



Public Utilities Commission

Application to Commit
Energy Efficiency/Peak Demand
Reduction Programs
(Mercantile Customers Only)

Case No.: 13-0153-EL-EEC

Mercantile Customer: USG Interiors LLC

Electric Utility: The Cleveland Electric Illuminating Company

Program Title or
Description: Westlake Lighting and Compressor Upgrades

Rule 4901:1-39-05(F), Ohio Administrative Code (O.A.C.), permits a mercantile customer to file, either individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the electric utility's programs. The following application form is to be used by mercantile customers, either individually or jointly with their electric utility, to apply for commitment of such programs in accordance with the Commission's pilot program established in Case No. 10-834-EL-POR

Completed applications requesting the cash rebate reasonable arrangement option (Option 1) in lieu of an exemption from the electric utility's energy efficiency and demand reduction (EEDR) rider will be automatically approved on the sixty-first calendar day after filing, unless the Commission, or an attorney examiner, suspends or denies the application prior to that time. Completed applications requesting the exemption from the EEDR rider (Option 2) will also qualify for the 60-day automatic approval so long as the exemption period does not exceed 24 months. Rider exemptions for periods of more than 24 months will be reviewed by the Commission Staff and are only approved up the issuance of a Commission order.

Complete a separate application for each customer program. Projects undertaken by a customer as a single program at a single location or at various locations within the same service territory should be submitted together as a single program filing, when possible. Check all boxes that are applicable to your program. For each box checked, be sure to complete all subparts of the question, and provide all requested additional information. Submittal of incomplete applications may result in a suspension of the automatic approval process or denial of the application.

Any confidential or trade secret information may be submitted to Staff on disc or via email at ee-pdr@puc.state.oh.us.

Section 1: Mercantile Customer Information

Name: Fred Mazurski

Principal address: 550 West Adams St., Chicago, IL 60661-3676

Address of facility for which this energy efficiency program applies: 1000 Crocker Rd., Westlake, OH 44145

Name and telephone number for responses to questions: 312.436.4177

Electricity use by the customer (check the box(es) that apply):

- ☒ The customer uses more than seven hundred thousand kilowatt hours per year at the above facility. (Please attach documentation.)
- ☐ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.)

Section 2: Application Information

A) The customer is filing this application (choose which applies):

- ☐ Individually, without electric utility participation.
- ☒ Jointly with the electric utility.

B) The electric utility is: The Cleveland Electric Illuminating Company

C) The customer is offering to commit (check any that apply):

- ☒ Energy savings from the customer's energy efficiency program. (Complete Sections 3, 5, 6, and 7.)
- ☐ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)
- ☐ Both the energy savings and the capacity savings from the customer's energy efficiency program. (Complete all sections of the Application.)

Project #1 - Westlake Lighting Upgrades

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (check those that apply):

- ☒ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)). **If Checked, Please see Exhibit 1 and Exhibit 2**
- ☐ Installation of new equipment to replace equipment that needed to be replaced. The customer installed new equipment on the following date(s): _____.
- ☐ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): _____.
- ☐ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by the energy efficiency program:

- 1) If you checked the box indicating that the project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) - (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: 841,969 kWh

- 2) If you checked the box indicating that the customer installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____ kWh

Please describe any less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

Project #1 - Westlake Lighting Upgrades

- 3) If you checked the box indicating that the project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____ kWh

Please describe the less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

Project #1 - Westlake Lighting Upgrades

Section 4: Demand Reduction/Demand Response Programs

A) The customer's program involves (check the one that applies):

- ☐ Coincident peak-demand savings from the customer's energy efficiency program.
- ☐ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)
- ☐ Potential peak-demand reduction (check the one that applies):
 - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.
 - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.

B) On what date did the customer initiate its demand reduction program?

No specific demand reduction program. Coincidental reduction with completion of lighting project work on 10/31/2012.

C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

121 kW

Project #1 - Westlake Lighting Upgrades

Section 5: Request for Cash Rebate Reasonable Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

☐ Option 2: An exemption from the energy efficiency cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

B) The value of the option that the customer is seeking is:

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts):

☒ A cash rebate of \$31,574.00. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

Option 2: An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

☐ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for _____ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

OR

☐ A commitment payment valued at no more than \$_____. (Attach documentation and calculations showing how this payment amount was determined.)

Project #1 - Westlake Lighting Upgrades

OR

- ☐ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of the customer's ongoing efficiency program. (Attach documentation that establishes the ongoing nature of the program.) In order to continue the exemption beyond the initial 24 month period, the customer will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

- ☐ Total Resource Cost (TRC) Test. The calculated TRC value is: _____(Continue to Subsection 1, then skip Subsection 2)
- ☒ Utility Cost Test (UCT) . The calculated UCT value is: See Exhibit 3 (Skip to Subsection 2.)

Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The incremental measure costs were _____.

Project #1 - Westlake Lighting Upgrades

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were See Exhibit 3

The utility's program costs were See Exhibit 3

The utility's incentive costs/rebate costs were See Exhibit 3

Section 7: Additional Information

Please attach the following supporting documentation to this application:

- Narrative description of the program including, but not limited to, make, model, and year of any installed and replaced equipment.
- A copy of the formal declaration or agreement that commits the program or measure to the electric utility, including:
 - 1) any confidentiality requirements associated with the agreement;
 - 2) a description of any consequences of noncompliance with the terms of the commitment;
 - 3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;
 - 4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,
 - 5) a commitment by the customer to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.
- A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.

Project #2 - Compressor Replacement

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (check those that apply):

- ☒ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)). If Checked, Please see Exhibit 1 and Exhibit 2
- ☐ Installation of new equipment to replace equipment that needed to be replaced. The customer installed new equipment on the following date(s): _____.
- ☐ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): _____.
- ☐ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by the energy efficiency program:

- 1) If you checked the box indicating that the project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) - (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: 612,992 kWh

- 2) If you checked the box indicating that the customer installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____ kWh

Please describe any less efficient new equipment that was rejected in favor of the more efficient new equipment. Please see Exhibit 1 if applicable

Project #2 - Compressor Replacement

- 3) If you checked the box indicating that the project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____ kWh

Please describe the less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

Project #2 - Compressor Replacement

Section 4: Demand Reduction/Demand Response Programs

- A) The customer's program involves (check the one that applies):
- ☐ Coincident peak-demand savings from the customer's energy efficiency program.
 - ☐ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)
 - ☐ Potential peak-demand reduction (check the one that applies):
 - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.
 - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.
- B) On what date did the customer initiate its demand reduction program?
- _____
- C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):
- _____ kW

Project #2 - Compressor Replacement
Section 5: Request for Cash Rebate Reasonable
Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

☐ Option 2: An exemption from the energy efficiency cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

B) The value of the option that the customer is seeking is:

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts): \$17,112.00

☒ A cash rebate of ~~\$22,816.00~~. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

Option 2: An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

☐ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for _____ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

OR

☐ A commitment payment valued at no more than \$_____. (Attach documentation and calculations showing how this payment amount was determined.)

Project #2 - Compressor Replacement

OR

- ☐ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of the customer's ongoing efficiency program. (Attach documentation that establishes the ongoing nature of the program.) In order to continue the exemption beyond the initial 24 month period, the customer will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

- ☐ Total Resource Cost (TRC) Test. The calculated TRC value is: _____(Continue to Subsection 1, then skip Subsection 2)
- ☒ Utility Cost Test (UCT) . The calculated UCT value is: See Exhibit 3 (Skip to Subsection 2.)

Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The incremental measure costs were _____.

Project #2 - Compressor Replacement

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were See Exhibit 3

The utility's program costs were See Exhibit 3

The utility's incentive costs/rebate costs were See Exhibit 3

Section 7: Additional Information

Please attach the following supporting documentation to this application:

- Narrative description of the program including, but not limited to, make, model, and year of any installed and replaced equipment.
- A copy of the formal declaration or agreement that commits the program or measure to the electric utility, including:
 - 1) any confidentiality requirements associated with the agreement;
 - 2) a description of any consequences of noncompliance with the terms of the commitment;
 - 3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;
 - 4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,
 - 5) a commitment by the customer to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.
- A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.



Public Utilities Commission

Application to Commit
Energy Efficiency/Peak Demand
Reduction Programs
(Mercantile Customers Only)

Case No.: 13-0153-EL-EEC

State of Ohio :

Fred Mazurski, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

USG Interiors LLC

[insert customer or EDU company name and any applicable name(s) doing business as]

2. I have personally examined all the information contained in the foregoing application, including any exhibits and attachments. Based upon my examination and inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete.

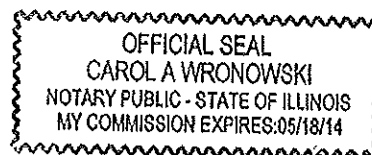
Fred Mazurski, Senior Mgr., Energy
Signature of Affiant & Title

Sworn and subscribed before me this 14th day of May, 2013 Month/Year

Carol A. Wronowski
Signature of official administering oath

Carol A. Wronowski
Print Name and Title

My commission expires on 5-18-14



Customer Legal Entity Name: USG Interiors Inc.

Site Address: USG Interiors Inc. Westlake Plant

Principal Address: 1000 Crocker Rd.

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	Westlake Lighting Upgrades	Early retirement of 1000 watt, 400 watt Metal Halide, various halodgen and incandescent lamps on the production floor and linear fluorescent T12 fixtures outfitted with standard magnetic ballasts. See Attachment A.1 for equipment cutsheet information.	Plant Engineers and E Group compiled lighting savings for projects self performed over last two years (IPMVP Option A). First Energy provides lighting calculator to calculate savings for rebate. (See Attachment B.1 and B.1A)	As the lamps fail but there were no plans to replace the basic fixtures	N/A
2	Compressor Replacement	Replaced fully functional Gardner Denver Compressor (1992) with new Sullair compressor outfitted with VFD. As part of this project, USG was able to eliminate regenerative dryer which required 15% purge air with a new refrigerated dryer. (See Attachment A.2)	Third party supplier conducted compressed air evaluation by logging compressed air usage over one week (7 day or 168 hour) period of time and provided energy saving projections for new compressor/dryer versus the existing compressor/dryer which was later replaced. (IPMVP Option A). See Attachment B.2 and Attachment B.2A	3- 5 years. With proper maintenance and as needed repairs compressor could be kept running beyond the estimate noted previously.	N/A

Exhibit 2

Customer Legal Entity Name: USG Interiors Inc.

Site Address: USG Interiors Inc. Westlake Plant

Principal Address: 1000 Crocker Rd.

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (C) <i>Note 1</i>
2011	9,188,160	9,188,160	9,188,160
2010	8,956,416	8,956,416	8,956,416
2009	8,195,264	8,195,264	8,195,264
Average	8,779,947	8,779,947	8,779,947

Project Number	Project Name	In-Service Date	Project Cost \$	50% of Project Cost \$	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) \$	Eligible Rebate Amount (H) \$ <i>Note 2</i>
1	Westlake Lighting Upgrades	10/31/2012	\$147,360	\$73,680	841,969	841,969	121	\$42,098	\$31,574
2	Compressor Replacement	10/31/2012	\$58,408	\$29,204	612,992	612,992	-	\$22,816	\$17,112
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
Total			\$205,768		1,454,961	1,454,961	121	\$64,914	\$48,686

Docket No. 13-0153

Site: 1000 Crocker Rd.

Notes

(1) Customer's usage is adjusted to account for the effects of the energy efficiency programs included in this application. When applicable, such adjustments are prorated to the in-service date to account for partial year savings.

(2) The eligible rebate amount is based upon 75% of the rebates offered by the FirstEnergy Commercial and Industrial Energy Efficiency programs or 75% of \$0.08/kWh for custom programs for all energy savings eligible for a cash rebate as defined in the PUCO order in Case NO.10-834-EL-EEC dated 9/15/2010, not to exceed the lesser of 50% of the project cost or \$250,000 per project. The rebate also cannot exceed \$500,000 per customer per year, per utility service territory.

Commitment
Payment
\$

\$0

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost \$/MWh (B)	Utility Avoided Cost \$ (C)	Utility Cost \$ (D)	Cash Rebate \$ (E)	Administrator Variable Fee \$ (F)	Total Utility Cost \$ (G)	UCT (H)
1	842	\$ 308	\$ 259,562	\$ 2,025	\$31,574	\$8,420	\$ 42,018	6.2
2	613	\$ 308	\$ 188,973	\$ 2,025	\$17,112	\$6,130	\$ 25,267	7.48
Total	1,455	\$ 308	448,535	4,050	\$48,686	\$14,550	67,285	6.7

Notes

(A) From Exhibit 2, = kWh saved / 1000

(B) This value represents avoided energy costs (wholesale energy prices) from the Department of Energy, Energy Information Administration's 2009 Annual Energy Outlook (AEO) low oil prices case. The AEO represents a national average energy price, so for a better representation of the energy price that Ohio customers would see, a Cinergy Hub equivalent price was derived by applying a ratio based on three years of historic national average and Cinergy Hub prices. This value is consistent with avoided cost assumptions used in EE&PDR Program Portfolio and Initial Benchmark Report, filed Dec 15, 2009 (See Section 8.1, paragraph a).

(C) = (A) * (B)

(D) Represents the utility's costs incurred for self-directed mercantile applications for applications filed and applications in progress. Includes incremental costs of legal fees, fixed administrative expenses, etc.

(E) This is the amount of the cash rebate paid to the customer for this project.

(F) Based on approximate Administrator's variable compensation for purposes of calculating the UCT, actual compensation may be less.

(G) = (D) + (E) + (F)

(H) = (C) / (G)

USG Interiors Inc. ~ USG Interiors Inc. Westlake Plant
Docket No. 13-0153

Site: 1000 Crocker Rd.

GE
Lighting Solutions

Technical Guide

IMMERSION™

LED Refrigerated Display Lighting

Vertical Cases
RV40 Series

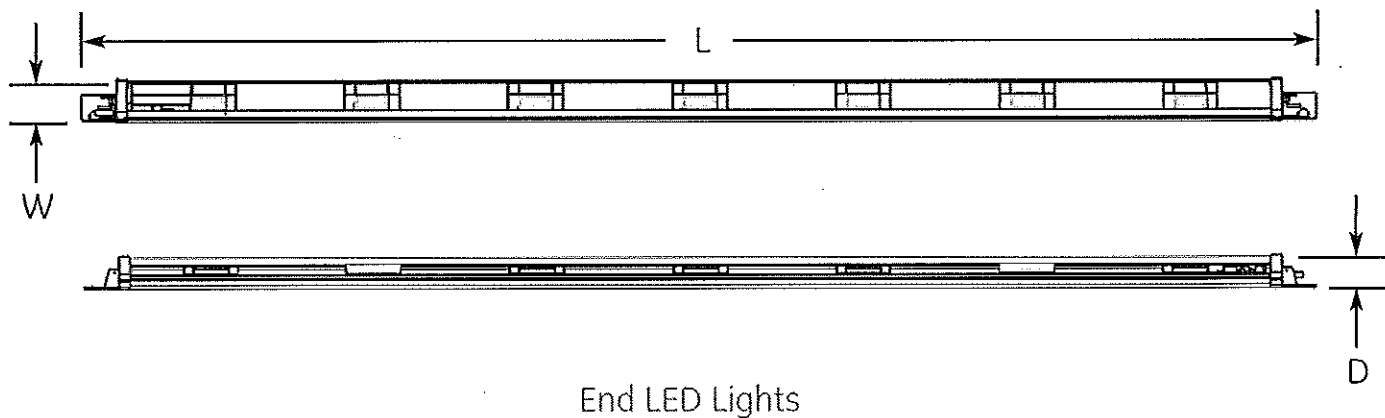
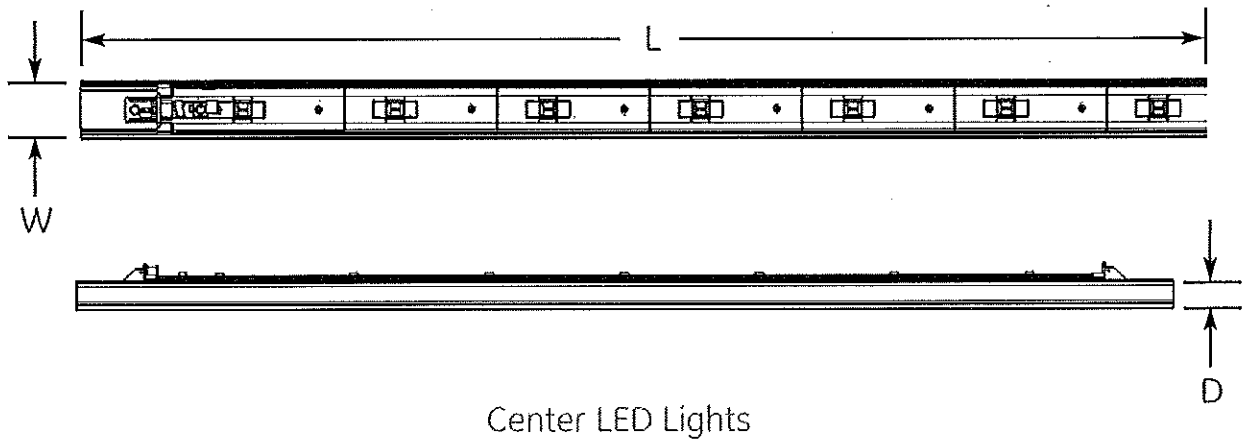


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ecomagination™

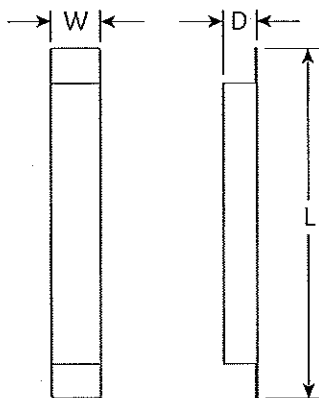


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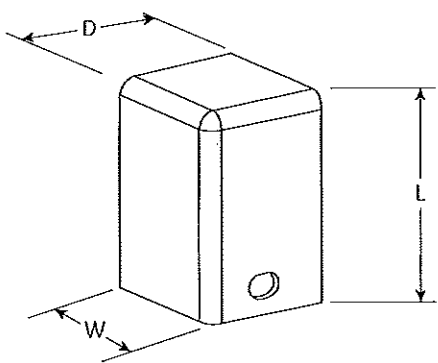
LED Lights



Accessories



LED Driver



Wire Cover

Product Code (Single)	Description	Item	DIMENSIONAL DATA		
			Length (L)	Width (W)	Depth (D)
79813	GEPS4000NCMUL-SY	LED Driver	(inch) 10.75	1.65	1.05
			(mm) 273	42	26.7
79814	GE-CV-4060CTR	Wire Cover	(inch) 1.77	1.42	1.19
			(mm) 45.01	36	30.23

	Product Code (Single)	Product Code (10-Pack)	Description	Item	PERFORMANCE DATA							DIMENSIONAL DATA			
					Color Temp (K)*	Lumens**	LPW	Lumens Per ft (m)	Life (Hours)	CRI (Typical)	Power (Watts)***	Length (L)	Width (W)	Depth (D)	
5000K	79777	79780	GELT403050CTR-SY, -SB	30" LED Light - Center	5000	644	71.6	258 846	50,000	75	9	(inch) (mm)	29.30 744.2	2.58 65.5	1.28 32.5
	79778	79781	GELT403050EDR-SY, -SB	30" LED Light - Right End	5000	379	79	152 500	50,000	75	4.8	(inch) (mm)	29.30 744.2	2.06 52.4	1.59 40.4
	79779	79782	GELT403050EDL-SY, -SB	30" LED Light - Left End	5000	652	68.6	217 712	50,000	75	9.5	(inch) (mm)	35.16 893.1	2.58 65.5	1.28 32.5
	79795	79798	GELT403650CTR-SY, -SB	36" LED Light - Center	5000	395	79	132 433	50,000	75	5	(inch) (mm)	35.16 893.1	2.06 52.4	1.59 40.4
	79796	79799	GELT403650EDR-SY, -SB	36" LED Light - Right End	5000	872	74.5	218 715	50,000	75	11.7	(inch) (mm)	48.50 1232.4	2.60 65.5	1.30 32.5
	79797	79800	GELT403650EDL-SY, -SB	36" LED Light - Left End	5000	477	78.2	119 390	50,000	75	6.1	(inch) (mm)	48.50 1232.4	2.10 52.3	1.60 40.4
	65602	65605	GELT404850CTR-SY, -SB	48" LED Light - Center	5000	1070	66.9	214 702	50,000	75	16	(inch) (mm)	60.3 1532	2.58 65.5	1.28 32.5
	65603	65606	GELT404850EDR-SY, -SB	48" LED Light - Right End	5000	650	81.3	130 427	50,000	75	8	(inch) (mm)	60.3 1532	2.06 52.4	1.59 40.4
	65604	65607	GELT404850EDL-SY, -SB	48" LED Light - Left End	5000	1268	65.7	227 744	50,000	75	19.3	(inch) (mm)	70.75 1797.1	2.58 65.5	1.28 32.5
	79741	79744	GELT406050CTR-SY, -SB	60" LED Light - Center	5000	739	78.9	132 434	50,000	75	10	(inch) (mm)	70.75 1797.1	2.06 52.4	1.59 40.4
	79742	79745	GELT406050EDR-SY, -SB	60" LED Light - Right End	5000	606	67.3	242 794	50,000	80	9	(inch) (mm)	29.30 744.2	2.58 65.5	1.28 32.5
	79743	79746	GELT406050EDL-SY, -SB	60" LED Light - Left End	4000	335	69.8	134 440	50,000	80	4.8	(inch) (mm)	29.30 744.2	2.06 52.4	1.59 40.4
	79759	79762	GELT407050CTR-SY, -SB	70" LED Light - Center	5000	638	67.2	213 699	50,000	80	9.5	(inch) (mm)	35.16 893.1	2.58 65.5	1.28 32.5
	79760	79763	GELT407050EDR-SY, -SB	70" LED Light - Right End	5000	331	66.2	110 361	50,000	80	5	(inch) (mm)	35.16 893.1	2.06 52.4	1.59 40.4
	79761	79764	GELT407050EDL-SY, -SB	70" LED Light - Left End	4000	806	68.9	202 663	50,000	80	11.7	(inch) (mm)	48.50 1232.4	2.60 65.5	1.30 32.5
4000K	79783	79786	GELT403040CTR-SY, -SB	30" LED Light - Center	4000	441	72.3	110 361	50,000	80	6.1	(inch) (mm)	48.50 1232.4	2.10 52.3	1.60 40.4
	79784	79787	GELT403040EDR-SY, -SB	30" LED Light - Right End	4000	1070	59	213 698	50,000	80	18	(inch) (mm)	60.3 1532	2.58 65.5	1.28 32.5
	79785	79788	GELT403040EDL-SY, -SB	30" LED Light - Left End	4000	650	72	129 424	50,000	80	9	(inch) (mm)	60.3 1532	2.06 52.4	1.59 40.4
	79801	79804	GELT403640CTR-SY, -SB	36" LED Light - Center	4000	1213	62.8	217 712	50,000	80	19.3	(inch) (mm)	70.75 1797.1	2.58 65.5	1.28 32.5
	79802	79805	GELT403640EDR-SY, -SB	36" LED Light - Right End	4000	695	69.5	124 408	50,000	80	10	(inch) (mm)	70.75 1797.1	2.06 52.4	1.59 40.4
	79803	79806	GELT403640EDL-SY, -SB	36" LED Light - Left End	4000	695	69.5	124 408	50,000	80	10	(inch) (mm)	70.75 1797.1	2.06 52.4	1.59 40.4
	65608	65611	GELT404840CTR-SY, -SB	48" LED Light - Center	4000	753	64.4	188 617	50,000	80	11.7	(inch) (mm)	48.50 1232.4	2.60 65.5	1.30 32.5
	65609	65612	GELT404840EDR-SY, -SB	48" LED Light - Right End	4000	416	68.2	104 341	50,000	80	6.1	(inch) (mm)	48.50 1232.4	2.10 52.3	1.60 40.4
	65610	65613	GELT404840EDL-SY, -SB	48" LED Light - Left End	4000	1055	58.6	211 692	50,000	80	18	(inch) (mm)	60.3 1532	2.58 65.5	1.28 32.5
	79747	79750	GELT406040CTR-SY, -SB	60" LED Light - Center	4000	1070	59	213 698	50,000	80	18	(inch) (mm)	60.3 1532	2.58 65.5	1.28 32.5
	79748	79751	GELT406040EDR-SY, -SB	60" LED Light - Right End	4000	650	72	129 424	50,000	80	9	(inch) (mm)	60.3 1532	2.06 52.4	1.59 40.4
	79749	79752	GELT406040EDL-SY, -SB	60" LED Light - Left End	4000	1213	62.8	217 712	50,000	80	19.3	(inch) (mm)	70.75 1797.1	2.58 65.5	1.28 32.5
	79765	79768	GELT407040CTR-SY, -SB	70" LED Light - Center	4000	695	69.5	124 408	50,000	80	10	(inch) (mm)	70.75 1797.1	2.06 52.4	1.59 40.4
	79766	79769	GELT407040EDR-SY, -SB	70" LED Light - Right End	4000	695	69.5	124 408	50,000	80	10	(inch) (mm)	70.75 1797.1	2.06 52.4	1.59 40.4
	79767	79770	GELT407040EDL-SY, -SB	70" LED Light - Left End	4000	695	69.5	124 408	50,000	80	10	(inch) (mm)	70.75 1797.1	2.06 52.4	1.59 40.4
3500K	65614	65617	GELT404835CTR-SY, -SB	48" LED Light - Center	3500	753	64.4	188 617	50,000	80	11.7	(inch) (mm)	48.50 1232.4	2.60 65.5	1.30 32.5
	65615	65618	GELT404835EDR-SY, -SB	48" LED Light - Right End	3500	416	68.2	104 341	50,000	80	6.1	(inch) (mm)	48.50 1232.4	2.10 52.3	1.60 40.4
	65616	65619	GELT404835EDL-SY, -SB	48" LED Light - Left End	3500	1055	58.6	211 692	50,000	80	18	(inch) (mm)	60.3 1532	2.58 65.5	1.28 32.5
	79753	79756	GELT406035CTR-SY, -SB	60" LED Light - Center	3500	1055	58.6	211 692	50,000	80	18	(inch) (mm)	60.3 1532	2.58 65.5	1.28 32.5
	79754	79757	GELT406035EDR-SY, -SB	60" LED Light - Right End	3500	589	65.4	118 386	50,000	80	9	(inch) (mm)	60.3 1532	2.06 52.4	1.59 40.4
	79755	79758	GELT406035EDL-SY, -SB	60" LED Light - Left End	3500	1148	59.5	205 674	50,000	80	19.3	(inch) (mm)	70.75 1797.1	2.58 65.5	1.28 32.5
	79771	79774	GELT407035CTR-SY, -SB	70" LED Light - Center	3500	1148	59.5	205 674	50,000	80	19.3	(inch) (mm)	70.75 1797.1	2.58 65.5	1.28 32.5
	79772	79775	GELT407035EDR-SY, -SB	70" LED Light - Right End	3500	649	64.9	116 381	50,000	80	10	(inch) (mm)	70.75 1791.1	2.06 52.4	1.59 40.4
	79773	79776	GELT407035EDL-SY, -SB	70" LED Light - Left End	3500	649	64.9	116 381	50,000	80	10	(inch) (mm)	70.75 1791.1	2.06 52.4	1.59 40.4

*Color temp (CCT) +/- 10%

**Based on typical in-store performance.

***System watts Typ AC based on Typical in-store performance

LED Driver Performance Data

79813
GEPS4000NCMUL-SY

	Min	Typical	Max
Input Voltage (VAC)	100		240
Input Current (A)		1	
Input Line Frequency (Hz)		50/60	
LED Light Output Voltage (VDC)		12	
Output Power (W)			60
Max Output Current (A)		5	
Total Harmonic Distortion		N/A*	
Power Factor at >80% Load (48W @ 120 VAC, 48W @ 240VAC)	0.9		
Operating Temperature Range (°C)	-20 C		45 C
Storage Temperature Range (°C)	-40 C		70 C

Conforms to the following standards:



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class [A] RFLD complies with the Canadian standard ICES-005.
Ce DEFR de la classe [A] est conforme à la NMB-005 du Canada.



GE Lighting Solutions • 1-888-MY-GE-LED • www.gelightingsolutions.com
1-888-69-43-533

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DISP030-R092111



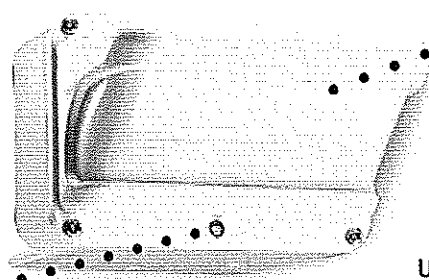
STANDARD LIGHTING CONTROLS
FOR THE FUTURE

FS-705/FS-755 Wide Angle PIR Occupancy Sensor

Dual pyro covers more than 40 detection zones

User-adjustable time delay

LED motion indicator



180° horizontal coverage

Ideal for refrigerator and freezer cases

User-adjustable sensitivity

PROJECT

LOCATION/TYPE

Product Overview

Description

The FS-705/FS-755 Wide Angle PIR Occupancy Sensors control lighting based on occupancy utilizing passive infrared (PIR) technology. The sensors provide 180 degree coverage and are designed for locations that require wide angle occupancy detection, such as refrigerator and freezer cases, vending machines and aisleway displays.

Operation

The FS-705/FS-755 are self-contained devices. The FS-705 is a 24 VDC device that operates via a 120, 230 or 277 VAC WattStopper power pack, while the FS-755 is a line voltage unit operating at 120/277 VAC. By detecting the difference between infrared energy from a human body in motion and the background space within the controlled area, the sensor turns lighting systems on. When occupants leave the controlled area, it switches lighting off after the user-selectable time delay elapses.

Wide Angle and Sensitivity Range

Equipped with a Fresnel lens and a unique dual pyro, the FS-705/FS-755 can cover more than 40 detection zones in all directions. Coverage is adjustable to 12 or 15 feet. When mounted at seven feet six inches above the floor, the sensor provides true 180 degree horizontal coverage and 70 degree vertical coverage to efficiently monitor the controlled area. The sensor's time delay adjusts to one of four settings: thirty seconds, one minute, two minutes or eight minutes.

Applications

The FS-705/FS-755 offers excellent control of lighting for locations where wide angle coverage is needed, such as refrigerator and freezer cases, vending machines and aisleways. Its wide coverage pattern detects motion before a person reaches the display area to turn lighting on, and turns off lighting when the area is vacant for the user-adjustable time delay. In cold food aisles, one sensor is typically used per case. It is ideally suited to controlling LED lighting. Sensor performance will provide fast payback and many years of energy savings.

Features

- Dual pyro covers more than 40 detection zones
- Coverage pattern adjustable to 12 or 15 feet when mounted 7'6" above the floor
- Time delay selectable to one of four settings (30 seconds, 1 minute, 2 minutes or 8 minutes)
- 180 degree horizontal coverage pattern
- 70 degree vertical coverage pattern
- Line and low voltage options
- LED indicator for occupancy detection
- DIP switch simplifies sensor adjustments
- RoHS compliant

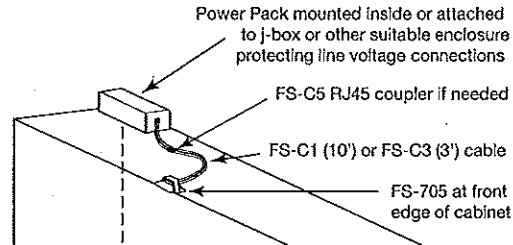
Specifications

- FS-705: Power Supply: 24 VDC from WattStopper Power Pack
- FS-755: 120/277 VAC, 60 Hz
- Current consumption: 7mA @ 24VDC
- Weight: 2.11oz (60 grams)
- Detection indication: green LED

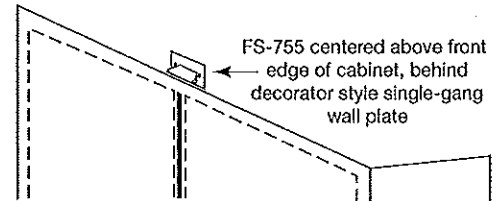
- Operating temperature range: 32-131°F [0-55°C]
- Storage temperature range: -22-176°F [-30-80°C]
- UL and CUL listed
- Five year warranty

Mounting Diagrams

FS-705 Mounting

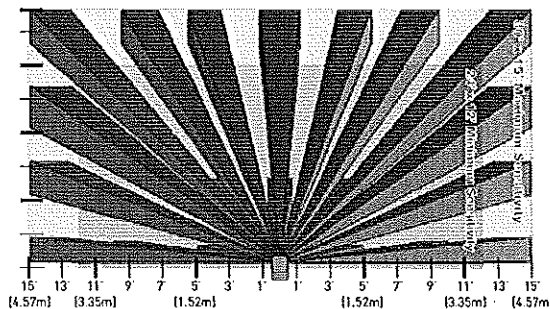


FS-755 Mounting

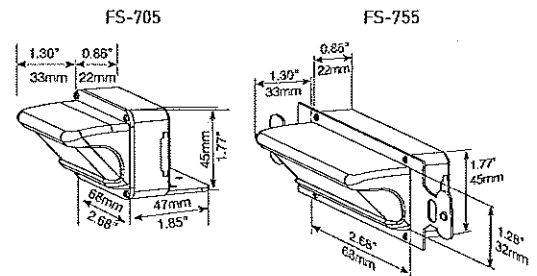


Coverage and Dimensions

Top View

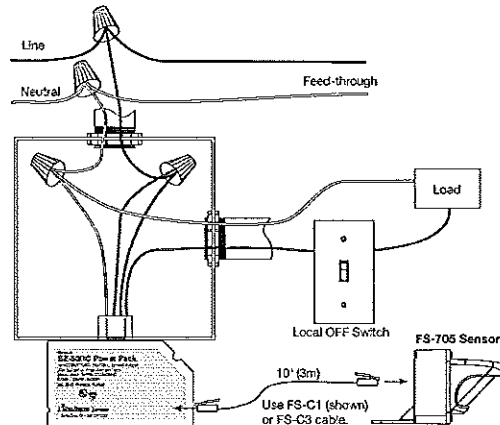


Dimensions

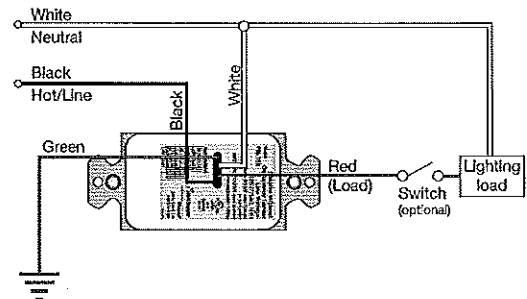


Wiring

FS-705 wiring with a BZ-50RC Power Pack



FS-755 wiring



Ordering Information

Catalog No.

Description

<input type="checkbox"/> FS-705	Wide Angle PIR Occupancy Sensor, 24 VDC
<input type="checkbox"/> FS-755	Wide Angle PIR Occupancy Sensor, 120/277 VAC
<input type="checkbox"/> FS-C1	10' (3.048m) cable with shielded RJ45 male connectors at each end
<input type="checkbox"/> FS-C1-20	20' extension cable with shielded RJ45 male connectors at each end
<input type="checkbox"/> FS-C2	6' (1.828m) cable with 3 flying leads at one end and a shielded RJ45 male connector on the other
<input type="checkbox"/> FS-C2-J	RJ45 override jumper
<input type="checkbox"/> FS-C3	3' (0.914m) cable with shielded 90° male RJ45 on one end and a shielded straight male RJ45 at the other
<input type="checkbox"/> FS-C4	Shielded RJ45 splitter with female to dual female receptacles
<input type="checkbox"/> FS-C5	Shielded RJ45 male to male coupler
<input type="checkbox"/> FS-C6	24" cable with 90° RJ45 connector and three flying leads
<input type="checkbox"/> BZ-50	Univ. Volt. Power Pack, 120/230/277VAC Input, 50/60Hz, 24 VDC; 225 mA* Output w/flying leads
<input type="checkbox"/> BZ-50RC	Univ. Volt. Power Pack, 120/230/277VAC Input, 50/60Hz, 24 VDC; 225 mA* Output w/RJ45 connector
<input type="checkbox"/> BZ-150	Univ. Volt. Power Pack, 120/230/277VAC Input, 50/60Hz, 24 VDC; 225 mA* Output w/flying leads, manual/auto-on option

NOTE: *Output is 225 mA with relay connected.

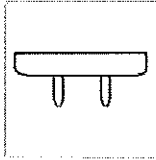
CUTSHEET #2

EXISTING TO BE REPLACED FREEZER/ REFRIG. CASE
LIGHTING - 58 WATT, 60", T8 LAMP w/ LOW TEMP BALLAST



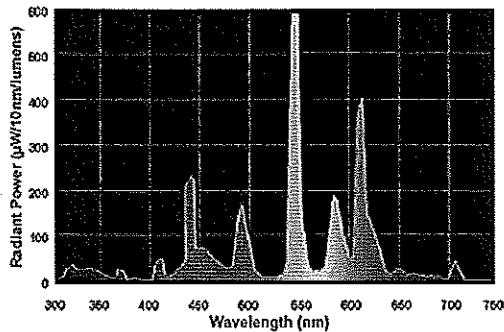
GE
Lighting

40081 - F58T8/841PLYLXLR
GE T8



GRAPHS & CHARTS

Graphs_Spectral Power Distribution



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight
Bulb	Linear
Base	T8
Rated Life	Medium Bi-Pin (G13)
Bulb Material	20000.0 hrs
	Soda lime

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	5200.0
Mean Lumens	4940.0
Nominal Initial Lumens per Watt	89
Color Temperature	4000.0 K
Color Rendering Index (CRI)	85.0

ELECTRICAL CHARACTERISTICS

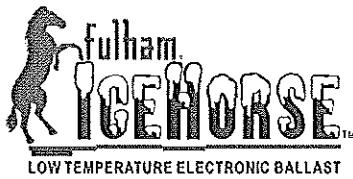
Wattage	58.0
Lamp Current	0.7 A

DIMENSIONS

Nominal Length	60.000 in(1524.0 mm)
Bulb Diameter (DIA)	1.000 in(25.4 mm)
Max Base Face to Base Face (A)	1500.000 in(38100.0 mm)

PRODUCT INFORMATION

Product Code	40081
Description	F58T8/841PLYLXLR
Standard Package	Case
Standard Package GTIN	10043168400814
Standard Package Quantity	25
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	25
UPC	043168400817

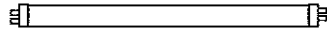


SPECIFICATION SHEET : IH2-UNV-270-T8

This Is An Original Product From Fulham Co., Inc

Description : Universal Voltage, Auto Restart With Cold Starting Feature For Refrigeration Application/s.

This Ballast Will Operate Following Lamps.

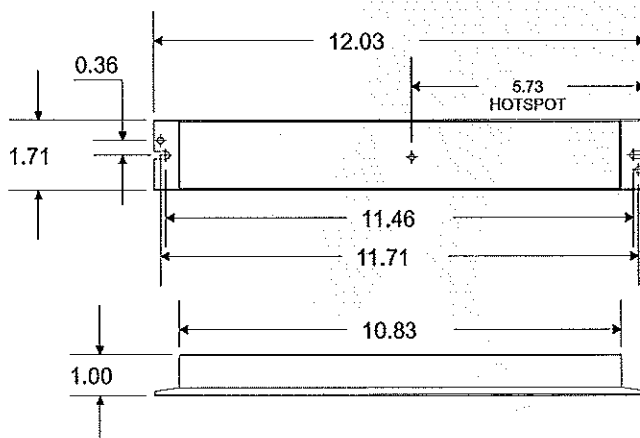


F58T8, F70T8

ELECTRICAL DATA (277V APPLICATION)

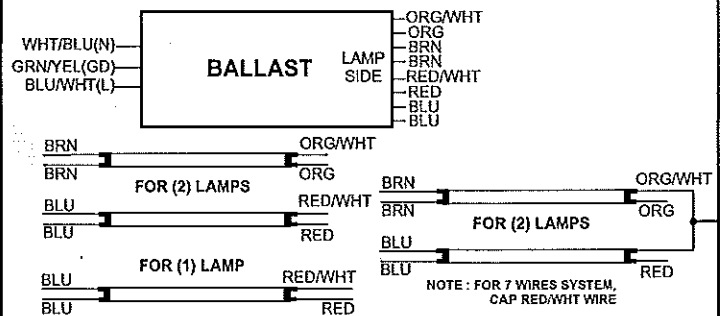
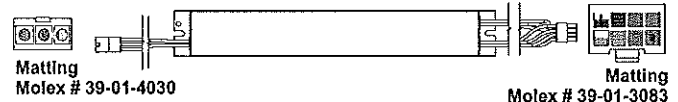
INPUT VOLT: 277V \pm 10%, 50/60Hz						
LAMP WATTS/TYPE	F58T8	F70T8	F58T8	F70T8	-	-
LAMPS OPERATED	1	1	2	2		
INPUT POWER (W)	66	77	130	152		
LINE CURRENT	0.25	0.29	0.48	0.56		
POWER FACTOR	> 0.9					
THD	< 10 %					
CURRENT CREST FACTOR	< 1.7					
EMI/RFI COMPLIANCE	FCC PART 18-A (Non-Consumer)					
SOUND RATING	" A "					
BALLAST TYPE	PROGRAMMED PREHEAT START					
VOLTAGE TRANSIENTS	ANSI 62.41					
INPUT/PROTECTION	FUSE					
OUTPUT/PROTECTION	DEACTIVATED LAMP PROTECTION					
MIN. OPERATING TEMP	-30 °C (-22 ° F)					
MAX. CASE TEMP	70 °C (158 ° F)					
TYPE	"CC"					
APPROVALS/CLASS	UL /cUL LISTED, CLASS " P ", 1 OUTDOOR					

MECHANICAL DATA



WIRING DIAGRAM

WIRES	WHT	BLK	GRN						
LENGTH-INCHES	7 ± 1"	7 ± 1"	7 ± 1"						
WIRES	ORG/WH	ORG	BRN	BRN	RED/WH	RED	BLU	BLU	
LENGTH-INCHES	7 ± 1"	7 ± 1"	7 ± 1"	7 ± 1"	7 ± 1"	7 ± 1"	7 ± 1"	7 ± 1"	



NOTE : This Ballast Case Must Be Grounded

Fulham Co., Inc extends limited warranty only to the original purchaser or to the first user for the period of **3 years** from the date of manufacture as indicated by the date code stamped on each product and when properly installed and under normal conditions of use. For additional warranty guide line, please refer to our Complete Product Catalog OR call Customer Service at 1-323-599-5000.

DUE TO A PROGRAM OF CONTINUOUS IMPROVEMENT, FULHAM Co., INC RESERVES THE RIGHT TO MAKE ANY VARIATION IN DESIGN OR CONSTRUCTION TO THE EQUIPMENT DESCRIBED.

Address : 12705 South Van Ness Ave., Hawthorne, CA 90250 Tel.: 1-323-599-5000, Fax.: 1-323-754-9060. Website: www.fulham.com 2006-142-3 rev C

Attachment A-2

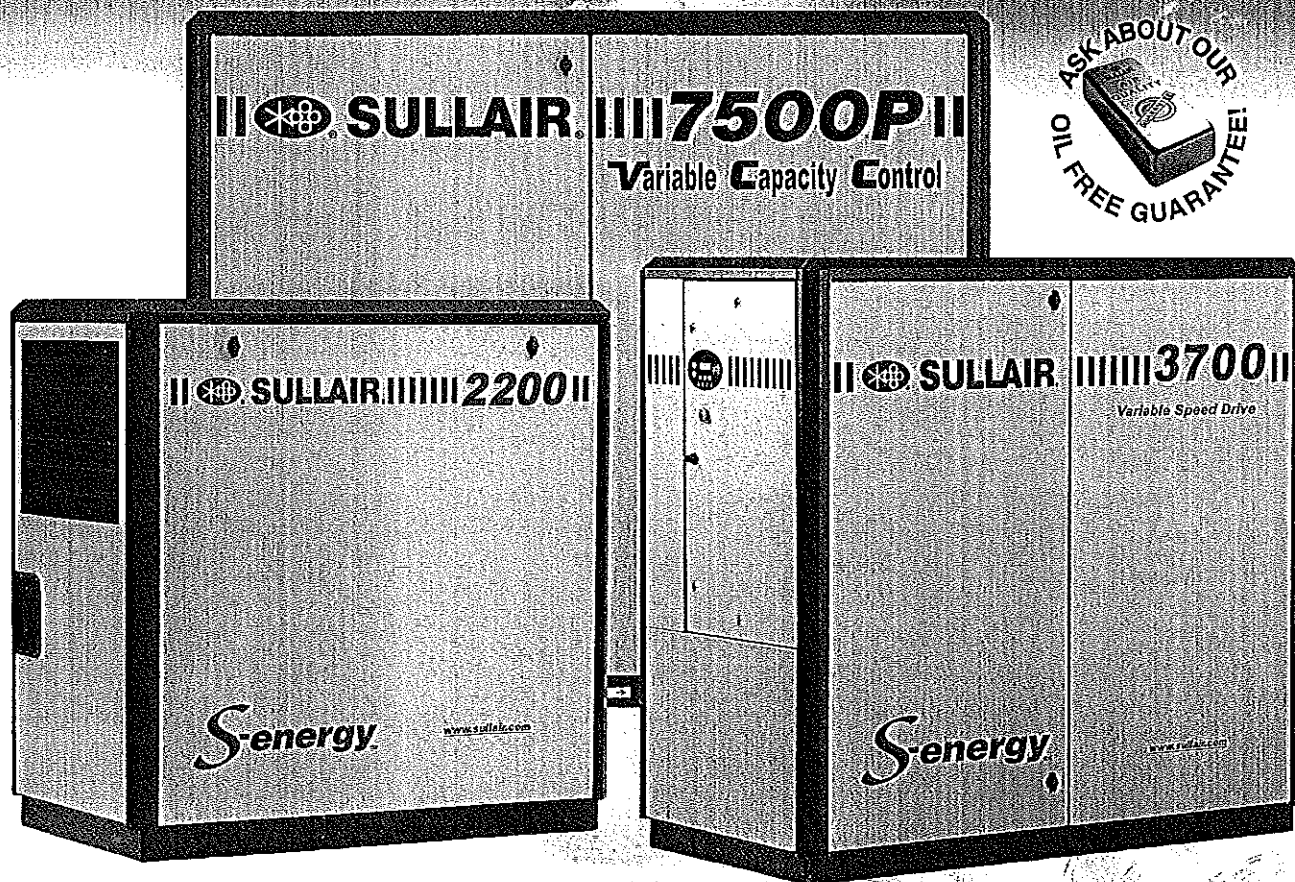
Compressor & Dryer Units

S-energy

Lubricated Rotary Screw Air Compressors

Constant Speed and Variable Speed Drives

18-75 kW ■ 25-100 Horsepower



- Reliable
- Quiet
- Energy efficient
- Small footprint
- Easy to maintain


SULLAIR
Always air. Always there.®

For the Maximum Energy Efficiency and Operating Consistency, Sullair Air Compressors with **VSD**

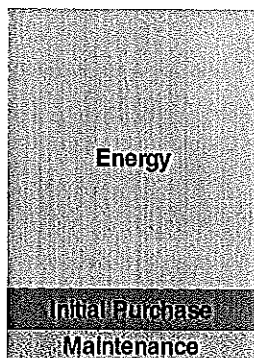
The Sullair Compressors with **VSD** Provide:

- Excellent energy savings
- Relief from potential peak demand charges
- Possible utility company rebate
- DC link Choke or 3% Line Reactor Included (Model/Voltage Specific)
- Stable system pressure
- Consistent product quality
- Reduced system air leaks
- Reduced storage requirements
- Flexibility for future growth
- Lowest 5-year life cycle cost

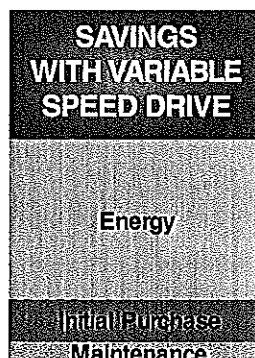
Your Compressed Air System Can Improve Your Bottom Line: 35% Energy Savings in the First Five Years

In just five years, the electrical power cost to operate a standard compressor can be more than six times greater than its purchase price.

Standard Compressors

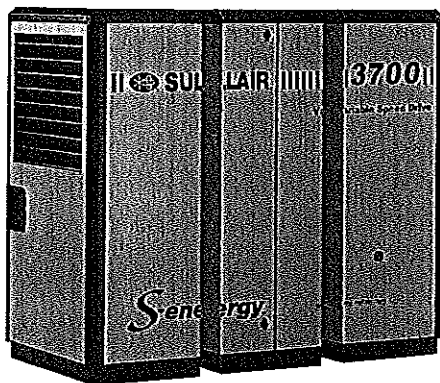


Sullair's VSD Compressors



Total Compressor Flexibility

Sullair's **VSD** compressors provides the flexibility to vary both capacity and pressure. This flexibility makes it possible to "grow" your air system without adding more compressors.

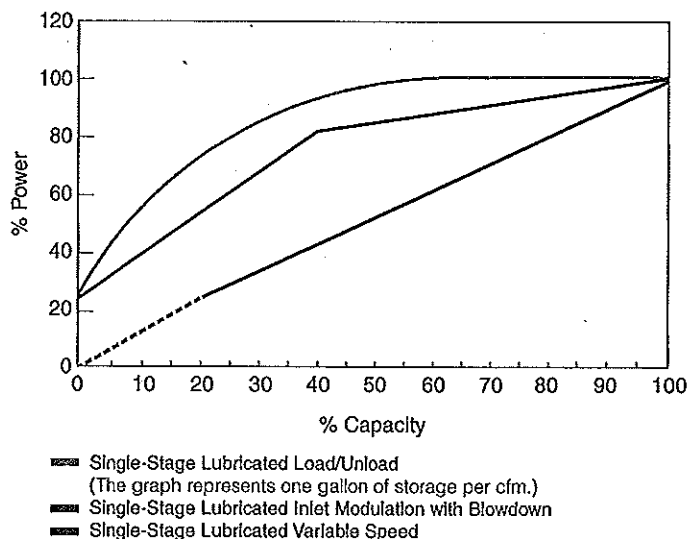


FOR TODAY, TOMORROW, AND THE FUTURE

Variable Speed Drive is the Superior Alternative to Other Compressor Control Systems

The chart below is a representation of nominal control systems for generic comparative purposes. A detailed and accurate comparison of specific compressor models is available from your Sullair representative or authorized distributor.

PART-LOAD PERFORMANCE ASSESSMENT

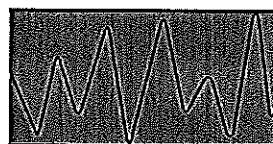


Reference: *Compressed Air and Gas Handbook*, 6th Edition, pages 221-223.

Stable System Pressure Improves the Consistency of Your Process to Reduce Product Rejects

- Lowers air system leaks
- Reduces system storage requirements
- Provides increased energy savings to increase profits

Standard Compressors



Sullair's VSD Compressors



Soft Start is Standard with Unlimited Starts and Stops

- No need for Wye Delta and other soft starters
- No need to control the number of hot or cold starts
- Unlimited starts and stops save electrical costs
- Avoids high electrical current at start-up

VSD Avoids Potential Peak Demand Charges

VSD compressors provide the highest power factor over the entire frequency range, often avoiding utility company penalties.

Senergy® Series Compressors Are Easiest to Maintain

Before we designed these compressors, we reviewed every aspect of product development with the customer and the maintenance staff in mind. The result is Sullair reliability in the most compact, most robust, most maintenance-friendly and quietest compressor package available on the market.

Multiple features of the **Senergy** Series revolutionize the compressor's serviceability and provide for a cleaner, safer work environment and cost effective compressor. Standard maintenance can all be performed from this side.

Sullair Optimizer™ Air-Fluid Separator

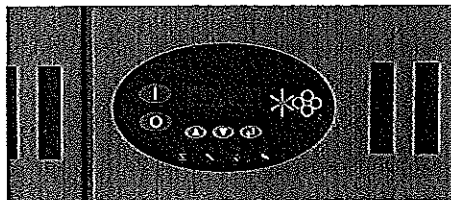
- High efficiency molded media
- Lower pressure drop reduces power consumption
- Less than 1 ppm carryover reduces cost of make-up fluid



Fiberglass Fluid Filter

- Coreless, non-metallic design means easy disposal
- 20% more efficient than common cellulose media
- Better filtration lengthens the life of the compressor unit

WS Microprocessor Control System



With the simplified WS microprocessor, there are no complicated menus to manage.

- The graphic display is clear and concise
- Get the critical operations information more easily, including status, temperature, pressure, and load/unload set points
- Use a Windows PC to remotely monitor, upgrade the software, and set up changes
- Built-In sequencing of up to 16 machines

Sullair Optimalair™ Air Filter

- Provides the finest inlet filtration in the industry (.4 micron)
- Keeps fluid clean and extends life of internal components
- Reduces pressure drop during operating life, resulting in energy savings



Environmental Protection Pan

This series features a fully sealed environmental protection pan to capture spills that may occur during servicing.

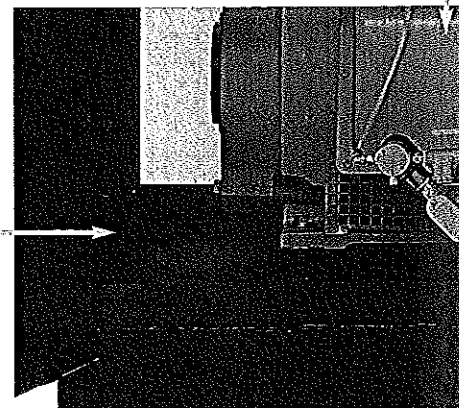
Quick Access to Cooler

With the removal of just a few bolts, the cooler slides out on rails for easy routine cleaning.



Sullair Motor Features

- Slow speed—1800 rpm
- Cast iron construction
- NEMA design
- Direct coupled/flange mounted
- Most comprehensive warranty in the industry



Sullair's Variable Capacity Control Technology

How the Spiral Valve Operation Works

The compression volume varies to suit the air demand by progressively opening or closing internal bypass ports on the air end.

Capacity is matched to system demand, reducing cycling time and extending component life.

Part-load capacity and efficiency can produce energy savings up to 17%.

Variable Displacement Air End

Sullair's variable displacement air end maintains system pressure to

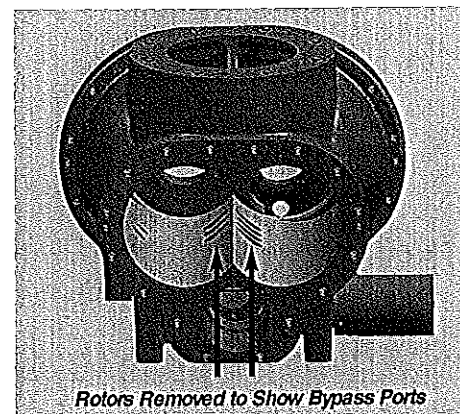
the plant to match air demand. Since the VCC compressors use large, efficient, slow running rotors, a lower power consumption is achieved at the top end of capacity. Oil foaming does not occur, air is not wasted to atmosphere, and bearings last longer.

The motor and air end run at optimum speed and therefore maintain optimum efficiency throughout the full variable output range.

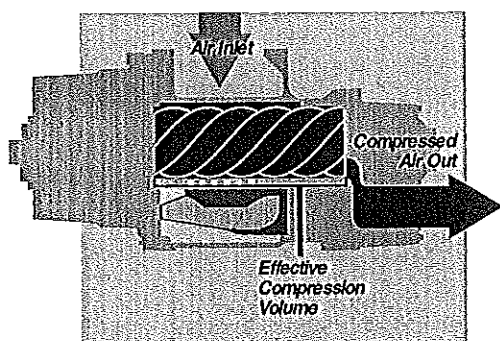
Sullair VCC compressors react quickly to rapid changes in demand. The effective rotor length is progressively reduced as the demand is reduced which provides the most efficient part-

load control system to 50% output. This system is extremely simple and provides a cost effective, energy efficient control alternative.

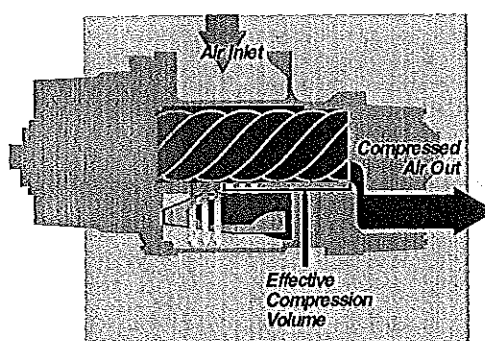
Bypass Ports in Stator



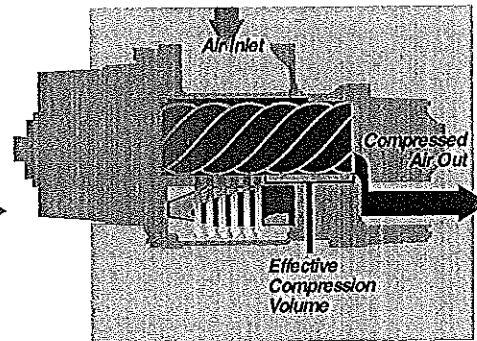
Closed Bypass Ports



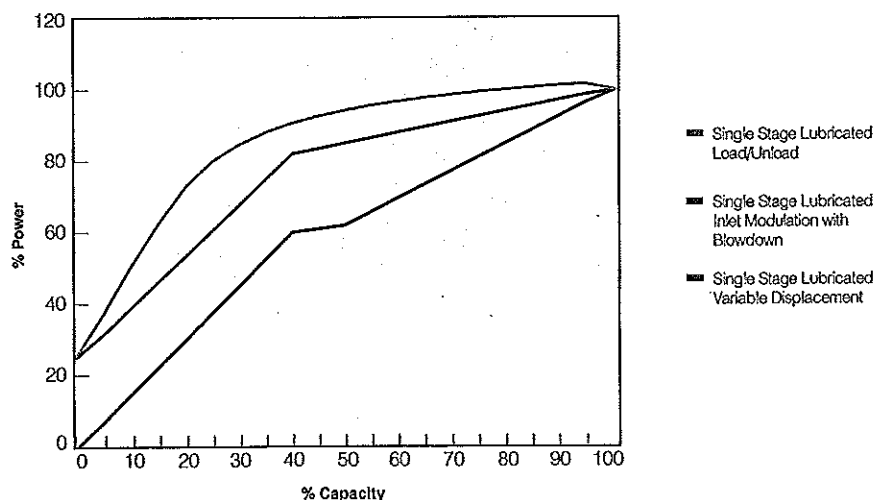
Partially Open Bypass Ports



Open Bypass Ports



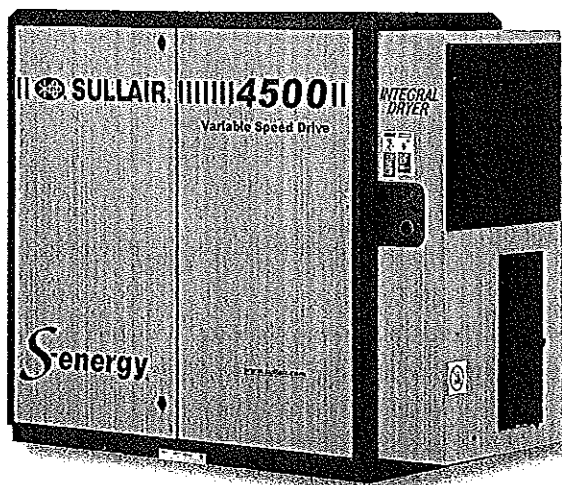
PART LOAD PERFORMANCE ASSESSMENT



The *S-energy*® Performance Air System

Clean, Dry Air is Essential

Quality air treatment — the removal of condensate and particulate — is essential. When cooled, vapor in compressed air will condense. The removal of condensate and particulate is essential for quality air. First, the air must be dry. Vapor in compressed air will condense when cooled. Without removing the condensate, moisture in the air stream can damage your total compressed air system, product, or process. To protect your plant air system and air-using equipment, particulate must be removed by filtration. Sullair filters will provide this protection and improve the quality of your product or process. Proper filtration will also reduce your compressed air energy costs.



The Sullair Performance Air System

The Performance Air System includes a *S-energy*® compressor and a Sullair dryer. We've taken the guesswork out of putting your System together. All components of the System have been perfectly matched and sized to provide maximum performance, without paying for more than you need. Plus, the Performance Air System is simple to install and, because of its small footprint, requires a minimum amount of floor space.

Sullair Air Quality Guarantee

Two Levels of Air Quality

Sullair recognizes that the requirements for air quality vary according to each compressed air application. For this reason, Sullair provides compressed air systems that achieve two distinct levels of air quality and a guarantee for each.

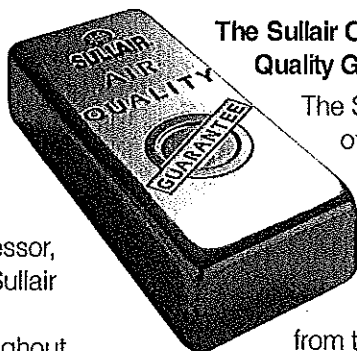
Sullair Stationary Air Power System

The Sullair Stationary Air Power System matches a Sullair compressor, a Sullair dryer and Sullair filters. Sullair assures that its System will meet specific performance levels throughout its operational life. We offer a one-year test/review period, backed by a purchase refund guarantee, to verify the performance of the Sullair System.

Select the System

Select the air quality level to meet your plant air or process requirements. You

can be assured that the quality of air from the Sullair System you specify will remain consistent for the life of the equipment. Sullair guarantees it... and that's as good as gold.



The Sullair Oil-Free Air Quality Guarantee

The System consists of a Sullair compressor, Sullair dryer, and Sullair filters. The compressed air from this system contains particulates no

larger than .01 micron, including coalesced liquid water and lubricants.

Maximum remaining oil aerosol content is 0.01 parts per million by weight (ppm/w) @ 70°F, including oil vapor. The air from this Sullair System meets the most stringent ISO standard (ISO

8573.1, Class 1 for oil vapor and Class 1 for particulate) for air quality.

The Sullair Critical Air Quality Guarantee

The compressed air from this Sullair System exceeds the ISO standard (ISO 8573.1, Class 1 for oil vapor and Class 1 for particulate). The System includes a Sullair compressor, Sullair dryer, and Sullair filters. The odor-free compressed air from this system contains particulates no larger than 0.01 micron, including water and oil aerosol content of 0.01 parts per million by weight (ppm/w) @ 70°F. The remaining oil vapor content is less than 0.003 ppm/w.

To get more information on Sullair's Air Quality Guarantee, please contact your Sullair distributor.

These Systems are not intended to remove carbon monoxide, methyl isocyanate or other noxious, corrosive or toxic gases, vapors or fumes. The System does not provide breathing air.

Technical Specifications

60Hz Motor Frequency			Full-Load Capacities ***								Weight		Weight **		Discharge Connect	dBA †
Model*	Motor		100 psig	7 bar	125 psig	9 bar	150 psig	10 bar	175 psig	12 bar						
	hp	kW	acfm	m³/min	acfm	m³/min	acfm	m³/min	acfm	m³/min	lbs	kg	lbs	kg		
1800	25	18	119	3.37	106	3.00	96	2.71	85	2.40	1420	644	1621	735	1-1/2" NPT	67
1800V	25	18	107	3.05	99	2.80	90	2.54	81	2.30	1461	663	1662	754	1-1/2" NPT	67
2200	30	22	140	3.96	127	3.59	111	3.14	104	2.94	1450	658	1651	749	1-1/2" NPT	67
2200V	30	22	138	3.90	125	3.54	115	3.25	105	2.97	1491	676	1692	768	1-1/2" NPT	67
3000	40	30	-	-	163	4.61	148	4.19	138	3.90	1615	733	1814	823	1-1/2" NPT	69
3000V	40	30	-	-	163	4.61	150	4.24	140	3.96	1654	750	1854	841	1-1/2" NPT	69
3000P	40	30	199	5.63	182	5.15	165	4.67	-	-	1990	903	2274	1031	1-1/2" NPT	68
3000PV	40	30	200	5.66	180	5.09	163	4.61	148	4.19	2050	930	2334	1059	1-1/2" NPT	68
3700	50	37	250	7.08	222	6.28	196	5.55	179	5.06	2040	925	2324	1054	1-1/2" NPT	68
3700V	50	37	249	7.05	225	6.37	202	5.72	183	5.18	2100	953	2384	1081	1-1/2" NPT	68
4500	60	45	-	-	267	7.56	247	6.99	220	6.23	2190	993	2474	1122	1-1/2" NPT	69
4500V	60	45	-	-	260	7.36	238	6.74	222	6.28	2300	1043	2584	1172	1-1/2" NPT	69
4500P	60	45	303	8.58	260	7.36	233	6.59	-	-	2815	1277	3188	1446	2" NPT	72
4500PV	60	45	305	8.63	269	7.61	-	-	-	-	2952	1339	3325	1508	2" NPT	72
4500PS	60	45	310	8.77	276	7.81	-	-	-	-	2957	1341	3330	1511	2" NPT	70
5500	75	55	376	10.64	344	9.74	296	8.38	276	7.81	2886	1309	3259	1478	2" NPT	72
5500V	75	55	377	10.67	341	9.65	306	8.66	278	7.87	2963	1344	3336	1513	2" NPT	72
5500PS	75	55	387	10.96	349	9.88	-	-	-	-	3028	1374	3401	1543	2" NPT	70
7500	100	75	490	13.87	444	12.57	397	11.24	369	10.45	3213	1457	3586	1627	2" NPT	73
7500V	100	75	493	13.96	454	12.85	415	11.75	381	10.79	3405	1545	3778	1714	2" NPT	73
7500P	100	75	500	14.16	457	12.94	418	11.83	371	10.50	3280	1488	3653	1657	2" NPT	71
7500PV	100	75	500	14.16	457	12.94	420	11.89	394	11.15	3472	1575	3845	1744	2" NPT	71
7500PS	100	75	500	14.16	457	12.94	418	11.83	371	10.50	3355	1522	3728	1691	2" NPT	71

50Hz Motor Frequency			Full-Load Capacities ***								Weight		Weight **		Discharge Connect	dBA †
Model *	Motor		7 bar	100	9 bar	125 psig	10 bar	150 psig	12 bar	175 psig						
	kW	hp	m³/min	acfm	m³/min	acfm	m³/min	acfm	m³/min	acfm	kg	lbs	kg	lbs		
1800	18	25	3.09	109	2.86	101	2.55	90	2.38	84	644	1420	735	1621	1-1/2" NPT	67
1800V	18	25	3.09	109	2.86	101	2.55	90	2.38	84	663	1461	754	1662	1-1/2" NPT	67
2200	22	30	3.77	133	3.43	121	3.03	107	2.89	102	658	1450	749	1651	1-1/2" NPT	67
2200V	22	30	3.79	134	3.45	122	3.05	108	2.89	102	676	1491	768	1692	1-1/2" NPT	67
3000	30	40	4.98	176	4.30	152	4.05	143	3.74	132	733	1615	823	1814	1-1/2" NPT	69
3000V	30	40	4.98	176	4.30	152	4.05	143	3.77	133	750	1654	841	1854	1-1/2" NPT	69
3000P	30	40	5.27	186	4.64	164	4.55	161	-	-	903	1990	1031	2274	1-1/2" NPT	
683000PV	30	40	5.55	196	4.98	176	4.47	158	4.13	146	930	2050	1059	2334	1-1/2" NPT	68
3700	37	50	6.80	240	6.29	222	5.78	204	5.10	180	925	2040	1054	2324	1-1/2" NPT	
683700V	37	50	6.88	243	6.14	217	5.64	199	5.13	181	953	2100	1081	2384	1-1/2" NPT	68
4500	45	60	-	-	7.53	266	6.74	238	6.20	219	993	2190	1122	2474	1-1/2" NPT	69
4500V	45	60	-	-	7.25	256	6.71	237	6.20	219	1043	2300	1172	2584	1-1/2" NPT	69
4500P	45	60	8.15	288	7.64	270	6.82	241	-	-	1277	2815	1446	3188	2" NPT	72
4500PV	45	60	8.33	294	7.33	259	-	-	-	-	1339	2952	1508	3325	2" NPT	72
4500PS	45	60	8.20	290	7.70	273	-	-	-	-	1341	2957	1511	3330	2" NPT	70
5500	55	75	10.47	370	9.37	331	7.98	282	7.56	267	1309	2886	1478	3259	2" NPT	72
5500V	55	75	10.28	363	9.32	329	8.39	296	7.62	269	1344	2963	1513	3336	2" NPT	72
5500PS	55	75	10.00	354	9.40	332	-	-	-	-	1374	3028	1543	3401	2" NPT	70
7500	75	100	13.30	470	12.43	439	11.63	411	10.30	364	1457	3213	1627	3586	2" NPT	73
7500V	75	100	13.45	475	12.40	438	11.33	400	10.39	367	1545	3405	1714	3778	2" NPT	73
7500P	75	100	13.90	491	12.50	443	11.50	405	10.50	369	1488	3280	1657	3653	2" NPT	71
7500PV	75	100	13.56	479	12.38	437	11.55	408	10.67	377	1575	3472	1744	3845	2" NPT	71
7500PS	75	100	13.90	491	12.50	443	11.50	405	10.50	369	1522	3355	1691	3728	2" NPT	71

* Model Variations: V = Variable Speed Drive; P = Premium Air End; S = Spiral Valve ** Weight with integral dryer. † dBA at 1 meter.

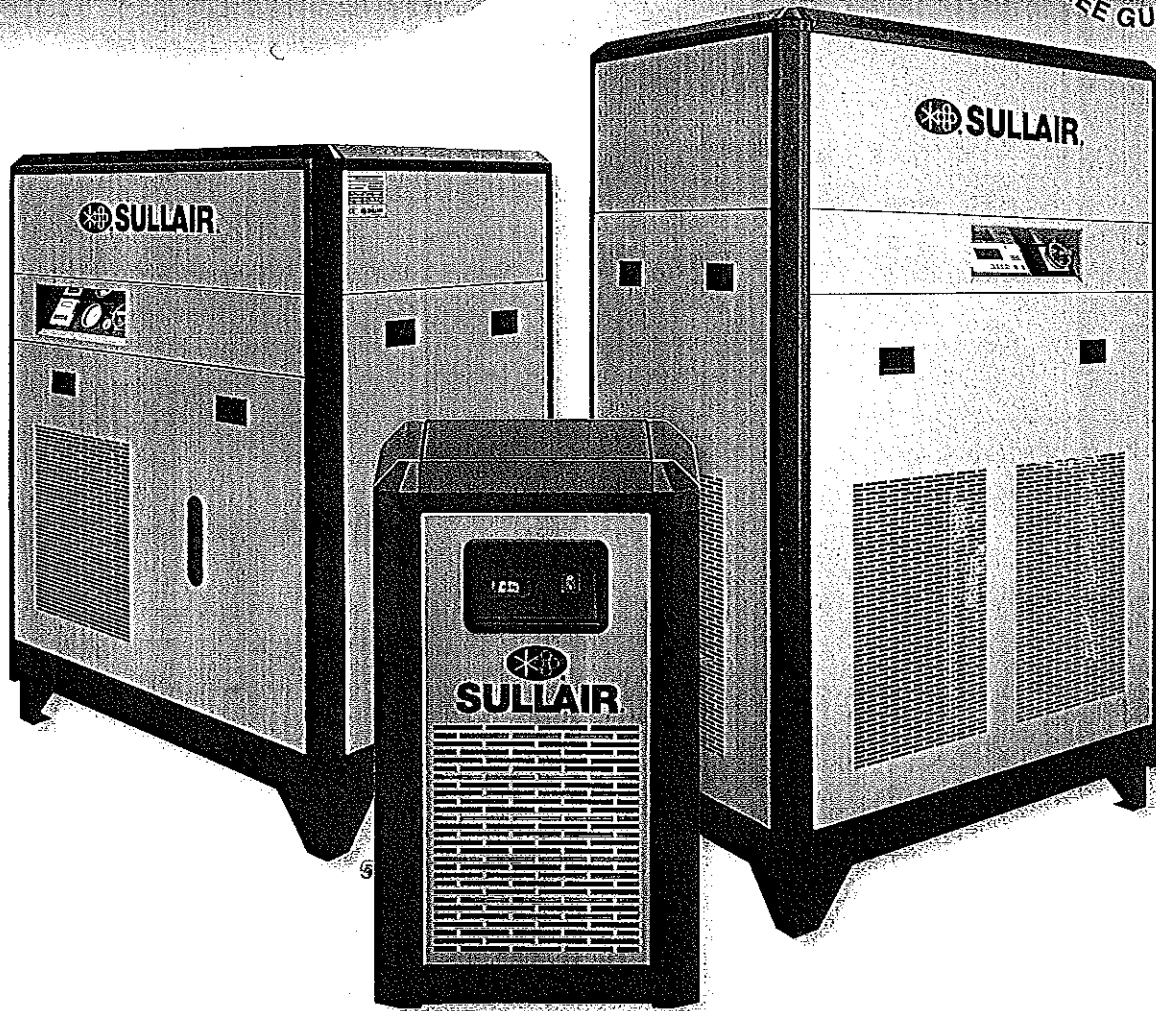
*** Capacity per CAGI / PNEUROP PN2GPTC2 (Annex C to ISO 1217) Moisture Drain Connection at 1/4" NPT.

Dimensions		Length		Length ††		Width		Height	
Models		in	mm	in	mm	in	mm	in	mm
1800, 1800V, 2200, 2200V, 3000, 3000V		53.2	1351	63.0	1600	31.5	800	53.2	1351
3000P, 3000PV, 3700, 3700V, 4500, 4500V		62.0	1575	71.5	1816	34.5	876	61.5	1562
4500P, 4500PV, 4500PS, 5500, 5500V, 5500PS, 7500, 7500V, 7500P, 7500PV, 7500PS		78.7	1999	91.9	2334	43.3	1100	68.9	1750

†† Length with integral dryer. Information and data are subject to change without notice.

Refrigerated Compressed Air Dryers

5-6,000 scfm



- Refrigerated Non-Cycling
- Refrigerated Cycling
- Refrigerated High Temperature


SULLAIR®
Always air. Always there.™

The Importance of Clean, Dry Compressed Air

How much water is too much?

Any amount of water is too much.

Water jeopardizes everything you want your compressed air system to do. It ruins product and fouls processes.

- Relative humidity is the amount of water vapor in air relative to what it could hold at a given temperature
- Moisture in compressed air remains in a vapor state through the compression cycle, so it is not a problem until it leaves the compressor
- Air discharged from a compressor is approximately 150°F to 450°F
- At 75°F and 75% relative humidity, a 75 hp compressor takes in 46 gallons of water vapor in 24 hours. When this air is cooled to approximately 35°F at 100 psig, the water vapor condenses into 46 gallons of liquid!



Liquid remaining after the aftercooler: 14.7 gallons (32%)



Liquid remaining after a refrigerated dryer: 1.8 gallons (4%)

Refrigerated Dryers

Sullair offers these configurations of refrigerant dryers

- **RN – Refrigerated Non-Cycling**
5 to 325 scfm
- **RD – Refrigerated Digital Cycling**
400 to 6,000 scfm
- **RC – Refrigerated Cycling**
150 to 3,000 scfm
- **RH – Refrigerated High Temperature**
15 to 100 scfm



All Sullair refrigerated dryers have these advantages and features:

- Energy saving – true green product
 - 3-in-1 heat exchanger
 - High efficiency compressors
- Globally marketable refrigerant R-134a
- Standard electronic timer drains for 35 scfm and above
- Refrigerant analyzer indicator
- Fan cycle switch
- Easy removable side panels and parts
- Consistent dew point performance
- Low power consumption
- Low pressure drop
- Insulated heat exchanger
- Evaporator with multi-stage separator stainless steel demister
- High quality fan motors
- Oversized condenser

Max Inlet Temperature: 150°F
(240°F High Temperature)
Max Inlet Pressure: 230 psig
Max Ambient Temperature 120°F

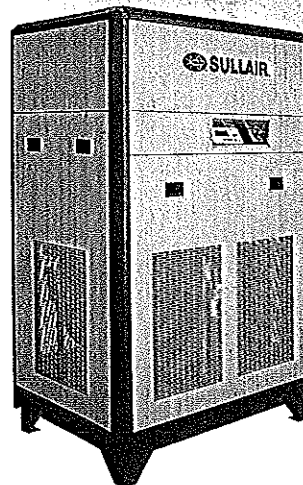
Features of the Sullair Refrigerated Dryers



Refrigerated Non-Cycling Dryers

RN Series: 5-325 scfm

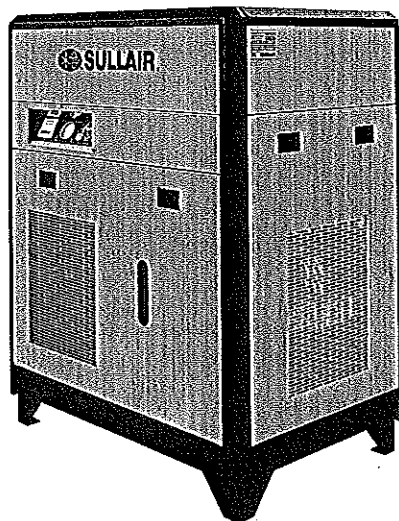
- No dew point swings
- Compact footprint
- Variable flow capacity from 10% to 100%
- High inlet temperature (up to 150°F)
- Counter-current, variable flow heat exchanger
- Non-velocity sensitive demister/separator
- Consistent dew point



Refrigerated Digital Cycling Dryers

RD Series: 400-6,000 scfm

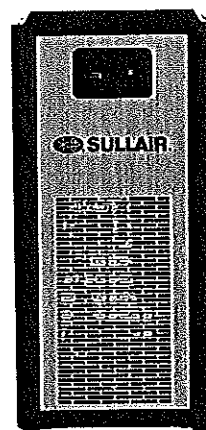
- Optimum dew point levels for the highest system performance
- Cycling control for increased energy savings
- Energy efficient scroll compressor
- Low operating cost
- Optional communication package
- Consistent dew point



Refrigerated Cycling Dryers

RC Series: 150-3,000 scfm

- Stainless steel pump and cold storage tank
- Thermal expansion valve
- Programmable temperature controller
- Energy savings at low loads
- Intermittent compressor operation
- Simple refrigerant circuit
- Thermal mass storage medium
- Accurate dew point control



High Temperature Dryers

RH Series: 15-100 scfm

- Inlet temperature up to 240°F
- Independent air cooled after-cooler
- Moisture separator
- Two independent timer drains
- Easy removable panels and maintenance
- Rated at 50°F dew point

Comprehensive Controls

Advanced, User-Friendly Microprocessor Controls

Models RC-400, RD-400 and larger dryers include:

- Digital multi-functional display
- Digital dew point temperature read-out for an accurate indication of actual working conditions
- Multiple alarm safety with easy-to-understand coded messages
- Extensive programmability allows system to be personalized to individual user needs
- Status reports for quick reference to dryer operation
- Indicator to optimize preventive maintenance
- Volt-free alarm contact offers a remote status signal
- The controller has 8 temperature sensor inputs

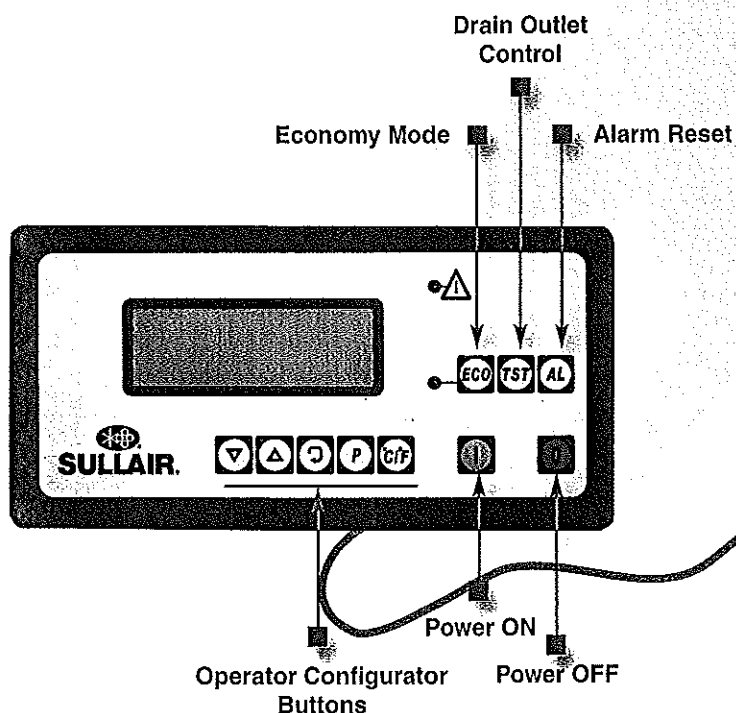
Models RN and RH dryers use simple analog indicators and controls.

- Off switch with light
- Dew point indicator



Operator Interface

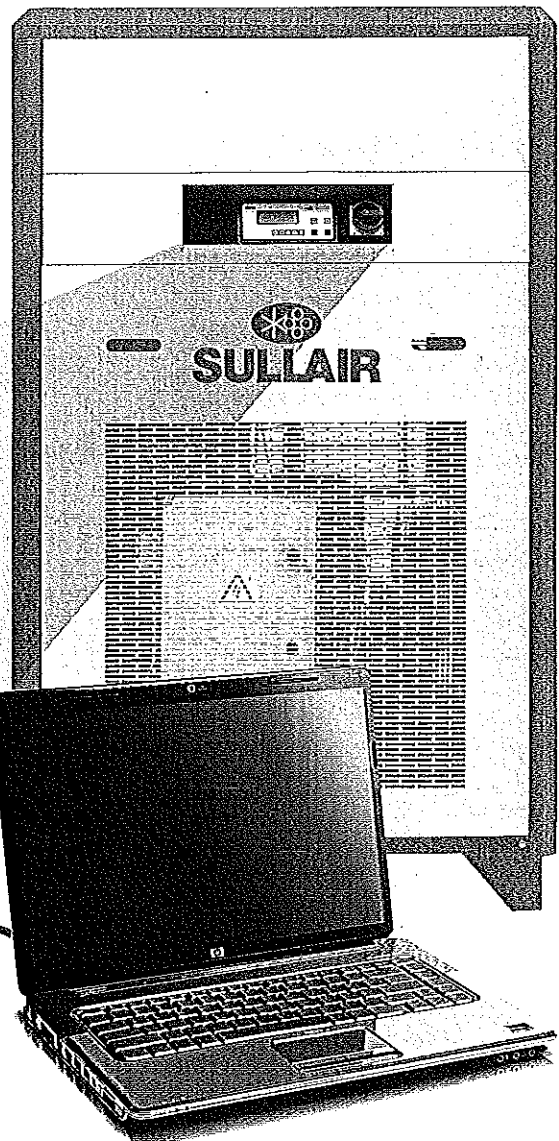
Closeup of panel shows its many features.



Remote Monitoring Capabilities (Optional)

The Sullair controller has a communications interface that can be used for remotely monitoring. Modbus RTU protocol is used for communication. The user can remotely start the dryer, stop the dryer, reset any alarm and monitor:

- Evaporator temperature
- Inlet air temperature
- Ambient temperature
- Refrigerant gas high and low temperature
- Fan, compressor and condenser working conditions
- Dew point
- Drain function
- Working hours



The front panel view of the controller contains a four line 20 character LCD display, 9 buttons and one alarm indicator LED.

Specifications: RN Non-Cycling Models, 60 Hz

Model	Electrical	AC / WC	scfm	Inlet-Outlet Connection	Drain	Width in	Depth in	Height in	Weight lbs
RN-5	115-1-60	AC	5	1/2" NPT	3/8"	14	14	24	85
RN-10	115-1-60	AC	10	1/2" NPT	3/8"	14	14	24	85
RN-15	115-1-60	AC	15	1/2" NPT	3/8"	14	14	24	85
RN-25	115-1-60	AC	25	1/2" NPT	3/8"	16	14	24	95
RN-25	230-1-60	AC	25	1/2" NPT	3/8"	16	14	24	95
RN-35	115-1-60	AC	35	1/2" NPT	3/8"	16	18	24	109
RN-35	230-1-60	AC	35	1/2" NPT	3/8"	16	18	24	109
RN-50	115-1-60	AC	50	3/4" NPT	3/8"	16	18	24	109
RN-50	230-1-60	AC	50	3/4" NPT	3/8"	16	18	24	109
RN-75	115-1-60	AC	75	3/4" NPT	3/8"	16	18	29	143
RN-75	230-1-60	AC	75	3/4" NPT	3/8"	16	18	29	143
RN-100	115-1-60	AC	100	3/4" NPT	3/8"	16	18	29	165
RN-100	230-1-60	AC	100	3/4" NPT	3/8"	16	18	29	165
RN-125	115-1-60	AC	125	1-1/2" NPT	3/8"	18	22	32	197
RN-125	230-1-60	AC	125	1-1/2" NPT	3/8"	18	22	32	197
RN-150	115-1-60	AC	150	1-1/2" NPT	3/8"	18	24	32	215
RN-150	230-1-60	AC	150	1-1/2" NPT	3/8"	18	24	32	215
RN-175	230-1-60	AC	175	1-1/2" NPT	3/8"	22	24	35	243
RN-200	230-1-60	AC	200	1-1/2" NPT	3/8"	22	24	35	243
RN-250	230-1-60	AC	250	1-1/2" NPT	3/4"	28	24	50	465
RN-250	230-3-60	AC	250	1-1/2" NPT	3/4"	28	24	50	465
RN-250	460-3-60	AC	250	1-1/2" NPT	3/4"	28	24	50	465
RN-250	575-3-60	AC	250	1-1/2" NPT	3/4"	28	24	50	465
RN-325	230-3-60	AC	325	2" NPT	3/4"	28	24	50	494
RN-325	460-3-60	AC	325	2" NPT	3/4"	28	24	50	494
RN-325	575-3-60	AC	325	2" NPT	3/4"	28	24	50	494

Correction Factors for Models RN and RD

Inlet Pressure

psig	50	60	75	100	115	125	150	175	200
bar	3.5	4.1	5	7	7.9	8.5	10	12	14
Factor Pressure: F1*	0.75	0.77	0.85	1.00	1.06	1.10	1.16	1.25	1.30

Ambient Temperature

°F	60	80	90	100	105	110	115	120
°C	16	26	32	38	40	43	46	49
Factor Ambient: F3*	1.12	1.08	1.06	1.00	0.96	0.90	0.80	0.65

*Flow Correction Factors

Capacity correction to be used when operating conditions differ from those shown above. To obtain dryer capacity at new conditions, multiply nominal capacity x F1 x F2 x F3.

Inlet Temperature

°F	85	90	95	100	110	120	130	140	150
°C	29	32	35	38	43	49	54	60	65
Factor Inlet: F2*	1.20	1.14	1.08	1.00	0.75	0.60	0.50	0.45	0.35

Performance Data Based On:

Ambient temperature	100°F
Inlet temperature	100°F
Inlet pressure	100 psig

For flow rates at other conditions, please contact Suitair for correct sizing.

Performance data obtained and presented in accordance with CAGI Standard No. ADF 100, "Refrigerated Compressed Air Dryers—Methods for Testing and Rating."

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	841,969
Total Change in Connected Load	121.22

Annual Estimated Cost Savings	\$84,196.90
Annual Operating Hours	5,466

Interior Lighting Incentive @ \$0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	\$42,043.40
Exterior Lighting Incentive @ \$0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	\$55.05
Total retrofit CFL Incentive @ \$1/screw-in CFL lamp; \$15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	\$0.00
Total retrofit LED Exit Incentive @ \$10/exit sign	\$0.00
Total Lighting Controls Incentive @ \$25/occupancy sensor and \$25/daylight sensor (includes all Lighting Controls, both interior and exterior)	\$0.00

Total Calculated Incentive	\$42,098.45
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Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	590
Total Lamp Quantity for retrofit Screw-In CFLs	0

Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

Please briefly describe how you estimated your coincidence factor (CF) and applicant equivalent full-load hours (EFLH) for facility type "Other" indicated on the Lighting Form tab Plant lighting and majority of office lighting on during CP times of the day.

Demand Savings (For Internal Use Only)	109.05
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Attachment B.1A USG Lighting kWh Savings Calculations

Client:	USG Westlake	Annual Hours:	7200	24/7 - 6 days/week
Contact:	Facilities Department	Annual Hours Office	3435	7- 7 5 days a week
Project:	Lighting Upgrade	Cost/KWH:	0.08	Estimated ongoing rate
Location:	Westlake	System Voltage:	480	
Lighting Supply Vendor:	Graybar	Age Current System:		
Lighting Installation Contractor:	Self Installation			

Existing	Existing Type	Existing Wattage/Lamp	Lamps/f ixture	Total System Wattage	Number of Fixtures	Total Wattage	Total KWH/Year
Plant	400W MH	400	1	458	10	4,580	32,976
Plant	400W MH	400	1	458	71	32,518	234,130
Plant	1000W MH	1,000	1	1080	85	91,800	660,960
Plant	60W Halogen	60	1	60	18	1,080	7,776
Office	60W Halogen	60	1	60	9	540	1,855
Plant	75W Halogen	75	1	75	11	825	5,940
Office	75W Halogen	75	1	75	9	675	2,319
Plant	90W Halogen	90	1	90	12	1,080	7,776
Office	90W Halogen	90	1	90	12	1,080	3,710
Plant	60W Halogen	60	1	60	9	540	3,888
Office	50W Halogen	50	1	50	9	450	1,546
Plant	50W Halogen	50	1	50	9	450	3,240
Office	60W Incandescent	60	1	60	6	360	1,237
Plant	400 W Flood	400	1	458	1	458	1,573
Office	T12 Utubes	34W	2	82	248	20,336	69,854
Office	T12 48"	34	2	80	6	480	1,649
Plant	8' T12's	60W	2	138	51	7,038	50,674
Plant	T12 48"	34	2	80	6	480	3,456
Plant	T12 48"	34	2	80	2	160	1,152
Plant	MH1000/1	1,000	1	1080	4	4,320	31,104
Plant	MH400/1	400	1	458	2	916	6,595
					590	170,166	1,133,408

New	Installed Type	Installed Wattage/lamp	Lamps/f ixture	Total System Wattage	Number of Fixtures	Total Wattage	
Plant	146 W LED	146	1	146	10	1,460	10,512
Plant	137 W LED	137	1	137	71	9,727	70,034
Plant	161 W LED	161	1	161	85	13,685	98,532
Plant	4.5 W LED	4.5	1	4.5	18	81	583
Office	4.5 W LED	4.5	1	4.5	9	41	139
Plant	10 W LED	10	1	10	11	110	792
Office	10 W LED	10	1	10	9	90	309
Plant	20 W LED	20	1	20	12	240	1,728
Office	20 W LED	20	1	20	12	240	824
Plant	4 W LED	4	1	4	9	36	259
Office	4 W LED	4	1	4	9	36	124
Plant	7 W LED	7	1	7	9	63	454
Office	9W LED	9	1	9	6	54	185

Plant	46W LED	46	1	46	1	46	158
Office	T8 Tubes	32	2	58	248	14,384	49,409
Office	T8 48"	32	2	59	6	354	1,216
Plant	Tandem T8 48"	32	4	112	51	5,712	41,126
Plant	T8 48"	32	2	59	6	354	1,216
Plant	T8 48"	32	2	59	2	118	850
Plant	6 Lamp T5	54	6	351	4	1,404	10,109
Plant	4 Lamp T5	54	4	234	2	468	3,370
					590	48,703	288,560

Annual KWH Savings (No Sensors) 844,848

KW Savings 121

ATTACHMENT B.2
COMPRESSED AIR EVALUATION

Systemate™

Compressed Air System Evaluation

08/06/2010

USG

1000 Crocker Rd

Westlake, OH

44145

Performed By:

Diversified Air Systems

4760 Van Epps Road

Brooklyn Hts, OH 44131



AirMetrix™



SULLAIR

Air Audit

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The following is a summary system performance review prepared for USG by Diversified Air Systems using the Systemate analysis package and the LogAir Datalogging System. This package uses the principles and equations as adopted for compressor load profiles from the U.S. DOE Compressed Air Challenge. The datalogging tools were used to analyze and record data every 15 seconds and store more than 120,957 data points. The evaluation was started at 7/9/2010 11:00:00 and ended at 7/16/2010 10:59:45 for a total logging period of 7 Days.

The primary goal of this review was to establish the current compressed air system demand and performance profile. This review was conducted for USG at the request of Mike Dimassa.

Site Conditions		
City	Westlake	
State/Province/Country	OH	
Elevation (Feet)	805	
Ambient Temperature	50	deg. F
Ambient Humidity	72	%Relative

The site conditions are based on either recorded conditions or NOAA standard site conditions for this area.

Energy Rate		
Annual Operating Hours	8,582	Hrs/Year
Utility Company	Default \$0.08/kwh \$10 Demand	
Base Energy Rate	0.08	\$/kwh
Demand Rate	10.00	\$/kw/Month

Annual Operating Hours are either actual calculated running hours of the compressors or reported hours provided by plant personnel.
The Energy Rate information is based on information provided by your personnel.

Compressor Ratings

Compressor Name	Manufacturer	Model	Nominal HP	Motor Eff.	Rated PSIG	Rated ACFM	Full load HP	Fan
150hp GD Comp	Gardner Denver	EBQ99F	150.0	0.950	100	750	165.0	5.0
Single Stage Lubricated Rotary Screw								
125hp GD Comp	Gardner Denver	EC00ND	125.0	0.920	100	600	147.9	5.0
Single Stage Lubricated Rotary Screw								
Inlet Modulation with Blow Down								

The compressor ratings are obtained from a combination of site gathered nameplate data and published manufacturer's data.

From the above entered information and the logged data the SysMate program uses the DOE/CAGI/CAC standard curves to determine load profiles and CFM output of the compressors. This information is summarized below and graphically represented in the attached graphs.

Please note that the summary information below is for the period from 7/9/2010 11:00:00 through 7/16/2010 10:59:45 and should be reviewed to determine if this represents an accurate portrayal of the average loading profile for this facility.

Compressor Name	Manufacturer	Model	Nominal HP	% Run Time	Average HP	% Loaded Power	% Loaded CFM	Average Pressure	Average Flow	Efficiency CFM/BHP	Annual Cost
150hp GD Comp	Gardner Denver	EBQ99F	150.0	98.1	119.7	74	35	97.0	266.6	2.23	81,053
125hp GD Comp	Gardner Denver	EC00ND	125.0	0.1	47.3	33	6	96.8	34.7	0.73	6,700

Compressor Performance Summary

The previous information represents a detailed performance summary of how each compressor in the system ran during the datalogging period. Below is a summary for the total systems performance over the entire period.

System Summary			
Flow(SCFM)		Pressure (psig)	Horsepower
Minimum	0.0	0.0	0.0
Average	261.6	94.0	123.1
Maximum	435.2	98.7	195.81
Annual Cost		\$87,752.76	

We truly appreciate the opportunity to help you assess and evaluate your compressed air system. We hope this information provided you with a basis to help you continue to improve your compressed air system. Should you need any further assistance do not hesitate to call.

Sincerely,

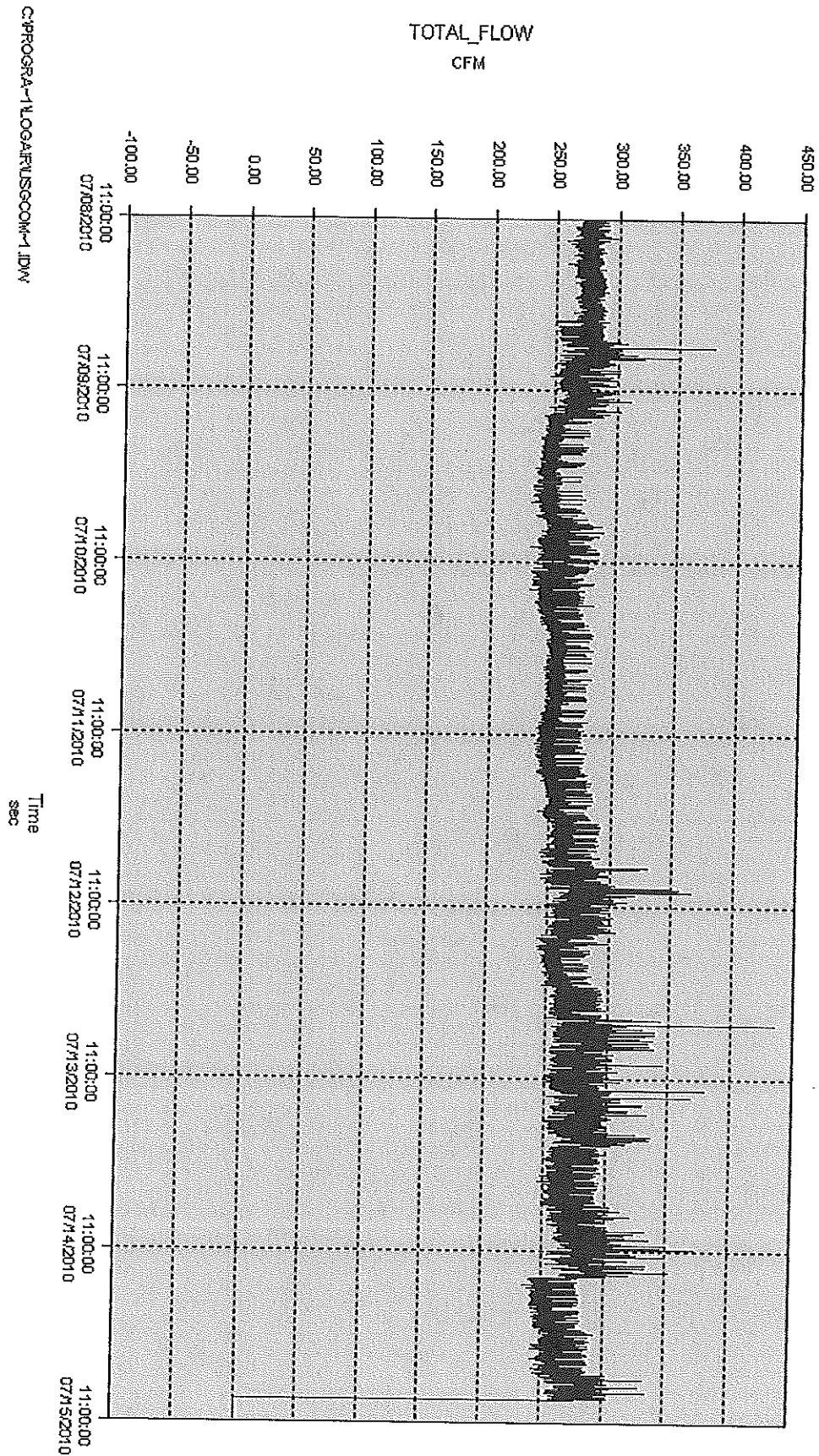
Ron Fugate

Diversified Air Systems

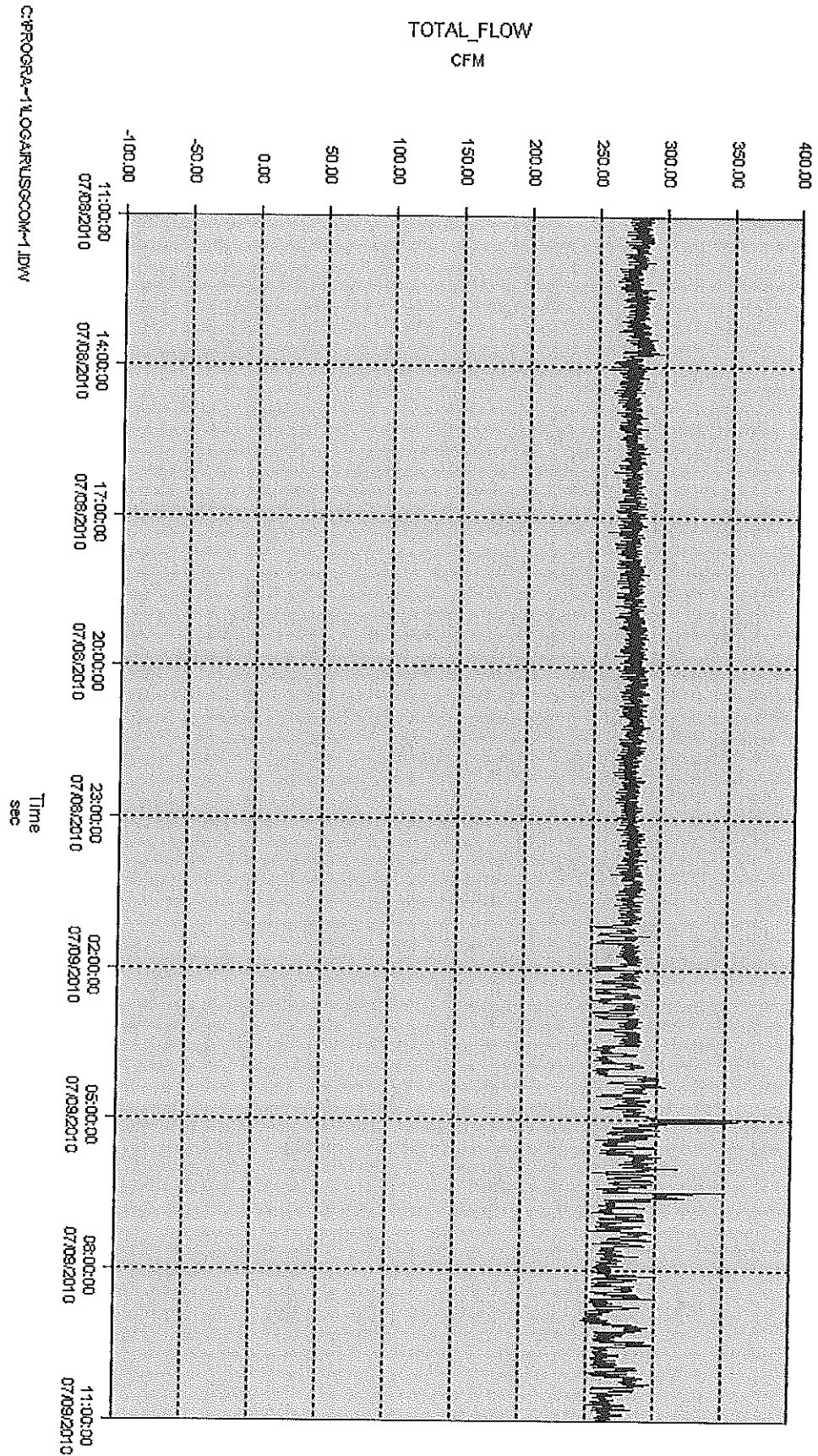
Air Audit

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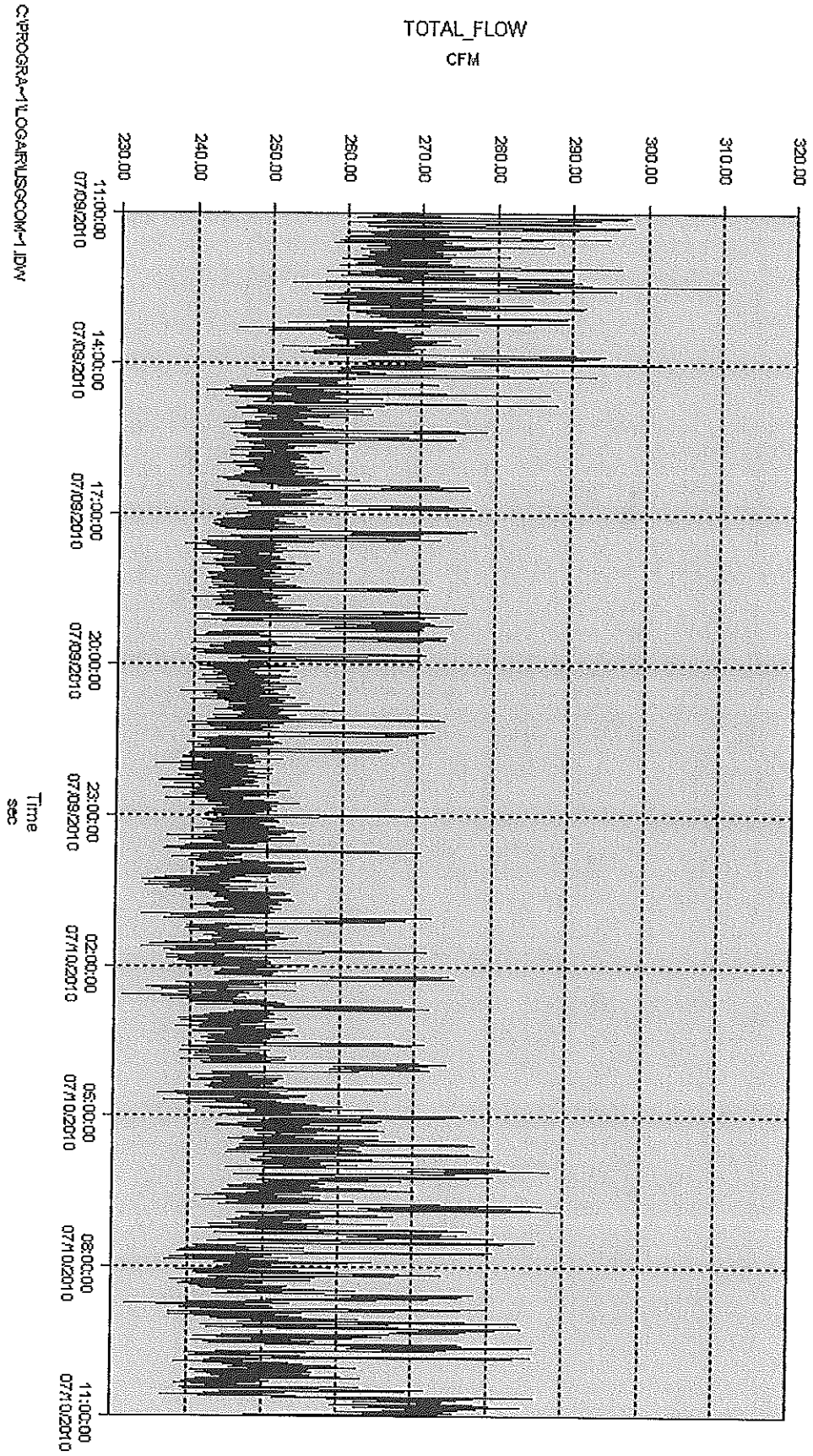
TOTAL FLOW FOR WEEK



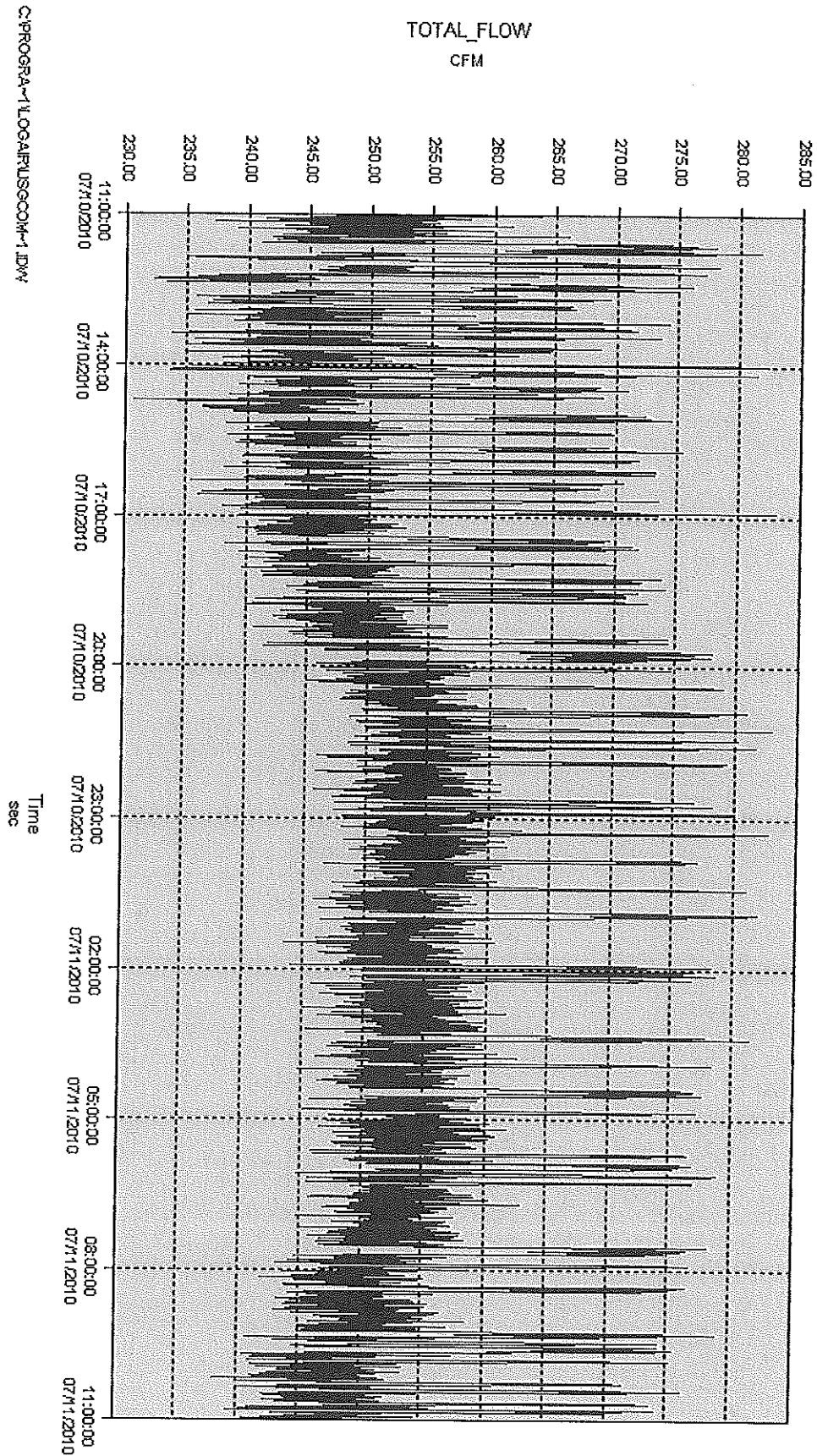
TOTAL FLOW PER DAY



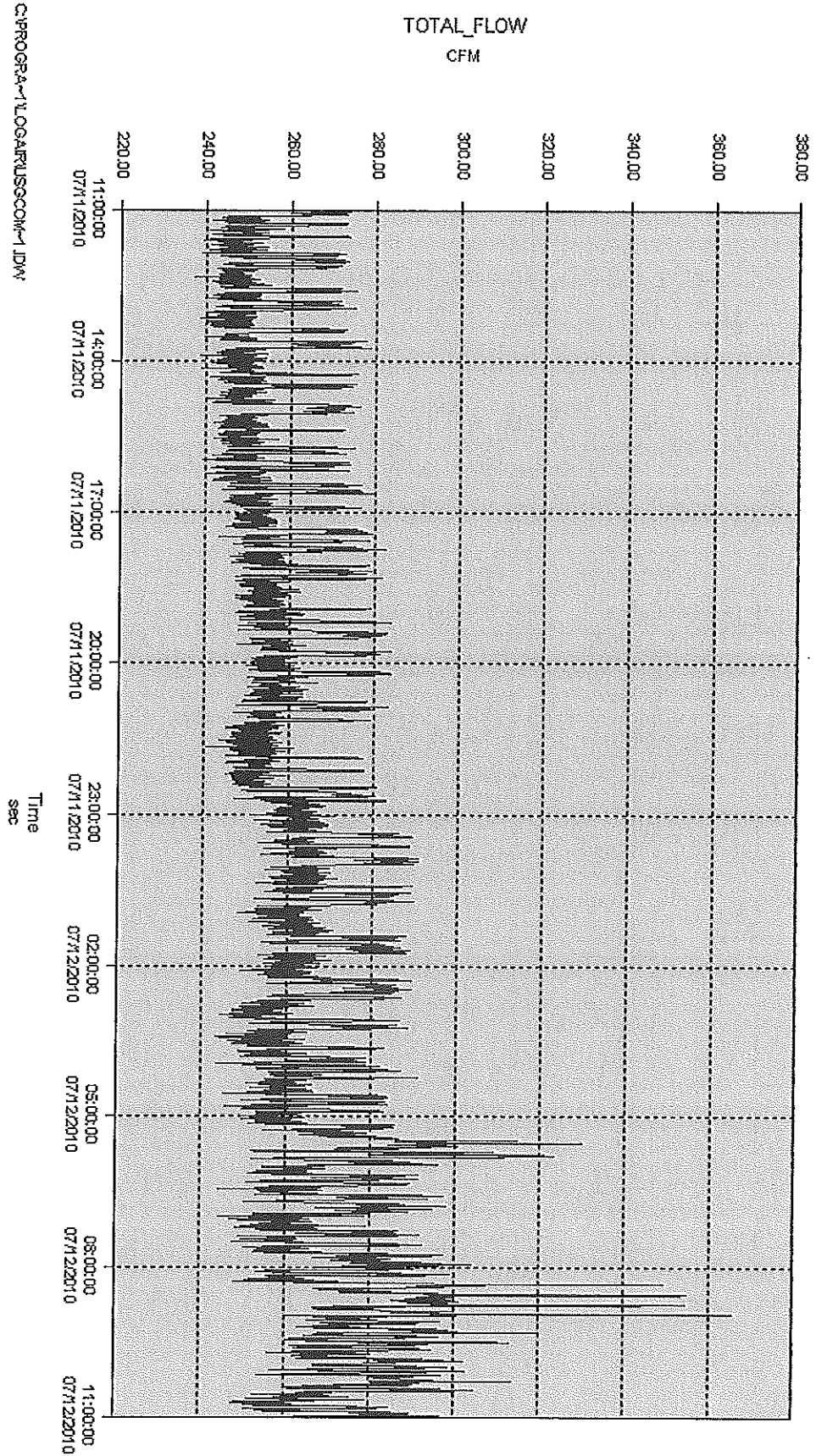
TOTAL FLOW PER DAY



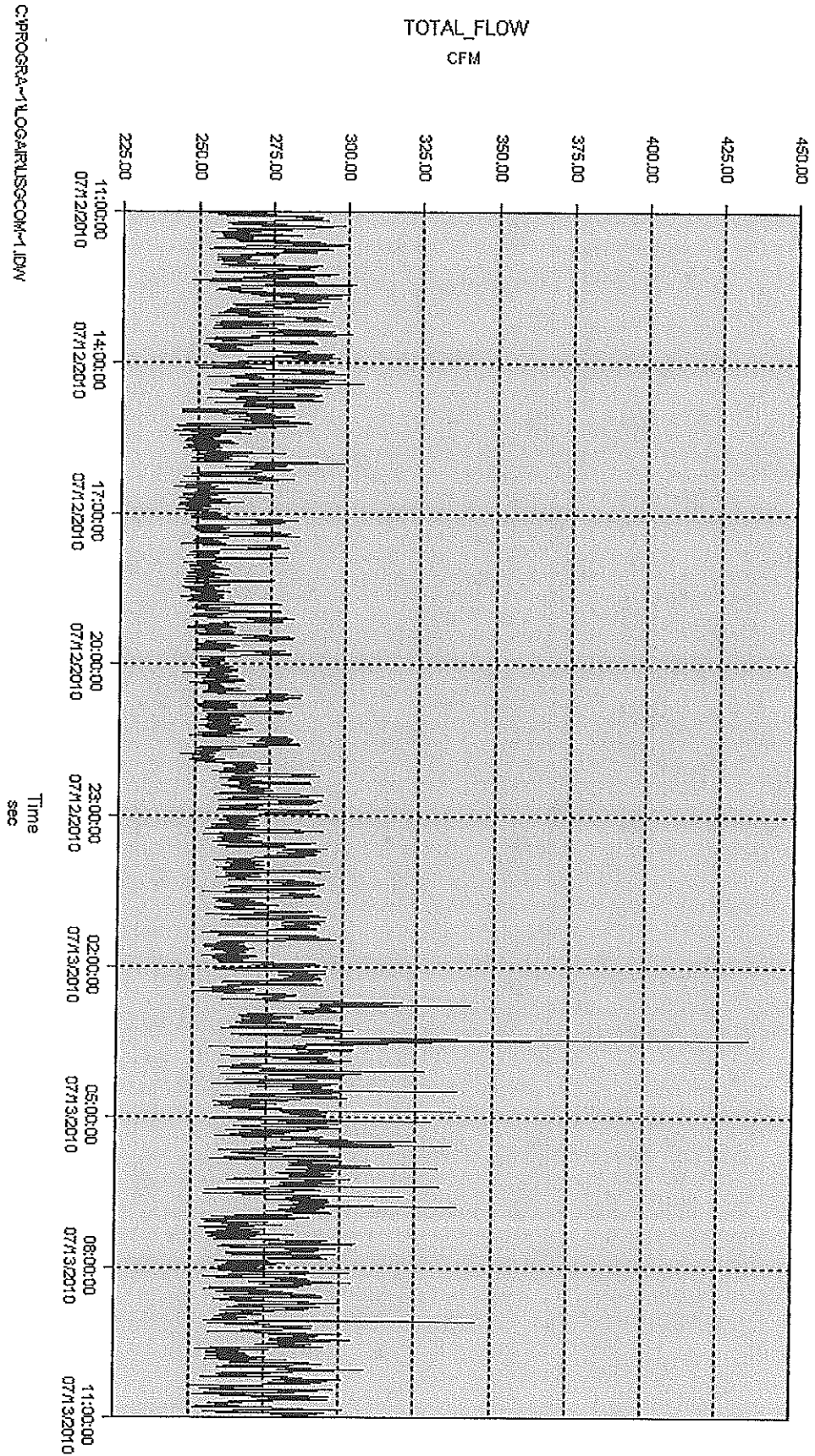
TOTAL FLOW PER DAY



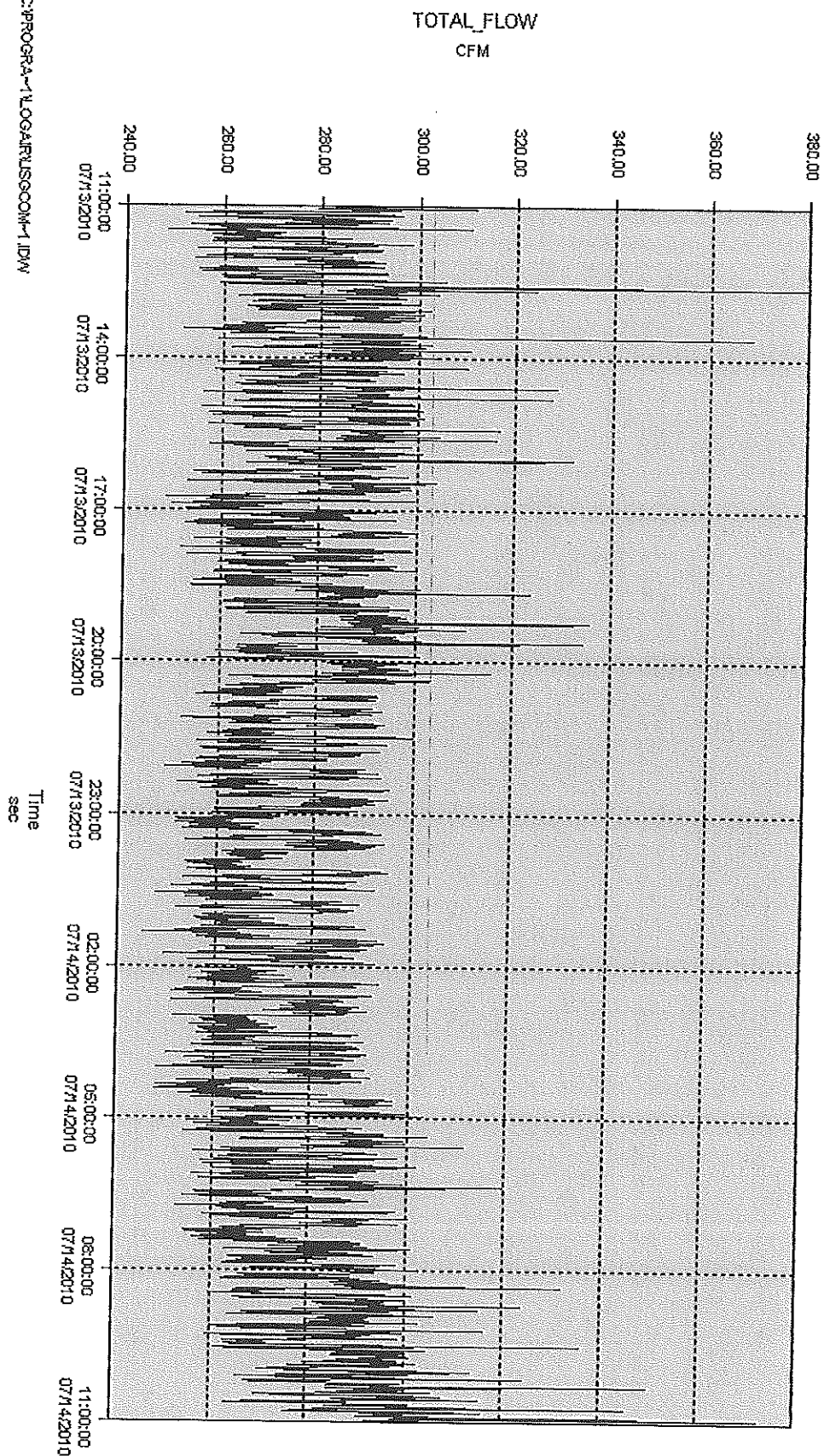
TOTAL FLOW PER DAY



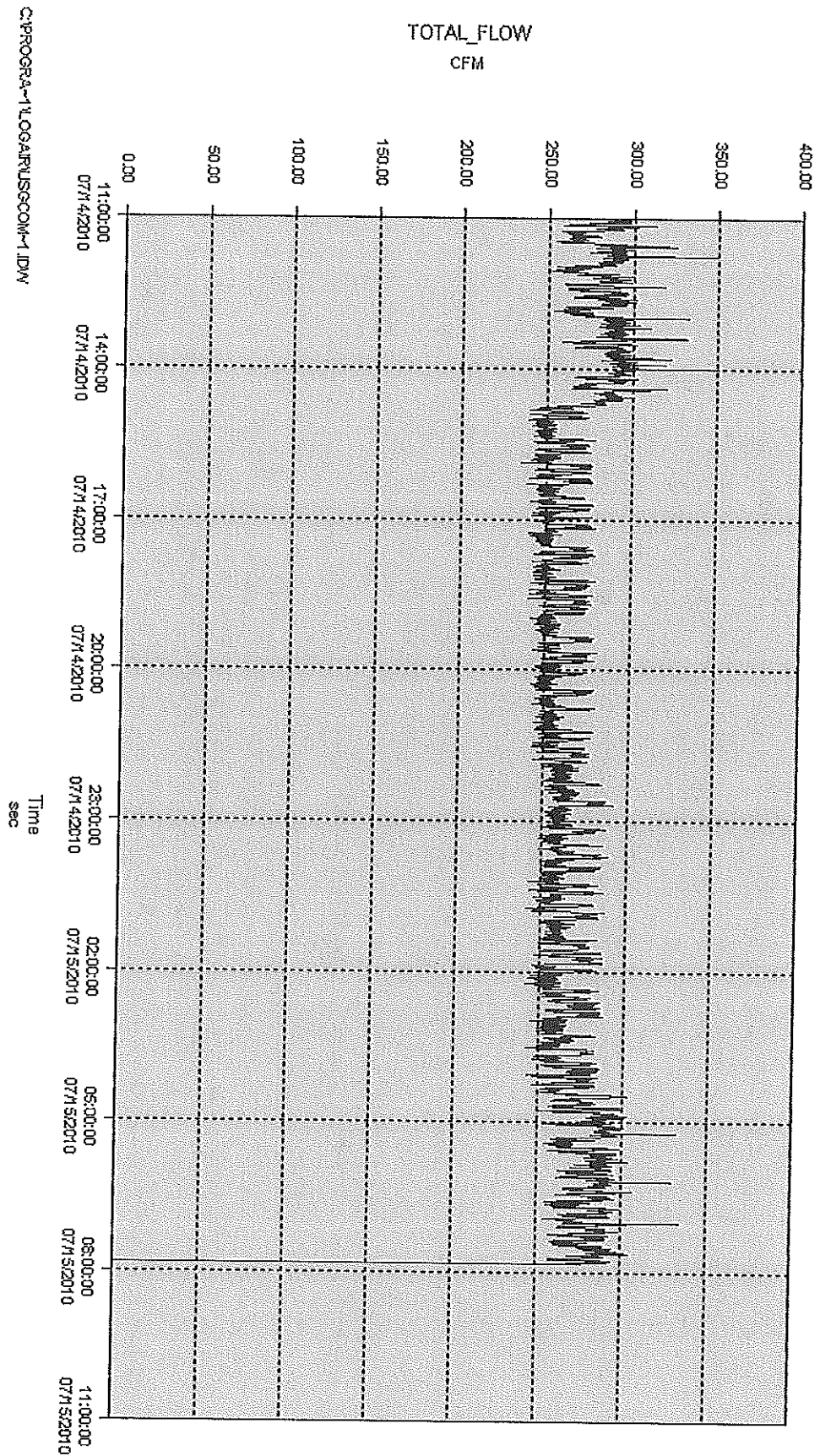
TOTAL FLOW PER DAY



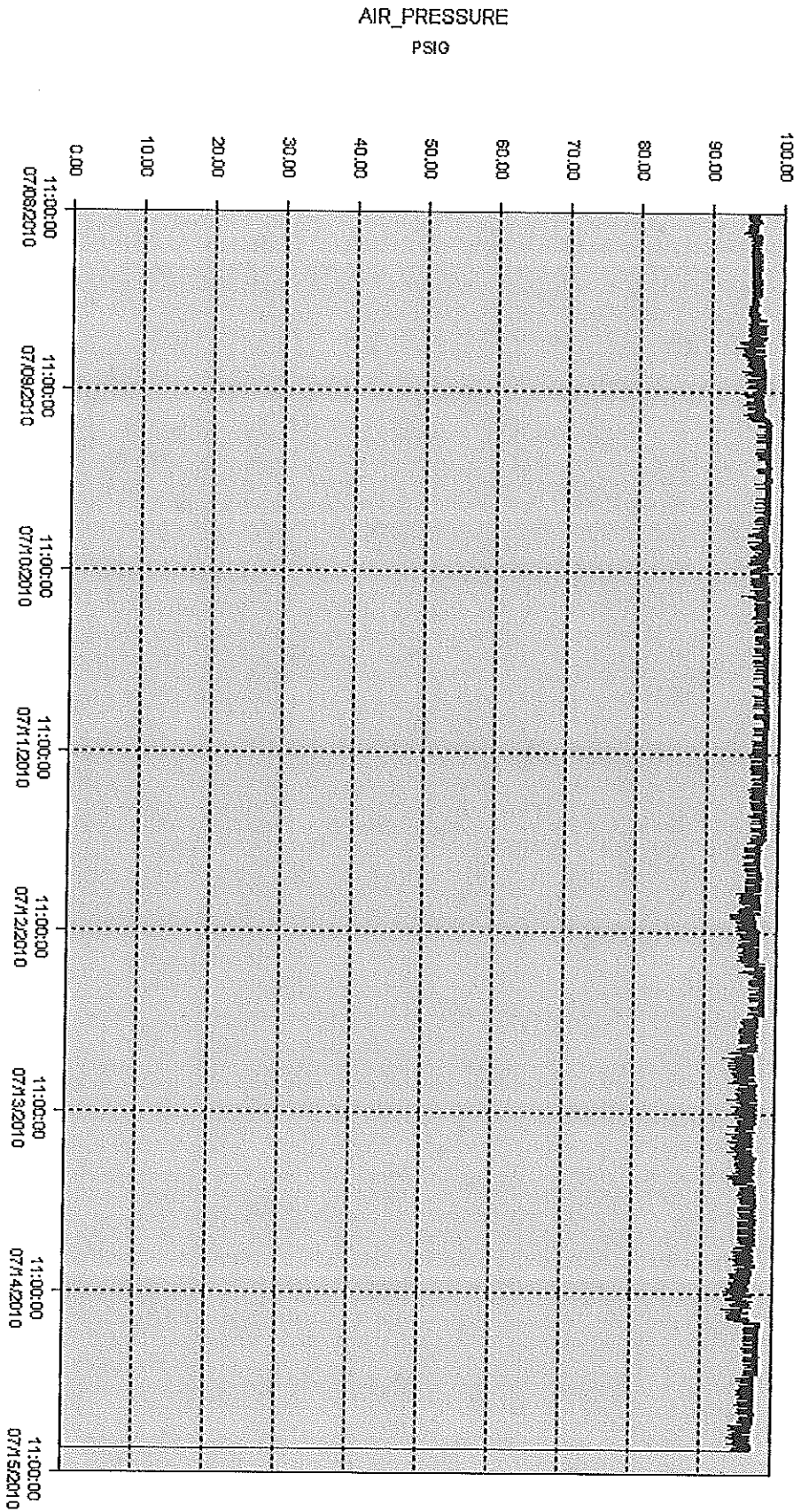
TOTAL FLOW PER DAY



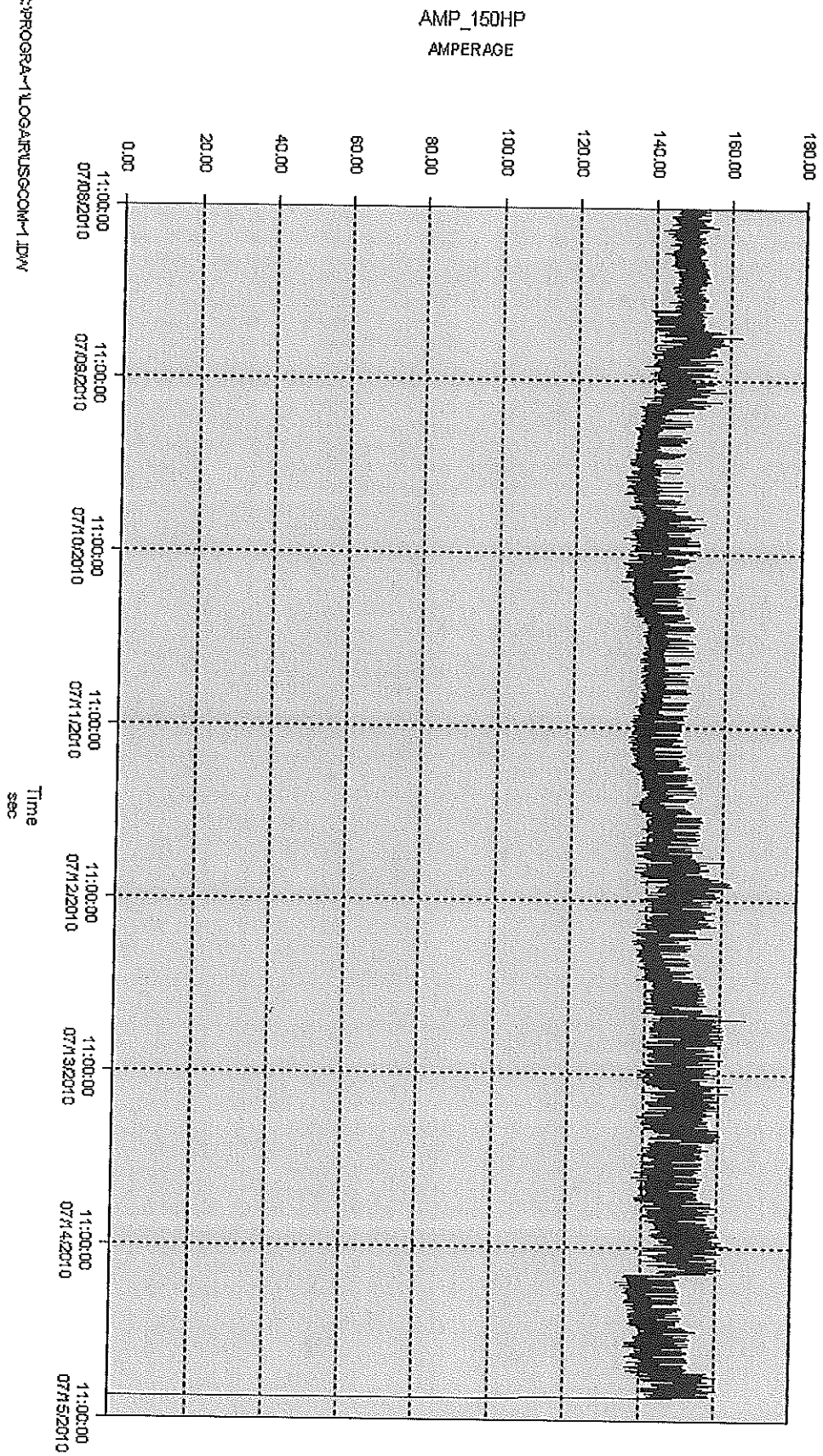
TOTAL FLOW PER DAY



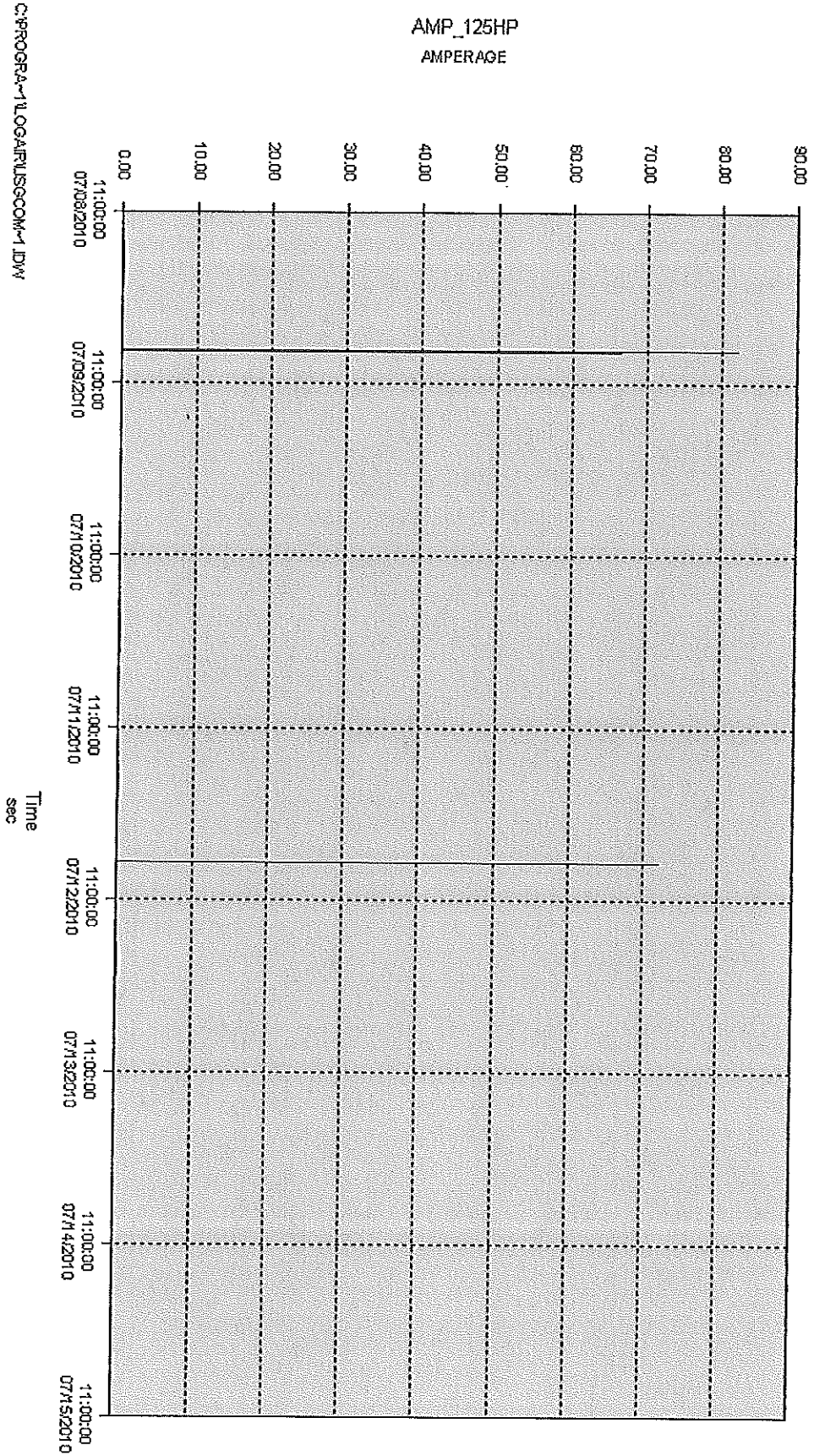
TOTAL AIR PRESSURE FOR WEEK



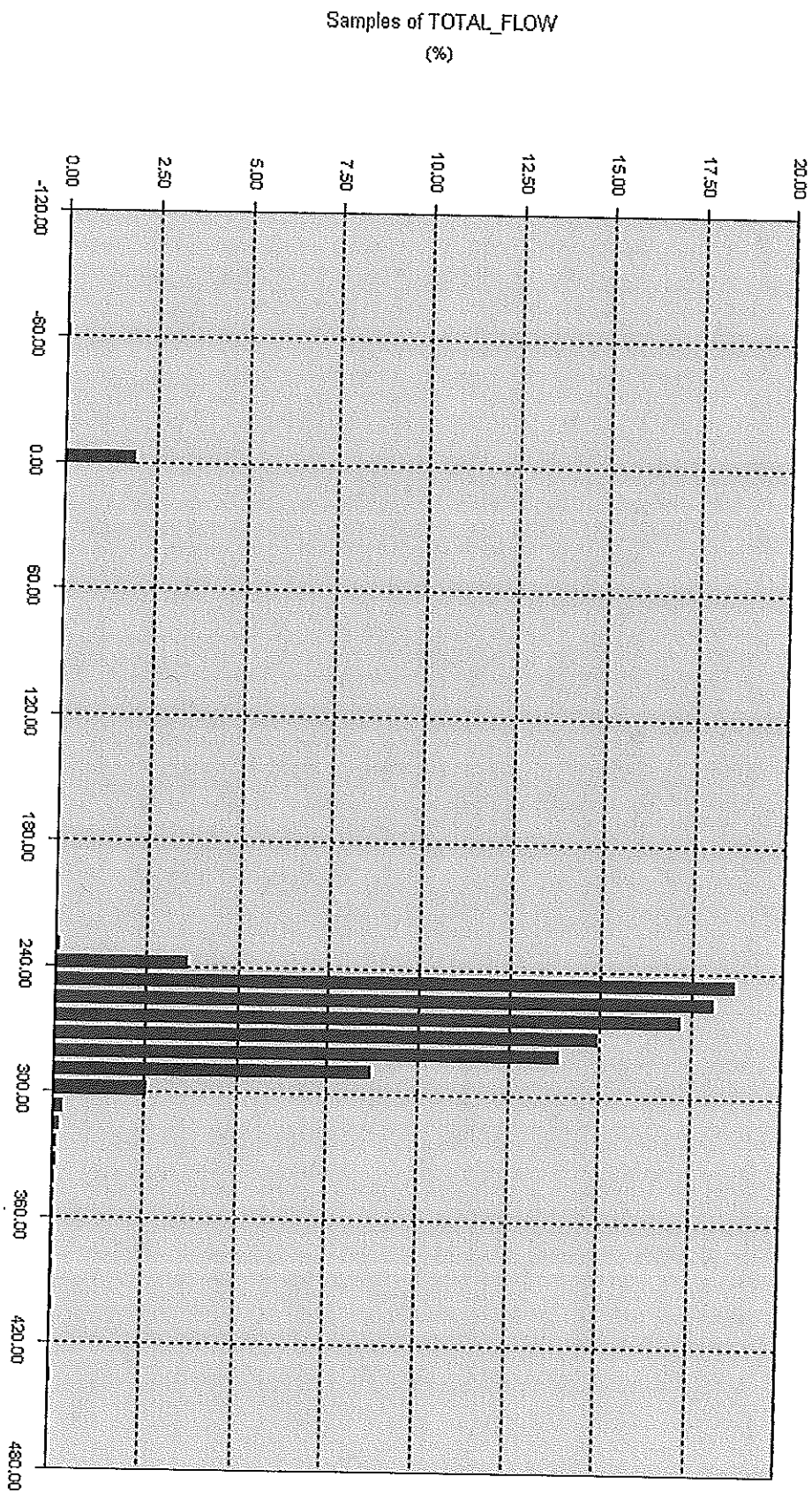
TOTAL AMPERAGE FOR WEEK FOR THE 150HP



TOTAL AMPERAGE FOR WEEK FOR THE 125HP



Histogram of TOTAL_FLOW
Bin Size: 8.593750
Peak of 18.66 at 243.75.





DIVERSIFIED
AIR SYSTEMS, INC.
COMPRESSED AIR INNOVATIONS

USG Interior
1000 Crocker Road
Westlake, OH 44145

Attention: Mark Seiwerth

mseiwerth@usg.com

Annual Energy Cost Comparison

8¢/KW-HR 24/7 Operation

New Sullair 100HP 30% loaded 95% Motor Efficiency (148 CFM) 500 CFM

Former Gardner Denver 150HP 35% Loaded 95% Motor Efficiency (262 CFM) 750 CFM

New: 100HP X 0.30 X $\frac{\$0.08}{\text{Kw-hr}}$ X $\frac{0.746\text{KW}}{\text{HP}}$ X 8582 / .95

= \$16,173.90

Former: 150HP X 0.70 X $\frac{\$0.08}{\text{Kw-hr}}$ X $\frac{0.746\text{KW}}{\text{HP}}$ X 8582 Hours / .95

= \$56,608.68.00

Annual Energy Savings \$40,434.78 (505,435 kWh)

The former 150HP Gardner Denver Compressor was used in conjunction with a 1630 CFM heatless regenerative air dryer, which required 15% purge air (244) when operating with a 10 minute purge cycle. Since this operating cycle was approximately 20 minutes, the purge air demand was approximately 122CFM. Hence the 35% demand (262/750) with the former 150HP Gardner Denver compressor.

Terry Perko
Diversified Air Systems, Inc.
4760 Van Epps Rd.
Cleveland, OH 44131
P: (216) 337-9651 F: (216) 741-0951
ronf@diversifiedair.com



DIVERSIFIED
AIR SYSTEMS, INC.
COMPRESSED AIR INNOVATIONS

March 21, 2013

USG Interior
1000 Crocker Road
Westlake, OH 44145

Attention: Mark Seiwert

mseiwert@usg.com

Former 150H Gardner Denver Compressor 750CFM

The 262 CFM required should be broken down as follows:

- 140 CFM plant air requirement
- 122 CFM purge air for 163 CFM desiccant dryer

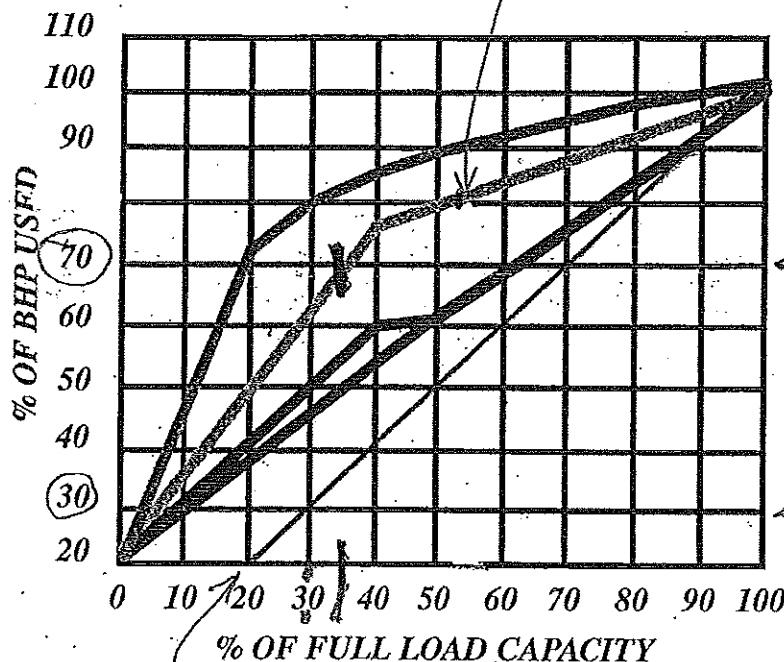
The dryer required 15% purge air (244 CFM) based on a standard 10 minute operating cycle. Since the actual operating cycle was 20 minutes, the purge air required was only 122 CFM.

262/750 yields 35% loaded, requiring 70% BHP- see attached curve.

New 100HP Sullair Compressor 500CFM

Now 30% loaded (per USG interior), requiring 30% BHP- see attached curve. This indicates 148CFM plant air requirements, very close to the 140CFM as indicated above. Another air study shouldn't be needed. If you have any questions or comments please give me a call

Terry Perko
Diversified Air Systems, Inc.
4760 Van Epps Rd.
Cleveland, OH 44131
P: (216) 337-9651 F: (216) 741-0951
ronf@diversifiedair.com



Compressor Performance Comparison

Application Specific % Capacity vs. Power Curves

This curve shows the % of power used for different types of control methods available.

- **Actual Load/No Load** - This graph realizes the true losses that occur when using Load/No Load Controls. Before a compressor can realize power savings using this method the machine must first run into the upper range of modulation which can be as high as 10 psig band before the machine will unload. This 10 psig unload point will cost a customer 5% of the motor horsepower on average. When the machine unloads it is done through a blow down valve which takes several seconds to blow the air that is pressurized in the sump to atmosphere. Air that you paid to compress. As the demand calls for more compressed air the machine must now repressurize the sump to provide more system air. This control method is the most economical control system for a manufacturer to produce and is the least efficient for a customer to use without extremely large air storage. (10 x the CFM output) Please note that Load/No Load control can be run on most all rotary screw compressors.

- **Theoretical Load/No Load** - This line in the graph does not realize the losses associated with running an oil flooded screw compressor. This curve in the graph can be used in conjunction with oil free rotary screw compressors, as there is no oil sump to consider.

FORMER: GARDNER-DENVER

- **Modulation controls** - This is one of the most common types of controls available used on oil flooded rotary screw compressors. Modulation control utilizes either an inlet butterfly valve or pneumatic inlet valve. As the plant pressure and capacity is met, the inlet to the compressor starts to close off. This limits the airflow through the rotor's housing reducing the amount of air being compressed. The inlet valve modulates its position based on the system requirement.
- **Spiral Valve Control** - This type of control is one of the most effective ways to meet fluctuating air demands. Spiral Valve Control progressively opens ports connecting the compression chamber intake in response to rising discharge pressure. This allows some of the intake air to be returned to the compressor inlet before it gets compressed and uses power. The progressive opening of the by-pass ports has the effect of shortening the length of the rotors after the lobes seal without choking the intake and increasing the compression ratio.



DIVERSIFIED
AIR SYSTEMS, INC.
COMPRESSED AIR INNOVATIONS

Energy Savings from Dryer Replacement

NEW DRYER 500 CFM refrigerated 3 HP

OLD DRYER 122 CFM purge air required with 4.5 CFM/HP 27 HP

Annual Energy Savings -- 24 HP

$24 \text{ HP} \times .746 \text{ KW/HP} \times .7 \text{ (LF)} \times 8582 \text{ Hr./Year} = 107,556 \text{ kWh}$

Total Savings from new compressor and dryer -
612,991 kWh

Along with the compressor replacement, USG replaced regenerative heat dryer and purge requirement with a refrigerated dryer, which does not require purge air. When doing compressor study, plant personnel indicated that the plant is kept at a minimum of 50 degrees F ambient temperature. Based on this minimum ambient air temperature and the new compressor dewpoint requirement of 38 degree, a new refrigerated dryer was able to be installed in place of the regenerative heat dryer that was required by the old compressor, which had a dew point requirement of -40 degrees degrees.

CLEVELAND
4760 Van Epps Road
Cleveland, OH 44131
PH: 216-741-1700
FX: 216-741-0951

AKRON
1201 George Washington Blvd.
Akron, OH 44312
PH: 330-784-3366
FX: 330-784-3284

TOLDEO
12295 Williams Road
Perrysburg, OH 43551
PH: 419-873-8400
FX: 419-873-8410

PITTSBURGH
269 Meadowlands Blvd.
Washington, PA 15301
PH: 724-873-0884
FX: 724-873-0887

Mercantile Customer Project Commitment Agreement
Cash Rebate Option

THIS MERCANTILE CUSTOMER PROJECT COMMITMENT AGREEMENT ("Agreement") is made and entered into by and between The Cleveland Electric Illuminating Company, its successors and assigns (hereinafter called the "Company") and USG Interiors LLC, Taxpayer ID No. 45-3811432 its permitted successors and assigns (hereinafter called the "Customer") (collectively the "Parties" or individually the "Party") and is effective on the date last executed by the Parties as indicated below.

WITNESSETH

WHEREAS, the Company is an electric distribution utility and electric light company, as both of these terms are defined in R.C. § 4928.01(A); and

WHEREAS, Customer is a mercantile customer, as that term is defined in R.C. § 4928.01(A)(19), doing business within the Company's certified service territory; and

WHEREAS, R.C. § 4928.66 (the "Statute") requires the Company to meet certain energy efficiency and peak demand reduction ("EE&PDR") benchmarks; and

WHEREAS, when complying with certain EE&PDR benchmarks the Company may include the effects of mercantile customer-sited EE&PDR projects; and

WHEREAS, Customer has certain customer-sited demand reduction, demand response, or energy efficiency project(s) as set forth in attached Exhibit 1 (the "Customer Energy Project(s)") that it desires to commit to the Company for integration into the Company's Energy Efficiency & Peak Demand Reduction Program Portfolio Plan ("Company Plan") that the Company will implement in order to comply with the Statute; and

WHEREAS, the Customer, pursuant to the Public Utilities Commission of Ohio's ("Commission") September 15, 2010 Order in Case No. 10-834-EL-EEC, desires to pursue a cash rebate of some of the costs pertaining to its Customer Energy Project(s) ("Cash Rebate") and is committing the Customer Energy Project(s) as a result of such incentive.

WHEREAS, Customer's decision to commit its Customer Energy Project(s) to the Company for inclusion in the Company Plan has been reasonably encouraged by the possibility of a Cash Rebate.

WHEREAS, in consideration of, and upon receipt of, said cash rebate, Customer will commit the Customer Energy Project(s) to the Company and will comply with all other terms and conditions set forth herein.

NOW THEREFORE, in consideration of the mutual promises set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties, intending to be legally bound, do hereby agree as follows:

1. **Customer Energy Projects.** Customer hereby commits to the Company and Company accepts for integration into the Company Plan the Customer Energy Project(s) set forth on attached Exhibit 1. Said commitment shall be for the life of the Customer Energy Project(s). Company will incorporate said project(s) into the Company Plan to the extent that such projects qualify. In so committing, and as evidenced by the affidavit attached hereto as Exhibit A, Customer acknowledges that the information provided to the Company about the Customer Energy Project(s) is true and accurate to the best of its knowledge.

- a. By committing the Customer Energy Project(s) to the Company, Customer acknowledges and agrees that the Company shall control the use of the kWh and/or kW reductions resulting from said projects for purposes of complying with the Statute. By committing the Customer Energy Project(s), Customer further acknowledges and agrees that the Company shall take ownership of the energy efficiency capacity rights associated with said Project(s) and shall, at its sole discretion, aggregate said capacity into the PJM market through an auction. Any proceeds from any such bids accepted by PJM will be used to offset the costs charged to the Customer and other of the Company's customers for compliance with state mandated energy efficiency and/or peak demand requirements
 - b. The Company acknowledges that some of Customer's Energy Projects contemplated in this paragraph may have been performed under certain other federal and/or state programs in which certain parameters are required to be maintained in order to retain preferential financing or other government benefits (individually and collectively, as appropriate, "Benefits"). In the event that the use of any such project by the Company in any way affects such Benefits, and upon written request from the Customer, Company will release said Customer's Energy Project(s) to the extent necessary for Customer to meet the prerequisites for such Benefits. Customer acknowledges that such release (i) may affect Customer's cash rebate discussed in Article 3 below; and (ii) will not affect any of Customer's other requirements or obligations.
 - c. Any future Customer Energy Project(s) committed by Customer shall be subject to a separate application and, upon approval by the Commission, said projects shall become part of this Agreement.
 - d. Customer will provide Company or Company's agent(s) with reasonable assistance in the preparation of the Commission's standard joint application for approval of this Agreement ("Joint Application") that will be filed with the Commission, with such Joint Application being consistent with then current Commission requirements.
 - e. Upon written request and reasonable advance notice, Customer will grant employees or authorized agents of either the Company or the Commission reasonable, pre-arranged access to the Customer Energy Project(s) for purposes of measuring and verifying energy savings and/or peak demand reductions resulting from the Customer Energy Project(s). It is expressly agreed that consultants of either the Company or the Commission are their respective authorized agents.
2. **Joint Application to the Commission.** The Parties will submit the Joint Application using the Commission's standard "Application to Commit Energy Efficiency/Peak Demand Reduction Programs" ("Joint Application") in which they will seek the Commission's approval of (i) this Agreement; (ii) the commitment of the Customer Energy Project(s) for inclusion in the Company Plan; and (iii) the Customer's Cash Rebate.

The Joint Application shall include all information as set forth in the Commission's standard form which, includes without limitation:

- i. A narrative description of the Customer Energy Project(s), including but not limited to, make, model and year of any installed and/or replaced equipment;
- ii. A copy of this Agreement; and
- iii. A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results.

3. **Customer Cash Rebate.** Upon Commission approval of the Joint Application, Customer shall provide Company with a W-9 tax form, which shall at a minimum include Customer's tax identification number. Within the greater of 90 days of the Commission's approval of the Joint Application or the completion of the Customer Energy Project, the Company will issue to the Customer the Cash Rebate in the amount set forth in the Commission's Finding and Order approving the Joint Application.
 - a. Customer acknowledges: i) that the Company will cap the Cash Rebate at the lesser of 50% of Customer Energy Project(s) costs or \$250,000; ii) the maximum rebate that the Customer may receive per year is \$500,000 per Taxpayer Identification Number per utility service territory; and iii) if the Customer Energy Project qualifies for a rebate program approved by the Commission and offered by the Company, Customer may still elect to file such project under the Company's mercantile customer self direct program, however the Cash Rebate that will be paid shall be discounted by 25%; and
 - b. Customer acknowledges that breaches of this Agreement, include, but are not limited to:
 - i. Customer's failure to comply with the terms and conditions set forth in the Agreement, or its equivalent, within a reasonable period of time after receipt of written notice of such non-compliance;
 - ii. Customer knowingly falsifying any documents provided to the Company or the Commission in connection with this Agreement or the Joint Application.
 - c. In the event of a breach of this Agreement by the Customer, Customer agrees and acknowledges that it will repay to the Company, within 90 days of receipt of written notice of said breach, the full amount of the Cash Rebate paid under this Agreement. This remedy is in addition to any and all other remedies available to the Company by law or equity.
4. **Termination of Agreement.** This Agreement shall automatically terminate:
 - a. If the Commission fails to approve the Joint Agreement;
 - b. Upon order of the Commission; or
 - c. At the end of the life of the last Customer Energy Project subject to this Agreement.

Customer shall also have an option to terminate this Agreement should the Commission not approve the Customer's Cash Rebate, provided that Customer provides the Company with written notice of such termination within ten days of either the Commission issuing a final appealable order or the Ohio Supreme Court issuing its opinion should the matter be appealed.

5. **Confidentiality.** Each Party shall hold in confidence and not release or disclose to any person any document or information furnished by the other Party in connection with this Agreement that is designated as confidential and proprietary ("Confidential Information"), unless: (i) compelled to disclose such document or information by judicial, regulatory or administrative process or other provisions of law; (ii) such document or information is generally available to the public; or (iii) such document or information was available to the receiving Party on a non-confidential basis at the time of disclosure.
 - a. Notwithstanding the above, a Party may disclose to its employees, directors, attorneys, consultants and agents all documents and information furnished by the other Party in connection with this Agreement, provided that such employees, directors, attorneys,

consultants and agents have been advised of the confidential nature of this information and through such disclosure are deemed to be bound by the terms set forth herein.

- b. A Party receiving such Confidential Information shall protect it with the same standard of care as its own confidential or proprietary information.
 - c. A Party receiving notice or otherwise concluding that Confidential Information furnished by the other Party in connection with this Agreement is being sought under any provision of law, to the extent it is permitted to do so under any applicable law, shall endeavor to: (i) promptly notify the other Party; and (ii) use reasonable efforts in cooperation with the other Party to seek confidential treatment of such Confidential Information, including without limitation, the filing of such information under a valid protective order.
 - d. By executing this Agreement, Customer hereby acknowledges and agrees that Company may disclose to the Commission or its Staff any and all Customer information, including Confidential Information, related to a Customer Energy Project, provided that Company uses reasonable efforts to seek confidential treatment of the same.
6. **Taxes.** Customer shall be responsible for all tax consequences (if any) arising from the payment of the Cash Rebate.
7. **Notices.** Unless otherwise stated herein, all notices, demands or requests required or permitted under this Agreement must be in writing and must be delivered or sent by overnight express mail, courier service, electronic mail or facsimile transmission addressed as follows:

If to the Company:

FirstEnergy Service Company
76 South Main Street
Akron, OH 44308
Attn: Victoria Nofziger
Telephone: 330-384-4684
Fax: 330-761-4281
Email: vmnofziger@firstenergycorp.com

If to the Customer:

USG Interiors LLC
550 West Adams St.
Chicago, IL 60661-3676
Attn: Fred Mazurski
Telephone: (312) 436-4177
Fax: (312) 672-4177
Email: Fmazurski@usg.com

and

USG Interiors LLC
1000 Crocker Road
Westlake, Ohio 44145-1089
Attn: Plant Manager
Telephone: (440) 892-7273
Email: jlco@usg.com

or to such other person at such other address as a Party may designate by like notice to the other Party. Notice received after the close of the business day will be deemed received on the next business day; provided that notice by facsimile transmission will be deemed to have been received by the recipient if the recipient confirms receipt telephonically or in writing.

8. **Authority to Act.** The Parties represent and warrant that they are represented by counsel in connection with this Agreement, have been fully advised in connection with the execution thereof, have taken all legal and corporate steps necessary to enter into this Agreement, and that the undersigned has the authority to enter into this Agreement, to bind the Parties to all provisions herein and to take the actions required to be performed in fulfillment of the undertakings contained herein.
9. **Non-Waiver.** The delay or failure of either party to assert or enforce in any instance strict performance of any of the terms of this Agreement or to exercise any rights hereunder conferred, shall not be construed as a waiver or relinquishment to any extent of its rights to assert or rely upon such terms or rights at any later time or on any future occasion.
10. **Entire Agreement.** This Agreement, along with related exhibits, and the Company's Rider DSE, or its equivalent, as amended from time to time by the Commission, contains the Parties' entire understanding with respect to the matters addressed herein and there are no verbal or collateral representations, undertakings, or agreements not expressly set forth herein. No change in, addition to, or waiver of the terms of this Agreement shall be binding upon any of the Parties unless the same is set forth in writing and signed by an authorized representative of each of the Parties. In the event of any conflict between Rider DSE or its equivalent and this document, the latter shall prevail.
11. **Assignment.** Customer may not assign any of its rights or obligations under this Agreement without obtaining the prior written consent of the Company, which consent will not be unreasonably withheld. No assignment of this Agreement will relieve the assigning Party of any of its obligations under this Agreement until such obligations have been assumed by the assignee and all necessary consents have been obtained.
12. **Severability.** If any portion of this Agreement is held invalid, the Parties agree that such invalidity shall not affect the validity of the remaining portions of this Agreement, and the Parties further agree to substitute for the invalid portion a valid provision that most closely approximates the economic effect and intent of the invalid provision.
13. **Governing Law.** This Agreement shall be governed by the laws and regulations of the State of Ohio, without regard to its conflict of law provisions.
14. **Execution and Counterparts.** This Agreement may be executed in multiple counterparts, which taken together shall constitute an original without the necessity of all parties signing the same page or the same documents, and may be executed by signatures to electronically or telephonically transmitted counterparts in lieu of original printed or photocopied documents. Signatures transmitted by facsimile shall be considered original signatures.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers or representatives as of the day and year set forth below.

The Cleveland Electric Illuminating Company_
(Company)

By: John C. Longi

Title: V.P. Of Energy Efficiency

Date: 5-17-13

USG Interiors LLC_
(Customer)

By: Sam Magenta

Title: Sr. Mgr., Energy

Date: 5/14/13

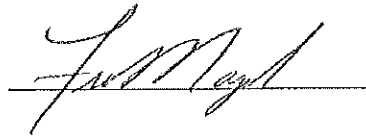
Affidavit of USG Interiors LLC -- Exhibit _A_

STATE OF ~~OHIO~~ ^{Illinois})
COUNTY OF ~~Cuyahoga~~ ^{Cook}) SS:

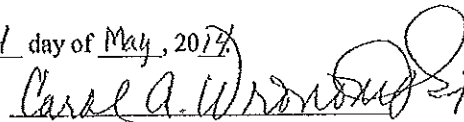
I, Fred Mazurski, being first duly sworn in accordance with law, deposes and states as follows:

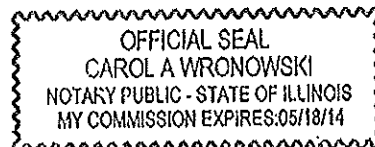
1. I am the Sr. Manager Energy of USG Interiors LLC ("Customer") As part of my duties, I oversee energy related matters for the Customer.
2. The Customer has agreed to commit certain energy efficiency projects to The Cleveland Electric Illuminating Company ("Company"), which are the subject of the agreement to which this affidavit is attached ("Project(s)").
3. In exchange for making such a commitment, the Company has agreed to provide Customer with Cash ("Incentive"). This Incentive was a critical factor in the Customer's decision to go forward with the Project(s) and to commit the Project(s) to the Company.
4. All information related to said Project(s) that has been submitted to the Company is true and accurate to the best of my knowledge.

FURTHER AFFIANT SAYETH NAUGHT.



Sworn to before me and subscribed in my presence this 14 day of May, 2014.


Notary



This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

8/27/2013 3:19:54 PM

in

Case No(s). 13-0153-EL-EEC

Summary: Application to Commit Energy Efficiency/Peak Demand Reduction Programs of The Cleveland Electric Illuminating Company and USG Interiors LLC electronically filed by Ms. Jennifer M. Sybyl on behalf of The Cleveland Electric Illuminating Company and USG Interiors LLC