Closed Refrigerators for Food Stores.

PREPARED FOR :
TURBO AIR, INC.
3088 Walnut Avenue
Long Beach, CA 90807

CONTACT : Mr. Jay Lee
PHONE : (562) 981-0123 ext.108
FAX : (562) 988-8172

PREPARED BY :
BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA. 92649

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- BR Laboratories was supplied with and instructed by TURBO AIR, INC. to:

- Test the "TURBO AIR" TSR-49SD commercial refrigerator in accordance with American National Standard ANSI/ASHRAE 117-1992, Method of Testing Self-Service Closed Refrigerators for Food Services.

II. COMMERCIAL REFRIGERATOR

1. Appliance nameplate data included the following:

Appliance	:	Commercial Refrigerator, Automatic Defrost.
Manufacturer	:	TURBO AIR, INC. 3088 Walnut Avenue Long Beach, CA 90807
Model No.	:	TSR-72SD
Serial No.	:	BE7R0273
Size, H×W×D, inch	:	77.9 × 81.9 × 30.8
Electrical	:	115 V, 1 Phase, 60 HZ, 11.0 Amps
Refrigerant	:	R134a, 14.82 oz.
Design Pressures	:	High Side = 312 PSI Low Side = 140 PSI
Listing	:	* UL, 438K, ANSI/NSF 7
Manufacturer Claim	:	Insulation is CFC free.
Style	:	Reach-in (Two solid doors)
MFG Date	:	October 2002

2. The manufacturer, "TURBO AIR", supplied a commercial refrigerator Model TSR-72SD. The contact person is Mr. Jay Lee, with phone no.: (568) 981-0123 ext.108. The package carried the address: "TURBO AIR", 3088 Walnut Avenue, Long Beach, CA 90807.

III. TEST PARAMETERS

A self-contained "TURBO AIR" commercial refrigerator, model TSR-49SD, serial number BJ4R0021 was tested in accordance with ANSI/ASHRAE Standard 117-1992. The ANSI/ASHRAE Standard 117-1992 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TSR-49SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TSR-49SD was tested at the thermostat temperature 6/9.

Test Conditions	:	Door Opening every 10 minutes for 8 consecutive hours Total = 48 openings
Ambient Temp	:	75 ± 2 °F dry bulb 64 ± 2 °F wet bulb

IV. TEST DATA

a)	Measured Volume	:	46.0 ft³
b)	Thermostat Setting	:	6 (max. 9)
	Refrigerant	:	R134a

- Equipment : Refrigerator
- Test Package :

Integrated Average Temperature (IAT), °F	=	38.0
Coldest Test Package Average (CTPA), °F	=	36.5
Warmest Test Package Average (WTPA), °F	=	39.3

- Maximum of Warmest Test Sample, °F = 39.9
- Temperatures:

Test Start, °F	=	37.4
Test End, °F	=	37.6

- Energy Input During Refrigerating Time, kWh/day = 6.090
- Total Energy Input, kWh/day = 6.120
- Percent Compressor Running Time = 37.81
- Ambient Temperatures:

Dry Bulb, °F	:	74.6
Wet Bulb, °F	:	63.6

- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

• Appliance/Equipment	:	Commercial Refrigerator, Automatic Defrost
• Size, H x W x D, in.	:	77.9 × 54.4 × 30.8
• Model No.	:	TSR-49SD
• Serial No.	:	BJ4R0021
• Style	:	Reach in (two solid doors, swing type)
• Illumination Wattage	:	25 W
• CFC Free	:	Refrigerant/Compressor Insulation (manufacturer claimed)
• Setting	:	6 (Max. 9)
• Mean Daily Energy Consumption	:	6.12 kWh
• Measured Volume	:	46.0 ft^3

- Compliance with the marking requirements of the CEC Appliance Efficiency Regulations (February 2002):

a) met the marking requirements of Sections 1607 (b) and (c).

Respectfully Submitted,

Bodh R. Subherwal

Bodh R. Subherwal, P.E.
Technical Manager

11-29-02
Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:

   a) Time
   b) Refrigerator Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water.
   Dummy loads - water filled plastic containers.

5. Type 'T' thermocouples

BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92647
(714) 891-0206
(714) 893-0818 FAX

REPORT NUMBER: 0212-14
TOTAL PAGES: 8
(Including Title Page and Table of Contents Page)

TEST REPORT ON "TURBO AIR" COMMERCIAL REFRIGERATOR AUTOMATIC DEFROST

Model No. : **TUR-28SD**
Serial No. : **UR20128035**

DECEMBER 2002

TEST PROCEDURE : Standard ANSI/ASHRAE 117-1992 Method of Testing Self Service Closed Refrigerators for Food Stores.

PREPARED FOR :
TURBO AIR, INC.
3088 Walnut Avenue
Long Beach, CA 90807

CONTACT : Mr. Jay Lee
PHONE : (562) 981-0123 ext.108
FAX : (562) 988-8172

PREPARED BY :
BR LABORATORIES, INC.
P.O. Box 1249
Huntington Beach, CA 92649

PHONE : (714) 891-0206
FAX : (714) 893-0818

TABLE OF CONTENTS

I. BACKGROUND

- BR Laboratories was supplied with and instructed by TURBO AIR, INC. to:

- Test the "TURBO AIR" TUR-28SD commercial refrigerator in accordance with American National Standard ANSI/ASHRAE 117-1992, Method of Testing Self-Service Closed Refrigerators for Food Stores.

II. COMMERCIAL REFRIGERATOR

1. Appliance nameplate data included the following:

Appliance	:	Commercial Refrigerator, Automatic Defrost
Manufacturer	:	TURBO AIR, INC. 3088 Walnut Avenue Long Beach, CA 90807 (Made in Korea)
Model No.	:	TUR-28SD
Serial No.	:	UR20128035
Size, H×W×D, inch	:	29.7 × 27.5 × 30.0
Electrical	:	115 V, 1 Phase, 60 HZ, 4.0 Amps
Refrigerant	:	R134a, 5.3 oz.
Design Pressures	:	High Side = 312 PSI Low Side = 140 PSI
Listing	:	* UL, 438K, Listed under commercial refrigerator and/or freezer * NSF
Manufacturer Claim	:	Insulation is CFC free.
Style	:	Undercounter (single solid door)
MFG Date	:	January 2001

2. The manufacturer, "TURBO AIR", supplied a commercial refrigerator Model TUR-28SD. The contact person is Mr. Jay Lee, with phone no.: (568) 981-0123 ext.108. The package carried the address: "TURBO AIR", 3088 Walnut Avenue, Long Beach, CA 90807.

III. TEST PARAMETERS

A self-contained "TURBO AIR" commercial refrigerator, model TUR-28SD, serial number UR20128035 was tested in accordance with ANSI/ASHRAE Standard 117-1992. The ANSI/ASHRAE Standard 117-1992 specifies that the anti-condensate controllers should be allowed to control if they are an integral part of the refrigerator. For the purposes of the ANSI/ASHRAE Standard, the TUR-28SD falls under the category of medium temperature refrigerator. The 24-hour test can be repeated for any desired number of test levels (refrigerator thermostat settings) to determine the performance of the refrigerator at different points of operation. In this case, TUR-28SD was tested at the thermostat setting "COLD".

Test Conditions	:	Door Opening every 10 minutes for 8 consecutive hours Total = 48 openings
Ambient Temp	:	75 ± 2 °F dry bulb 64 ± 2 °F wet bulb

IV. TEST DATA

a) Measured Volume : 6.9 ft³

b) Thermostat Setting : "COLD"

Refrigerant : R134a

- Equipment : Refrigerator
- Test Package :

Integrated Average Temperature (IAT), °F	=	37.7
Coldest Test Package Average (CTPA), °F	=	36.2
Warmest Test Package Average (WTPA), °F	=	38.9

- Maximum of Warmest Test Sample, °F = 39.8
- Temperatures:

Test Start, °F	=	37.6
Test End, °F	=	37.7

- Energy Input During Refrigerating Time, kWh/day = 1.440
- Total Energy Input, kWh/day = 1.460
- Percent Compressor Running Time = 24.74
- Ambient Temperatures:

Dry Bulb, °F	:	75.4
Wet Bulb, °F	:	64.3

- Number of Door Openings = 48

V. SUMMARY OF TEST RESULTS

• Appliance/Equipment	:	Commercial Refrigerator, Automatic Defrost
• Size, H x W x D, in.	:	29.7 × 27.5 × 30
• Model No	:	TUR-28
• Serial No.	:	UR20128035
• Style	:	Undercounter (single solid door, swing type)
• Illumination Wattage	:	None
• CFC Free	:	Refrigerant/Compressor Insulation (manufacturer claimed)
• Setting	:	"COLD"
• Mean Daily Energy Consumption	:	1.460 kWh
• Measured Volume	:	6.9 ft³

- Compliance with the marking requirements of the CEC Appliance Efficiency Regulations (February 2002):

  a) met the marking requirements of Sections 1607 (b) and (c).

Respectfully Submitted,

Bodh R. Subherwal

Bodh R. Subherwal, P.E.
Technical Manager

12 - 19 - 02
Date

VI. EQUIPMENT USED

1. Campbell Scientific 21X Micrologger to record:

   a) Time
   b) Refrigerator Temperatures
   c) Ambient Temperatures
   d) Dew Point
   e) kWh
   f) Cycles completed

2. Weighted type 'J' thermocouples

3. IBM-AT Computer

4. Sponges in plastic containers, filled with 6% salt water.
   Dummy loads - water filled plastic containers.

5. Type 'T' thermocouples

April 14, 2008

Turbo Air Inc
1250 Victoria Street
Carson, CA
90746
USA

Attention: Nelson Lee

Subject: Self-Contained Commercial Upright Refrigerator, reach-in, hinged double solid doors, R-134A Refrigerant and incandescent lighting

Dear Mr. Lee,

We have enclosed your Report for *Self-Contained Commercial Upright Refrigerator, reach-in, hinged double solid doors, R-134A Refrigerant and incandescent lighting*, Model: *TSR-49SD.* (Report No. EE1030-7)

May we take this opportunity to thank you for choosing QPS as your Safety Certification Agency and we look forward to assisting you in the future.

Yours sincerely,

Sara Machado
Customer Service-Toronto
QPS Evaluation Services Inc.
Phone: (416) 241-8857 ext 257
Fax: (416) 241-0682
Smachado@qps.ca

ENERGY EFFICIENCY VERIFICATION RECORD – CANADA

FILE NUMBER: EE1030

- NRC COMMERCIAL FREEZER AND REFRIGERATOR EFFICIENCY TEST REPORT. ANSI/ASHRAE 117-1992 – Method of Testing for Closed Refrigerators. Natural Resource Canada Energy Efficiency Regulations Technical Requirements for Energy-Using Products Self-contained commercial refrigerator. Self-Contained Commercial Refrigerator, reach-in, with automatic defrost, hinged single solid door, R-134A Refrigerant. Model No. **TSR-23SD** for general storage.

Rated Input		Illumination (Watts)	Refrigerant Type	Amount (oz)	Refrigerated Volume (Litre)	Hi-side / Low-side (PSIG)	Measured KwHr/Day	Allowed KwHr/Day
Volts	Amps							
115	5.5	25	R-134a	7.76	651	256 / 92	5.148	9.732

- NRC COMMERCIAL FREEZER AND REFRIGERATOR EFFICIENCY TEST REPORT. Self-Contained Commercial Upright Display Refrigerator, reach-in, hinged single glass door, R-134A Refrigerant, and fluorescent lighting Model No. **TGM-11RV** for general storage. ANSI/ASHRAE 117-1992 – Method of Testing for Closed Refrigerators. Natural Resource Canada Energy Efficiency Regulations Technical Requirements for Energy-Using Products Self-contained commercial refrigerator

Rated Input		Illumination (Watts)	Refrigerant Type	Amount (oz)	Refrigerated Volume (Litre)	Hi-side / Low-side (PSIG)	Measured KwHr/Day	Allowed KwHr/Day (January 01, 2008)
Volts	Amps							
115	5.4	25	R-134a	4.93	258.7	312/ 140	3.083	6.34

- NRC COMMERCIAL FREEZER AND REFRIGERATOR EFFICIENCY TEST REPORT. Self-Contained Commercial Upright Display Refrigerator, reach-in, hinged single glass door, R-134A Refrigerant, and fluorescent lighting Model No. **TGM-14RV** for general storage.

Rated Input		Illumination (Watts)	Refrigerant Type	Amount (oz)	Refrigerated Volume (Litre)	Hi-side / Low-side (PSIG)	Measured KwHr/Day	Allowed KwHr/Day (January 01, 2008)
Volts	Amps							
115	6.3	25 + 13	R-134a	4.93	382.3	312/ 140	4.715	7.091

CUSTOMER FILE HISTORY

File Number: EE1030

Turbo Air Inc.

Report/Application Number	Issue Date	Description
EE1030-1	November 8, 2007	Self-Contained Commercial Undercounter Freezer, with automatic defrost, single solid door, R-134A Refrigerant. Model No. TUF-28SD for general storage.
EE1030-2	December 20, 2007	Self-Contained Commercial Refrigerator, reach-in, with automatic defrost, hinged single solid door, R-134A Refrigerant. Model No. TSR-23SD for general storage.
EE1030-3	March 5, 2008	Self-Contained Commercial Upright Display Refrigerator, reach-in, hinged single glass door, R-134A Refrigerant, and fluorescent lighting Model No. TGM-11RV for general storage.
EE1030-4	March 14, 2008	Self-Contained Commercial Upright Display Refrigerator, reach-in, hinged single glass door, R-134A Refrigerant, and fluorescent lighting Model No. TGM-14RV for general storage.
EE1030-5	April 7, 2008	Self-Contained Commercial Upright Display Refrigerator, reach-in, hinged single glass door, R-134A Refrigerant. Model No. TGM-22RV for general storage.
EE1030-6	March 24, 2008	Self-Contained Commercial Undercounter Refrigerator, reach-in, hinged single solid door, R-134A Refrigerant. Model No. TUR-28SD for general storage.
EE1030-7	March 10, 2008	Self-Contained Commercial Upright Refrigerator, reach-in, hinged double solid doors, R-134A Refrigerant and incandescent lighting. Model No. TSR-49SD for general storage.

ENERGY EFFICIENCY CERTIFICATE OF VERIFICATION

Product:	Self-Contained Commercial Upright Refrigerator, reach-in, hinged double solid doors, R-134A Refrigerant and incandescent lighting.
Model/Type/Catalogue Number:	TSR-49SD
Name and Address of Applicant:	Turbo Air Inc 1250 Victoria St. Carson, CA 90746 USA
Contact:	Nelson Lee
Name and Address of Manufacturer/Factory:	Daewoo Electronics 604 Younghyeon-5 dong Nam-ku, Incheon City Korea 402-834
Contact:	Same as above

Rating and Principal Characteristics:

Rated Input		Illumination (Watts)	Refrigerant Type	Amount (oz)	Refrigerated Volume (Litre)	Hi-side / Low-side (PSIG)	Measured KwHr/Day	Allowed KwHr/Day (January 01, 2008)
Volts	Amps							
115	9.2	25	R-134a	12.70	1387.5	249/ 92	7.652	7.921

Trademark (if any):	-
A sample of the Product was tested and found to be in compliance with:	ANSI/ASHRAE 117-1992 – Method of Testing for Closed Refrigerators. Natural Resource Canada Energy Efficiency Regulations Technical Requirements for Energy-Using Products Self-contained commercial refrigerator.
As shown in Energy Efficiency Verification Report No:	EE1030-7

Products in compliance with the Report are eligible to bear the QPS Certification Mark with the mandatory statement "Energy Efficiency Verified"

Issued by: QPS Evaluation Services Inc.
Toronto, ON Canada

Date: March 10, 2008

Quality Assurance

Customer File No: EE1030	Report No: EE1030-7	Issue Date: March 10, 2008
Issued By: Dennis Li	Reviewed By: Tom Mah	
Customer Name: Turbo Air Inc	Address: 1250 Victoria St., Carson, CA 90746, US	
Manufacturer: Daewoo Electronics Co. Ltd	Address: 604 Younghyeon-5 dong, Nam-ku, Incheon City, Korea 402-834	
Contents: Certificate of Conformity; Report: Pages 1 to 5; Photographs: none; Attachments: none		

SUBJECT:

NRC COMMERCIAL FREEZER AND REFRIGERATOR EFFICIENCY TEST REPORT

STANDARD(S) USED:

- ANSI/ASHRAE 117-1992 – Method of Testing for Closed Refrigerators.
- Natural Resource Canada Energy Efficiency Regulations Technical Requirements for Energy-Using Products Self-contained commercial refrigerator.

PRODUCT DESCRIPTION:

Self-Contained Commercial Upright Refrigerator, reach-in, hinged double solid doors, R-134A Refrigerant and incandescent lighting. Model No. TSR-49SD for general storage.

Rated Input		Illumination (Watts)	Refrigerant Type	Amount (oz)	Refrigerated Volume (Litre)	Hi-side / Low-side (PSIG)	Measured KwHr/Day	Allowed KwHr/Day (January 01, 2008)
Volts	Amps							
115	9.2	25	R-134a	12.70	1387.5	249/ 92	7.652	7.921

Safety approval:

UL certified. File No.: SA11863

RESULTS

Test conditions:	Door operating every 10 minutes for 8 consecutive hours, 48 openings. Total energy efficiency test duration 24 hours, temperature setting at 3.3°C +/- 1.1°C.
Ambient Temp:	24.2°C Dry-bulb; 18.0°C Wet-bulb.
Temperature Setting:	38F (scale 5) position
Measured KWh/Day:	7.652

Test Package:

Integral Average Temperature, IAT (°C):	3.4°C
Coldest Test Package Average, CTPA (°C):	3.2°C
Warmest Test Package Average, WTPA (°C):	3.7°C
Compressor Duty Cycle (%):	43.5%
Test Start Ambient Temperature:	23.8°C
Test End Ambient Temperature:	24.2°C
Total Energy Input KwHr / day:	7.652

CONCLUSIONS:

The test methods and results of the above tests have been reviewed and found to be in compliance with the applicable requirements of the Natural Resource Canada Energy Efficiency Regulations Technical Requirements for Energy-Using Products Self-contained commercial refrigerator (Effective January 01, 2008).

Manufacturer - YUYU
Model No. - UZ-2A BT110
Rating - 120V, 20A

12. Illuminations –
Model No. - Incandescent type T
Rating - 25 W

EQUIPMENT USED:

Inst. ID No.	Instrument Type	Test Number +; Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date
590	Agilent Data Acquisition System	Energy Efficiency Test	°C, T-Type / Auto	30-Apr-07	30-Apr-08
88	Power Analyzer	Energy Efficiency Test	Measurement: Volt, Amp, Frequency, kW-hr	1-May-07	1-May-08
1221	Power Analyzer	Energy Efficiency Test	Measurement: Volt, Amp, Frequency, kW-hr	15-Aug-07	15-Aug-08
1226	Hot Wire Anemometer	Energy Efficiency Test	Ms / Auto	03-Oct-07	03-Oct-08
1245	Light Meter	Energy Efficiency Test	Lux / 0-1999	16-May-07	15-May-09

Note:
For measurement uncertainty, please refer to the individual calibration certificates on file at the laboratory.

Reach-In Super Deluxe Series

Solid Door Refrigerators

Exceptional Quality 2 Years Parts and Labor Warranty

TSR-23SD TSR-35SD TSR-49SD TSR-72SD

FEATURES / BENEFITS

- **Digital Temperature Control System**
  Provides precise and constant temperature. This level of precision allows food products to remain fresh over an extended period of time.
- **High-Tech Monitor**
  The unit will beep if the door has been opened for more than 5 minutes. The monitor digitally displays the present temperature and current status of the refrigerator. You can easily change the temperature by adjusting the thermostat.
- **Efficient Refrigeration System**
  Turbo Air's solid door refrigerators are designed with oversized and balanced (CFC Free R-134A) refrigeration systems. These include efficient evaporators and condensers for faster cooling and greater efficiency.
- **Automatic Evaporator Fan Motor Delays**
  Through stopping the evaporator fan when the refrigerator door opens, the circulation of hot, moist air into the refrigerator is prevented. This increases energy efficiency and lengthens the life of the compressor.
- **Stainless Steel Cabinet Construction**
  The Turbo Air Super Deluxe model boasts a stainless steel interior and exterior (except the back). It guarantees the utmost in cleanliness and long product life.
  Unlike other companies' products, the sharp corners and edges have been rounded to reduce the risk of injury.
  The Super Deluxe can add a touch of style to the most refined setting.
- **Sturdy, Clean Stainless Shelving**
  Shelves are the most important part of cleanliness as they come in direct contact with food. After a while, PVC coated wire shelves may peel, rust and lead to unsanitary conditions. Only the Turbo Air Super Deluxe series uniquely provides stainless shelving.
- **High-density Polyurethane Insulation**
  The entire cabinet structure and solid doors are formed-in-place using high density, CFC free polyurethane insulation.
- **Ergonomically Designed Door**
  Customers' fatigue fades away with easy grip handles and doors that open effortlessly. Self-closing and stay open door features make this the ultimate choice in customer convenience.
- **Magnetic Door Gasket**
  Magnetic door gaskets are of one piece construction, removable without tools for ease of cleaning and replacement.
- **Bottom Mount Compressor Units**
  Turbo Air's bottom mount compressor allows easier access for service and extra storage space above. In addition, the lower area provides a cooler and less greasy operating environment which results in reduced compressor running time.
- **Refrigerator Holds 33°F ~ 38°F for The Best in Food Preservation**

Model	Swing Door	CU./FT.	#of Shelves	HP	AMPS	Crated Weight	L D H
TSR-23SD	**1**	**23**	**3**	**1/4**	**5.5**	**265**	**27 x 30 1/3 x 78 2/9**
TSR-35SD	**2**	**35**	**6**	**1/3**	**9.0**	**320**	**39 1/2 x 30 1/3 x 78 2/9**
TSR-49SD	**2**	**49**	**6**	**1/3**	**9.2**	**419**	**54 2/5 x 30 1/3 x 78 2/9**
TSR-72SD	**3**	**72**	**9**	**1/2**	**11.3**	**595**	**81 6/7 x 30 1/3 x 78 2/9**

* Height does not include 5" for caster height.

TSR-23SD / TSR-35SD / TSR-49SD / TSR-72SD SPECIFICATIONS

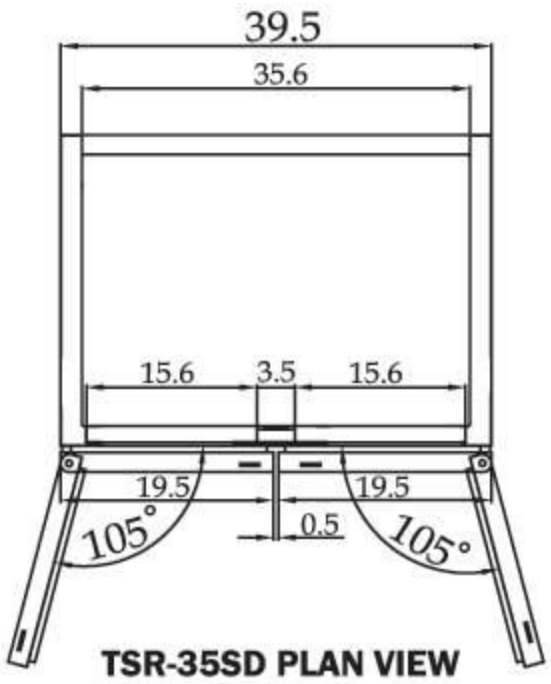
ELECTRICAL DATA	TSR-23SD	TSR-35SD	TSR-49SD	TSR-72SD
Voltage NEMA-5-15P	115/60-1	115/60-1	115/60-1	115/60-1
Amperes	5.5 A	9.0 A	9.2 A	11.3 A
Compressor (HP)	1/4	1/3	1/3	1/2
Feed Wire (with ground)	3	3	3	3
Cord Length	8.2 ft.	8.2 ft.	8.2 ft.	8.2 ft.
DIMENSIONAL DATA				
# of Doors	1	2	2	3
Cubic Feet	23	35	49	72
# of Racks Accepted	1	2	2	3
Length Overall (in)	27	39 1/2	54 2/5	81 6/7
Depth Overall (in)	30 1/3	30 1/3	30 1/3	30 1/3
Height Overall (in)	78 2/9	78 2/9	78 2/9	78 2/9
Interior Dimension (LxDxH)	23x24 4/5x60 2/5	35x24 4/5x60 2/5	50 1/2x24 4/5x60 2/5	78x24 4/5x60 2/5
Shelf Size	21 3/5x23 1/3	17 1/3x23 1/3	24 2/5x23 1/3	24 2/5x23 1/3
# of Shelves	3	6	6	9

*Design and specifications subject to change without notice.

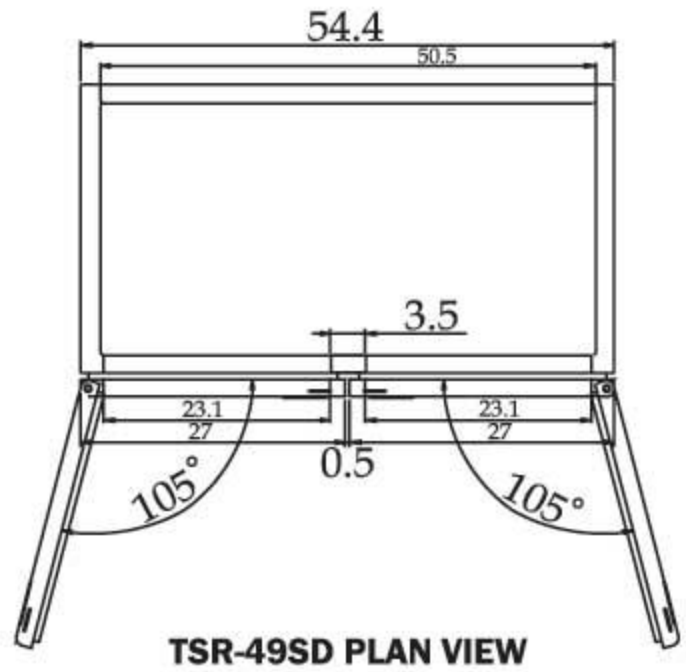
- INCANDESCENT INTERIOR LIGHTING
- DOOR LOCKS
- SELF-CONTAINED SYSTEM
- 4" SWIVEL CASTERS
- SOLID AND STURDY GRILLE DESIGN
- LEGS AVAILABLE FOR ALL MODELS (OPTION)
- TRAY RACK AVAILABLE (OPTION)
  All models accept full size tray racks.
- REMOTE CABINETS AND CONDENSING UNITS AVAILABLE FOR ALL MODELS.

■ **WARRANTY :** **2 Years Labor and Parts Warranty**
Additional 3 Years Warranty on Compressor

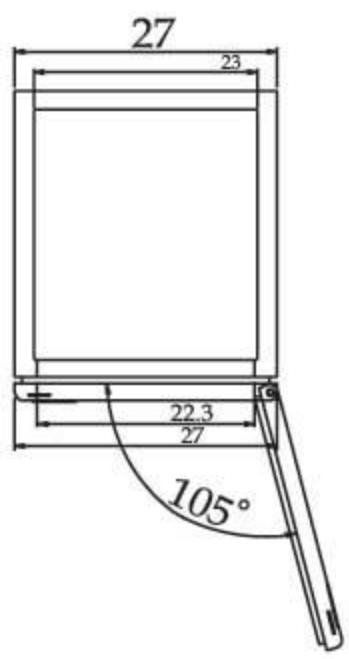
(unit : inch)



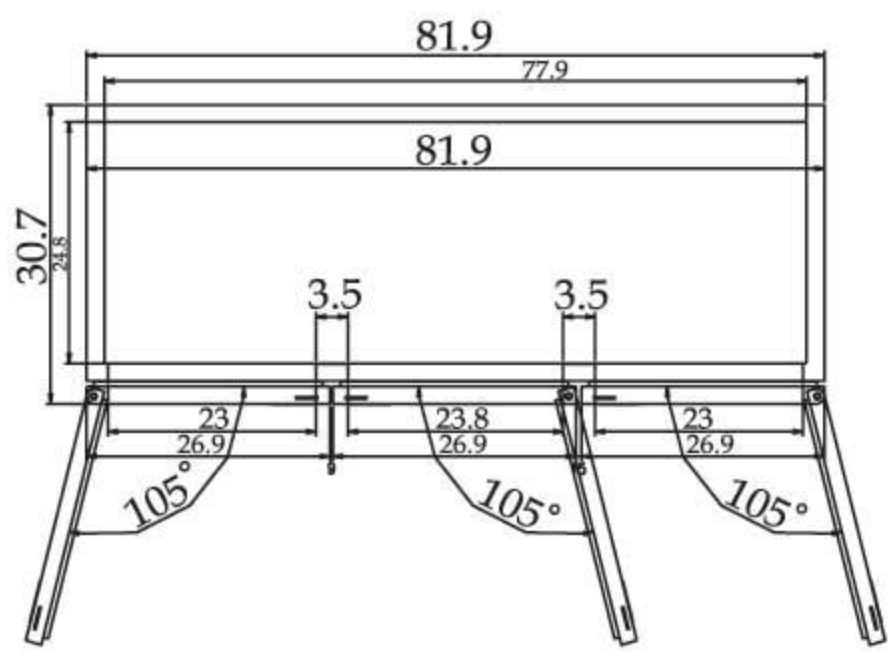
TSR-35SD PLAN VIEW



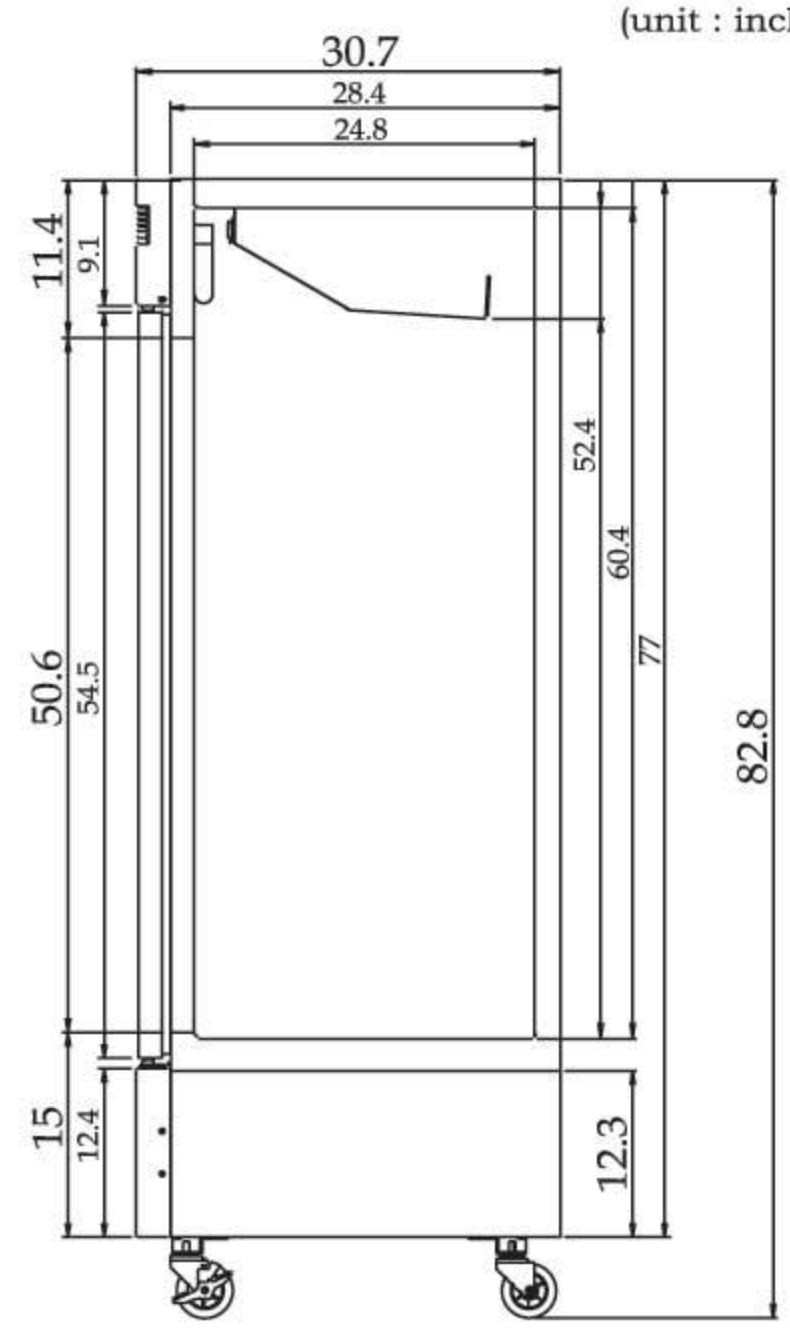
TSR-49SD PLAN VIEW



TSR-23SD PLAN VIEW



TSR-72SD PLAN VIEW



SIDE VIEW

Super Deluxe Series

Undercounter Refrigerators

Exceptional Quality 2 Years Parts and Labor Warranty

FEATURES / BENEFITS

- **Efficient Refrigeration System**
  Turbo Air's solid door refrigerators are designed with oversized and balanced (CFC Free R-134A) refrigeration systems. These include efficient evaporators and condensers for faster cooling and greater efficiency.

- **Stainless Steel Louver**
  Stainless steel louvers ensure even distribution of cold air throughout the interior of the unit. Built to withstand food acids and stains.

- **Stainless Steel Cabinet Construction**
  The Turbo Air Super Deluxe model boasts a stainless steel interior and exterior (except the back). It guarantees the utmost in cleanliness and long product life. The Super Deluxe can add a touch of style to the most refined setting.

- **High-density Polyurethane Insulation**
  The entire cabinet structure and solid doors are formed-in-place using high density, CFC free polyurethane insulation.

- **Sturdy, Clean Stainless Shelving**
  Shelves are the most important part of cleanliness as they come in direct contact with food. After a while, PVC coated wire shelves may peel, rust and lead to unsanitary conditions. Only the Turbo Air Super Deluxe series uniquely provides stainless shelving.

- **Ergonomically Designed Door**
  Customers' fatigue fades away with easy grip handles and doors that open effortlessly. These features along with self-closing doors make this the ultimate choice in customer convenience. ABS sheet door liners resist water condensation with thermal efficiency.

- **Magnetic Door Gasket**
  Magnetic door gaskets are of one piece construction, removable without tools for ease of cleaning and replacement.

- **Hot Gas Condensate System**
  Through Turbo Air's creative innovation, the condensate system surfaces have been specially treated to resist corrosion. This not only increases efficiency without the risk refrigerant leakage from corrosion, but also prevents the overflow of condensate water.

- **Refrigerator Holds 33°F ~ 38°F for The Best in Food Preservation**

* Height does not include 6" for caster height.

Model	Swing Door	CU./FT.	#of Shelves	HP	AMPS	Crated Weight	L D H
TUR-28SD	**1**	**7**	**1**	**1/3**	**6.6**	**165**	**27 1/2 x 30 x 30 1/3**
TUR-36SD	**2**	**11**	**2**	**1/3**	**6.6**	**190**	**36 1/3 x 30 x 30 1/3**
TUR-48SD	**2**	**12**	**2**	**1/3**	**6.5**	**243**	**48 2/9 x 30 x 30 1/3**
TUR-60SD	**2**	**16**	**2**	**1/3**	**8.9**	**265**	**60 1/4 x 30 x 30 1/3**
TUR-72SD	**3**	**19**	**3**	**1/2**	**9.9**	**353**	**72 2/3 x 30 x 30 1/3**

TUR-28SD / TUR-36SD / TUR-48SD / TUR-60SD / TUR-72SD SPECIFICATIONS

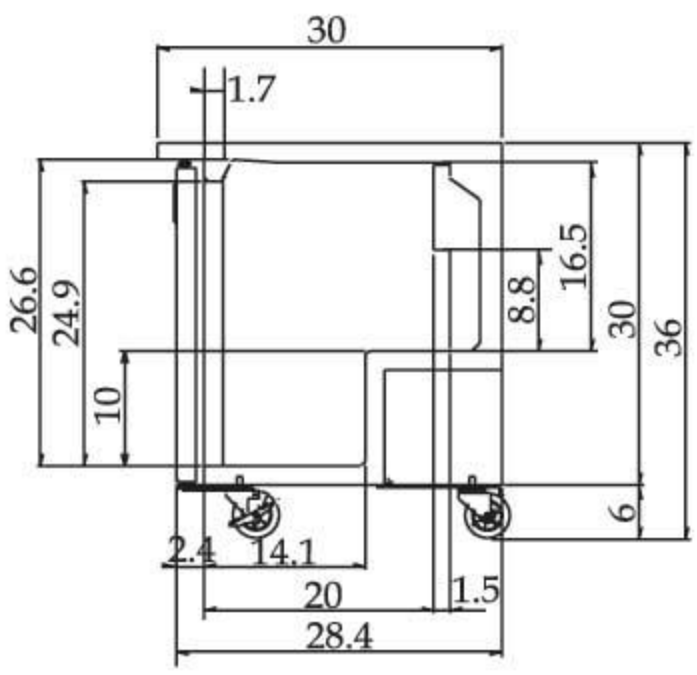
MODEL	TUR-28SD	TUR-36SD	TUR-48SD	TUR-60SD	TUR-72SD
Exterior Dimension (LxDxH)	27 1/2x30x31 1/3	36 1/3x30x30 1/3	48 2/9x30x30 1/3	60 1/4x30x30 1/3	72 2/3x30x30 1/3
Cubic Feet	7	11	12	16	19
Compressor (HP)	1/3	1/3	1/3	1/3	1/2
Shelves	1ea	2ea	2ea	2ea	3ea
Net Weight	150lbs	179lbs	221lbs	262lbs	306lbs
Voltage NEMA-5-15P	115V / 60Hz	115V / 60Hz	115V / 60Hz	115V / 60Hz	115V / 60Hz
Amp	6.6 A	6.6 A	6.5 A	8.9 A	9.9 A
Cord Length	9.2 ft.	9.2 ft.	9.2 ft.	9.2 ft.	9.2 ft.
Plug-In	NEMA 5-15P	NEMA 5-15P	NEMA 5-15P	NEMA 5-15P	NEMA 5-15P

*Design and specifications subject to change without notice.

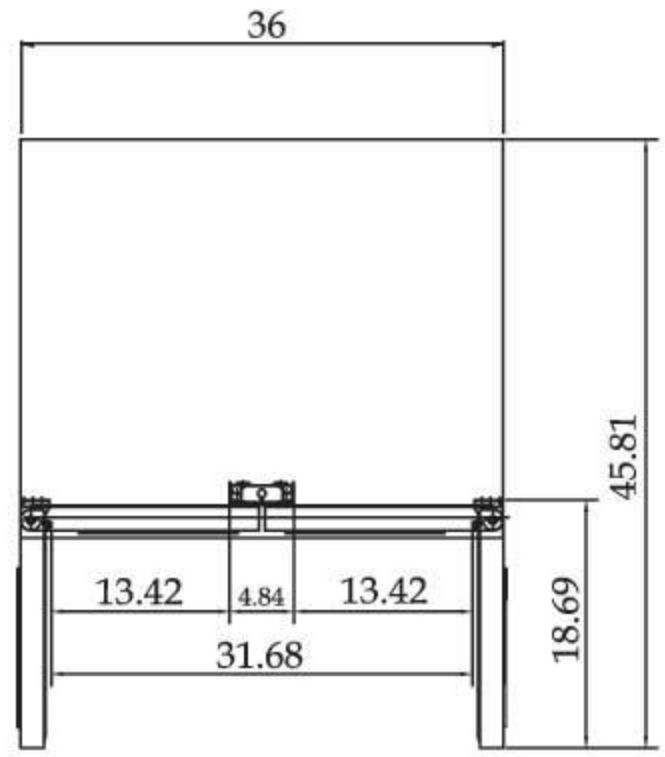
- SELF-CONTAINED SYSTEM
- 5" SWIVEL CASTERS
- LEGS AVAILABLE FOR ALL MODELS (OPTION)
- REMOTE CABINETS AND CONDENSING UNITS AVAILABLE FOR ALL MODELS.

- **WARRANTY :** 2 Years Labor and Parts Warranty
  Additional 3 Years Warranty on Compressor

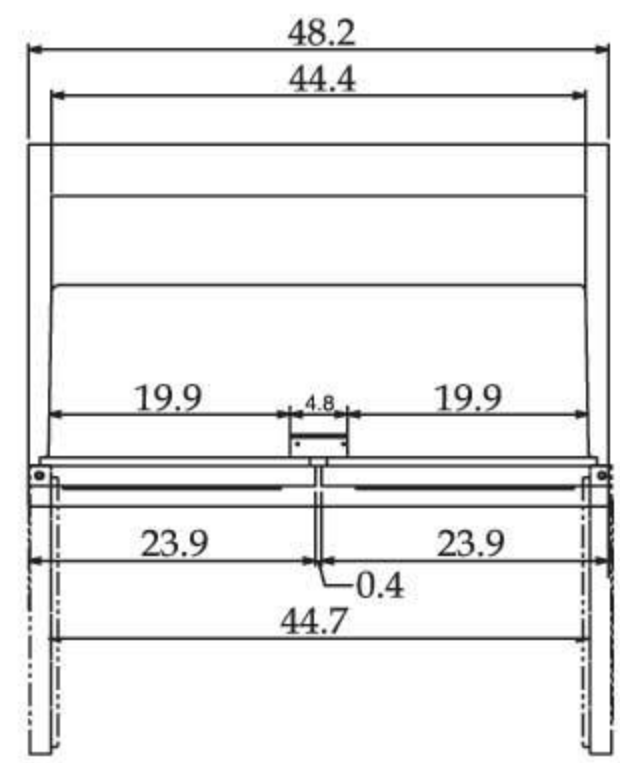
(unit : inch)



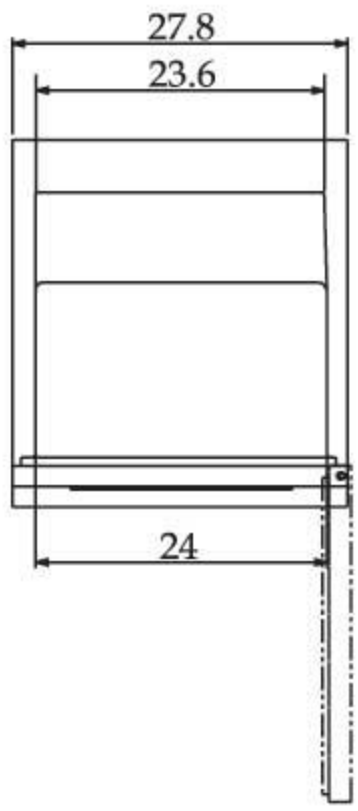
SIDE VIEW



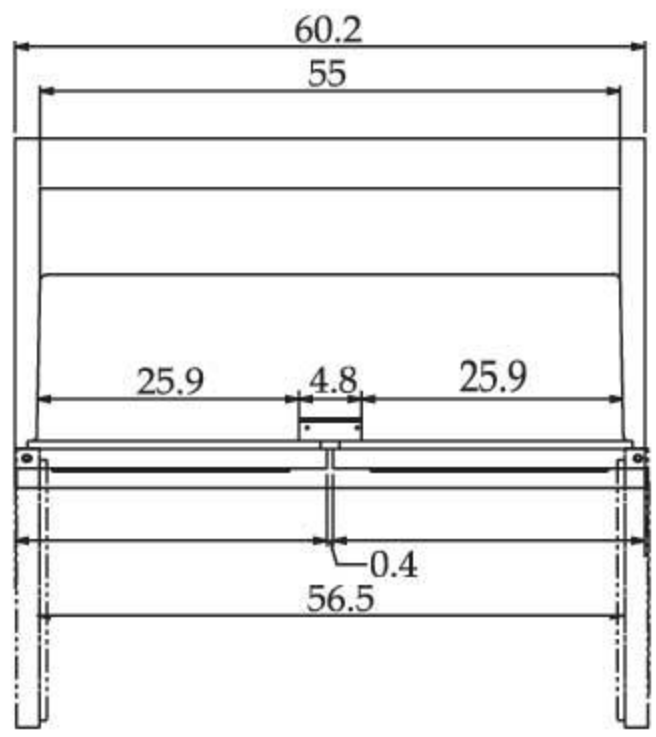
TUR-36SD PLAN VIEW



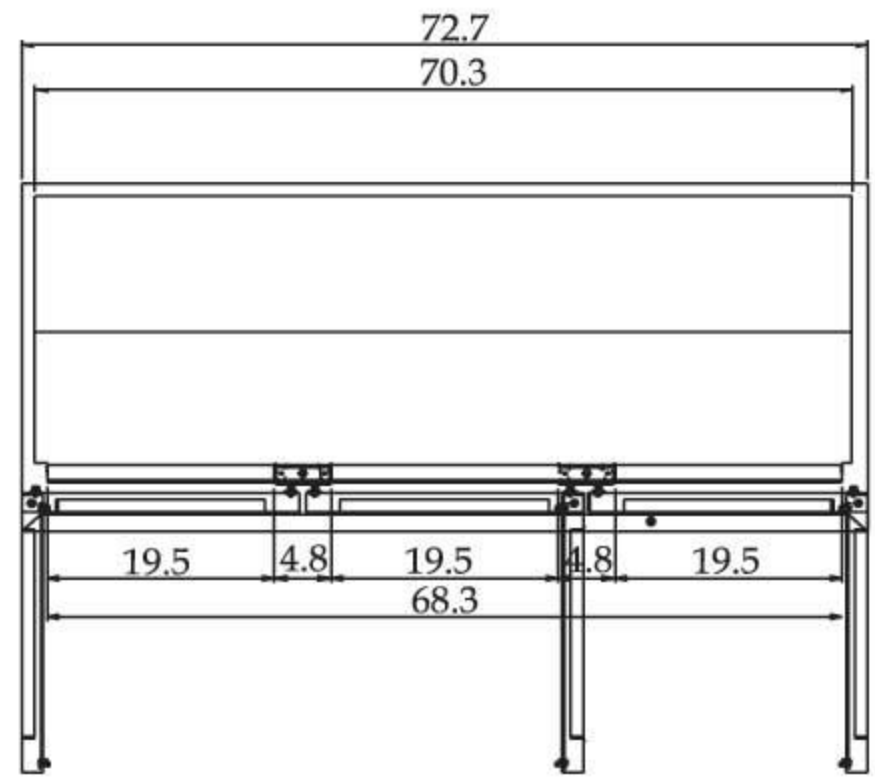
TUR-48SD PLAN VIEW



TUR-28SD PLAN VIEW



TUR-60SD PLAN VIEW



TUR-72SD PLAN VIEW

From: "Kim Erickson" <kerickson@cee1.org>
To: "Betty Chrisman" <bchrisma@energy.state.ca.us>
Date: 4/15/2009 8:08 AM
Subject: FW: Refrigerator Energy Consumption

Hi Betty,

I wanted to give you a heads up about a discrepancy on data reported for a few refrigeration units between the CEC, ENERGY STAR and NRCan. TurboAir units:

TSR-23SD

TSR-49SD

TUR-28SD

Do not meet the ENERGY STAR/CEE Tier 1 levels based on 3rd party certified data reported to NRCan. The data in the CEC database shows much lower energy consumption and different volume information. Give me a call if you would like me to walk you through the differences. Thanks.

Kim Erickson, Commercial Program Manager

Consortium for Energy Efficiency

Working Together, Advancing Efficiency

617-337-9280

kerickson@cee1.org

www.cee1.org

-----Original Message-----
From: Jawanda, Lakhbir [mailto:Lakhbir.Jawanda@NRCan-RNCan.gc.ca]
Sent: Wednesday, April 15, 2009 10:53 AM
To: Kim Erickson
Cc: Penty, Carmen
Subject: RE: Refrigerator Energy Consumption

Hello Kim,

We have checked the values for the three models mentioned below with the certifying agency (QPS). The

values in the NRCan database are correct.

Thank you,

Lakhbir Jawanda
Compliance Officer - Agente principale de conformité
Standards and Labelling - Normes et étiquetage
Office of Energy Efficiency/Office d'efficacité énergétique
1 Observatory Crescent - 1, croissant de l'Observatoire
Building #1, 2nd Floor - Édifice #1, 2e étage
Ottawa, Ontario K1A 0E4
Tel: (613) 947-9266
Fax/Télécop: (613) 947-5286
ljawanda@nrcan.gc.ca
www.oee.nrcan.gc.ca/regulations <http://www.oee.nrcan.gc.ca/regulations>

From: Kim Erickson [mailto:kerickson@cee1.org]
Sent: April 14, 2009 08:36
To: Michael Andrus; Penty, Carmen
Cc: Chris Kent
Subject: Refrigerator Energy Consumption

Hello Michael and Carmen,

I am trying to confirm the volume and energy consumption of three TurboAir solid door refrigerators. There is conflicting information through NRCan, the CEC, the FSTC, and ENERGY STAR on the following models:

TSR-23SD

TSR-49SD

TUR-28SD

For now I have removed these units from the CEE qualified products list as the energy consumption values information in the NRCan database do not allow these units to qualify under CEE specifications. Please let me know if the values currently listed by NRCan are incorrect. Thanks for your help!

Kim Erickson, Commercial Program Manager

Consortium for Energy Efficiency

Working Together, Advancing Efficiency

617-337-9280

kerickson@cee1.org

www.cee1.org