Legal Department

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
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November 4, 2011

Chairman Todd Snitchler
Ohio Power Siting Board
Public Utilities Commission of Ohio
180 East Broad Street
Columbus, OH 43215-3793

Anne M. Vogel
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RE:

In the Matter of Midwest Industries, Inc. and Ohio Power Company for Approval of A Special Arrangement Agreement with a Mercantile Customer	**)**	**Case No. 11-1557-EL-EEC**

Dear Chairman Snitchler,

Attached please find the Joint Application of Ohio Power Company (OPCo) and mercantile customer Midwest Industries, Inc. for approval of a Special Arrangement of the commitment of energy efficiency/peak demand reduction (EE/PDR) resources toward compliance with the statutory benchmarks for 2011.

Amended Substitute Senate Bill 221 sets forth in R.C. 4928.66 EE/PDR benchmarks that electric distribution utilities shall be required to meet or exceed. The statute allows utilities to include EE/PDR resources committed by mercantile customers for integration into the utilities programs to be counted toward compliance with a utility's EE/PDR benchmarks. The statute also enables the Commission to approve special arrangements for mercantile customers that commit EE/PDR resources to be counted toward compliance with EE/PDR benchmarks.

The Commission's Order in Case No. 10-834-EL-EEC, established a streamlined process to expedite review of these special arrangements by developing a sample application process for parties to follow for consideration of such programs implemented during the prior three calendar years. Attached is OPCo's version of that application and accompanying affidavit. Any confidential information referenced in the Joint Application has been filed in Commission Docket 10-1599-EL-EEC, under a request for protective treatment. OPCo respectfully requests that the Commission treat the two cases as associated dockets.

Cordially,

/s/ Anne M. Vogel
Anne M. Vogel, Counsel

Attachments

Ohio | Public Utilities Commission

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

Case No.: 11-1557-**EL-EEC**

Mercantile Customer: MIDWEST INDUSTRIES INC

Electric Utility: Ohio Power

Program Title or Description: AEP Ohio Business Incentives for Energy Efficiency: Self Direct Program

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: Company Information

Name: MIDWEST INDUSTRIES INC

Principal address: 979 S Conwell Ave., Willard, Oh 44890

Address of facility for which this energy efficiency program applies: 979 S Conwell Ave, Willard, Oh 44890-9301

Name and telephone number for responses to questions:

Kevin Smith, Midwest Industries Inc, (419) 935-6611

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

☒ The customer uses more than seven hundred thousand kilowatt hours per year at our facility. (Please attach documentation.)

See Confidential and Proprietary Attachment 4 – Calculation of Rider Exemption and UCT which provides the facility consumption for the last three years, benchmark kWh, and the last 12 months usage.

☐ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.) When checked, see Attachment 6 – Supporting Documentation for a listing of the customer's name and service addresses of other accounts in the AEP Ohio service territory.

Section 2: Application Information

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

☐ Individually, on our own.

☒ Jointly with our electric utility.

B) Our electric utility is: Ohio Power Company

The application to participate in the electric utility energy efficiency program is "Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application."

C) The customer is offering to commit (choose which applies):

☐ Energy savings from our 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 demand reduction from the customer's energy efficiency program. (Complete all sections of the Application.)

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (choose whichever applies):

☒ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, Various Dates (See Attachment 1 Summary Sheet) and the date on which the customer would have replaced your equipment if you had not replaced it 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)).

The remaining life of the equipment varies and is not known with certainty. The future replacement date is unknown and has historically been at the end of equipment life. Replacement was completed early to achieve energy savings and to reduce future maintenance costs.

☐ 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 your energy efficiency program:

1) If you checked the box indicating that your 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:

Unit Quantity (watts) = Existing (watts x units) – Installed (watts x units)

kWh Reduction (Annual Savings) = Unit Quantity x (Deemed kWh/Unit)

Annual savings: 271,018 kWh

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for annual energy savings calculations and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

2) If you checked the box indicating that you 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 the less efficient new equipment that you rejected in favor of the more efficient new equipment.

3) If you checked the box indicating that your 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 you rejected in favor of the more efficient new equipment.

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.

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):

- Choose one or more of the following 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?

The coincident peak-demand savings are permanent installations that reduce demand through energy efficiency and were installed on the date specified in Section 3 A above.

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

Unit Quantity (watts) = Existing (watts x units) – Installed (watts x units)

KW Demand Reduction = Unit Quantity (watts) x (Deemed KW/Unit (watts))

39.7 kW

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for peak demand reduction calculation, and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

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 cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

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

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

☐ A cash rebate of $_____. (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.)

OR

☒ A cash rebate valued at no more than 50% of the total project cost, which is equal to $ 9,452.63. (Attach documentation and calculations showing how this payment amount was determined.)

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for incentive calculations for this mercantile program.

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.)

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 an ongoing efficiency program that is practiced by our organization. (Attach documentation that establishes your organization's ongoing efficiency program. In order to continue the exemption beyond the initial 24 month period your organization 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: various see summary Attachment 1 (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 utility's incremental measure costs were _____.

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 $ 59,268.21

The utility's program costs were $ 1,626.11

The utility's incentive costs/rebate costs were $ 9,452.63.

Section 7: Additional Information

Please attach the following supporting documentation to this application:

- Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment.

  See Attachment 1 - Self Direct Project Overview and Commitment for a description of the project. See Attachment 6 – Supporting Documentation, for the specifications of the replacement equipment 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed. Due to the length of time since the equipment replacement, the make, model and year of the replaced equipment is not available.

- A copy of the formal declaration or agreement that commits your program to the electric utility, including:

  1) any confidentiality requirements associated with the agreement;

     See Attachment 2 – Self Direct Program Project Blank Application including Rules and Requirements. All confidentially requirements are pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.)

  2) a description of any consequences of noncompliance with the terms of the commitment;

     See Attachment 2 – Self Direct Program Project Blank Application including Rules and Requirements. All consequences of noncompliance are pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.

  3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;

     None required because the resources committed are permanent installations that reduce demand through increased efficiency during the Company's peak summer demand period generally defined as May through September and do not require specific coordination and communication to provide demand reduction capabilities to the Company.

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,

   See Attachment 2 – Self Direct Program Blank Application including Rules and Requirements granting such permission pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.

5) a commitment by you to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.

   See Attachment 1 - Self Direct Project Overview and Commitment for the commitment to comply with any information and compliance reporting requirements imposed by rule or as part of the approval of this arrangement by the Public Utilities Commission of Ohio.

- 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.

  The Company applies the same methodologies, protocols, and practices to Self Direct Program retrospective projects that are screened and submitted for approval as it does to prospective projects submitted through its Prescriptive and Custom Programs. The Commission has not published a technical reference manual for use by the Company so deviations can not be identified. The project submitted is a prescriptive project and energy savings are determined as described in Confidential and Proprietary Attachment 5 - Self Direct Program Project Calculation, and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Ohio | Public Utilities Commission

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

Case No.: 11-1557-EL-EEC

State of Ohio :

Brian Larcey, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

   KEMA Services, Inc agent of Ohio Power

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.

Signature of Affiant & Title Energy Efficiency Engineer

Sworn and subscribed before me this 31st day of October, 2011 Month/Year

Signature of official administering oath

Kimberly Flowers, Outreach Coordinator
Print Name and Title

My commission expires on June 01, 2016

NOTARIAL SEAL STATE OF OHIO

KIMBERLY FLOWERS
NOTARY PUBLIC
STATE OF OHIO
My Comm. Expires June 1, 2016

Self Direct Project Overview & Commitment

The Public Utility Commission of Ohio (PUCO) will soon review your application for participation in AEP Ohio's Energy Efficiency/Peak Demand Response program. Based on your submitted project, please select by initialing one of the two options below, sign and fax to 877-607-0740.

Customer Name	**MIDWEST INDUSTRIES INC**
Project Number	**Three Projects - See "Project Overview," Below**
Customer Premise Address	**Various - See Detail Sheet**
Customer Mailing Address	**979 S Conwell Ave., Willard, OH 44890**
Date Received	**8/30/2011**
Project Installation Date	**Various - See Detail Sheet**
Annual kWh Reduction	**271,018**
Total Project Cost	**Various - See Detail Sheet**
Unadjusted Energy Efficiency Credit (EEC) Calculation	**$12,603.50**
Simple Payback (yrs)	**Various - See Detail Sheet**
Utility Cost Test (UCT)	**Various - See Detail Sheet**

Please Choose One Option Below and Initial

Option 1 - Self Direct EEC: 75%	**$9,452.63**	**Initial: ____**
Option 2 - EE/PDR Rider Exemption	**Various (None chosen in this group)**	**Initial: ____**

Note: *This is a one time selection. By selecting Option 1, the customer will receive payment in the amount stated above. Selection of Option 2: EE/PDR rider exemption, will result in the customer not being eligible to participate in any other energy efficiency programs offered by AEP Ohio during the period of exemption. In addition, the term of Option 2: EE/PDR rider exemption is subject to ongoing review for compliance and could be changed by the PUCO.*

If Option 1 has been selected, will the Energy Efficiency Funds selected help you move forward with other energy efficiency projects?

____YES ____ NO

Project Overview:

The Self Direct (Prescriptive) projects that the above has completed and applied is as follows.

Projects:

AEP-11-04001
AEP-11-04002
AEP-11-04003

The documentation that was included with the application proved that the energy measures applied for were purchased and installed.

By signing this document, the Mercantile customer affirms its intention to commit and integrate the above listed energy efficiency resources into the utility's peak demand reduction, demand response, and energy efficiency programs. By signing, the Mercantile customer also agrees to serve as a joint applicant in any filings necessary to secure approval of this arrangement by the Public Utilities Commission of Ohio, and comply with any information and compliance reporting requirements imposed by rule or as part of that approval.

Ohio Power Company

Please see individual Overview and Commitments for customer and utility authorizations

MIDWEST INDUSTRIES INC

Please see individual Overview and Commitments for customer and utility authorizations

	Project 1	Project 2	Project 3	Totals
Customer Name	MIDWEST INDUSTRIES INC	MIDWEST INDUSTRIES INC	MIDWEST INDUSTRIES INC	
Project Number	AEP-11-04001	AEP-11-04002	AEP-11-04003	
Customer Premise Address	979 S CONWELL AVE, WILLARD, OH 44890-9301	979 S CONWELL AVE, WILLARD, OH 44890-9301	979 S CONWELL AVE, WILLARD, OH 44890-9301	
Customer Mailing Address	44890	44890	44890	
Date Received	8/30/2011	8/30/2011	8/30/2011	
Project Installation Date	9/15/2008	12/30/2009	10/13/2010	
Annual kWh Reduction	84,143	55,769	131,106	271,018
Total Project Cost	$21,115.66	$14,181.90	$34,271.54	
Unadjusted Energy Efficiency Credit (EEC) Calculation	$3,913.00	$2,593.50	$6,097.00	$12,603.50
Simple Payback (yrs)	2.8	2.9	2.9	
Utility Cost Test (UCT)	5.3	5.3	5.3	
Option 1 - Self Direct EEC: 75%	$2,934.75	$1,945.13	$4,572.75	$9,452.63

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Self Direct Project Overview & Commitment

The Public Utility Commission of Ohio (PUCO) will soon review your application for participation in AEP Ohio's Energy Efficiency/Peak Demand Response program. Based on your submitted project, please select by initialing one of the two options below, sign and fax to 877-607-0740.

Customer Name	MIDWEST INDUSTRIES INC	
Project Number	AEP-11-04001	
Customer Premise Address	979 S CONWELL AVE, WILLARD, OH 44890-9301	
Customer Mailing Address	979 S Conwell Ave., Willard, OH 44890	
Date Received	8/30/2011	
Project Installation Date	9/15/2008	
Annual kWh Reduction	84,143	
Total Project Cost	$21,115.66	
Unadjusted Energy Efficiency Credit (EEC) Calculation	$3,913.00	
Simple Payback (yrs)	2.8	
Utility Cost Test (UCT)	5.3	
		Please Choose One Option Below and Initial
Option 1 - Self Direct EEC: 75%	$2,934.75	[X] Initial: KMS
Option 2 - EE/PDR Rider Exemption	2 Months (After PUCO Approval)	[ ] Initial:

Note: *This is a one time selection. By selecting Option 1, the customer will receive payment in the amount stated above. Selection of Option 2: EE/PDR rider exemption, will result in the customer not being eligible to participate in any other energy efficiency programs offered by AEP Ohio during the period of exemption. In addition, the term of Option 2: EE/PDR rider exemption is subject to ongoing review for compliance and could be changed by the PUCO.*

If Option 1 has been selected, will the Energy Efficiency Funds selected help you move forward with other energy efficiency projects?

X YES ___ NO

Project Overview:

The Self Direct (Prescriptive) project that the above has completed and applied is as follows.
Replaced (86) 400W MH with (86) 6L T5 High Bay

The documentation that was included with the application proved that the energy measures applied for were purchased and installed.

By signing this document, the Mercantile customer affirms its intention to commit and integrate the above listed energy efficiency resources into the utility's peak demand reduction, demand response, and energy efficiency programs. By signing, the Mercantile customer also agrees to serve as a joint applicant in any filings necessary to secure approval of this arrangement by the Public Utilities Commission of Ohio, and comply with any information and compliance reporting requirements imposed by rule or as part of that approval.

Ohio Power Company

By: Jon F. Will

Title: Manager

Date: October 20, 2011

MIDWEST INDUSTRIES INC

By: Kevin M. Smith (Kevin M. Smith)

Title: Electrical Engineering Supervisor

Date: 10-20-11

AEP OHIO
A unit of American Electric Power

Self Direct Project Overview & Commitment

The Public Utility Commission of Ohio (PUCO) will soon review your application for participation in AEP Ohio's Energy Efficiency/Peak Demand Response program. Based on your submitted project, please select by initialing one of the two options below, sign and fax to 877-607-0740.

Customer Name	MIDWEST INDUSTRIES INC	
Project Number	AEP-11-04002	
Customer Premise Address	979 S CONWELL AVE, WILLARD, OH 44890-9301	
Customer Mailing Address	979 S Conwell Ave., Willard, OH 44890	
Date Received	8/30/2011	
Project Installation Date	12/30/2009	
Annual kWh Reduction	55,769	
Total Project Cost	$14,181.90	
Unadjusted Energy Efficiency Credit (EEC) Calculation	$2,593.50	
Simple Payback (yrs)	2.9	
Utility Cost Test (UCT)	5.3	
		Please Choose One Option Below and Initial
Option 1 - Self Direct EEC: 75%	$1,945.13	[X] Initial: KMS
Option 2 - EE/PDR Rider Exemption	1 Months (After PUCO Approval)	[ ] Initial:

Note: *This is a one time selection. By selecting Option 1, the customer will receive payment in the amount stated above. Selection of Option 2: EE/PDR rider exemption, will result in the customer not being eligible to participate in any other energy efficiency programs offered by AEP Ohio during the period of exemption. In addition, the term of Option 2: EE/PDR rider exemption is subject to ongoing review for compliance and could be changed by the PUCO.*

If Option 1 has been selected, will the Energy Efficiency Funds selected help you move forward with other energy efficiency projects?

X YES ___ NO

Project Overview:

The Self Direct (Prescriptive) project that the above has completed and applied is as follows.
Replaced (57) 400W MH with (57) 6L T5 High Bay

The documentation that was included with the application proved that the energy measures applied for were purchased and installed.

By signing this document, the Mercantile customer affirms its intention to commit and integrate the above listed energy efficiency resources into the utility's peak demand reduction, demand response, and energy efficiency programs. By signing, the Mercantile customer also agrees to serve as a joint applicant in any filings necessary to secure approval of this arrangement by the Public Utilities Commission of Ohio, and comply with any information and compliance reporting requirements imposed by rule or as part of that approval.

Ohio Power Company

By: Jon F. Williams

Title: Manager

Date: October 20, 2011

MIDWEST INDUSTRIES INC

By: Kevin M. Smith (Kevin M. Smith)

Title: Electrical Engineering Supervisor

Date: 10-20-11

AEP OHIO
A unit of American Electric Power

Self Direct Project Overview & Commitment

The Public Utility Commission of Ohio (PUCO) will soon review your application for participation in AEP Ohio's Energy Efficiency/Peak Demand Response program. Based on your submitted project, please select by initialing one of the two options below, sign and fax to 877-607-0740.

Customer Name	MIDWEST INDUSTRIES INC	
Project Number	AEP-11-04003	
Customer Premise Address	979 S CONWELL AVE, WILLARD, OH 44890-9301	
Customer Mailing Address	979 S Conwell Ave., Willard, OH 44890	
Date Received	8/30/2011	
Project Installation Date	10/13/2010	
Annual kWh Reduction	131,106	
Total Project Cost	$34,271.54	
Unadjusted Energy Efficiency Credit (EEC) Calculation	$6,097.00	
Simple Payback (yrs)	2.9	
Utility Cost Test (UCT)	5.3	
		Please Choose One Option Below and Initial
Option 1 - Self Direct EEC: 75%	$4,572.75	[X] Initial: KMS
Option 2 - EE/PDR Rider Exemption	4 Months (After PUCO Approval)	[ ] Initial:

Note: *This is a one time selection. By selecting Option 1, the customer will receive payment in the amount stated above. Selection of Option 2: EE/PDR rider exemption, will result in the customer not being eligible to participate in any other energy efficiency programs offered by AEP Ohio during the period of exemption. In addition, the term of Option 2: EE/PDR rider exemption is subject to ongoing review for compliance and could be changed by the PUCO.*

If Option 1 has been selected, will the Energy Efficiency Funds selected help you move forward with other energy efficiency projects?

X YES ____ NO

Project Overview:

The Self Direct (Prescriptive) project that the above has completed and applied is as follows.
Replaced (134) 400W MH with (134) 6L T5 High Bay

The documentation that was included with the application proved that the energy measures applied for were purchased and installed.

By signing this document, the Mercantile customer affirms its intention to commit and integrate the above listed energy efficiency resources into the utility's peak demand reduction, demand response, and energy efficiency programs. By signing, the Mercantile customer also agrees to serve as a joint applicant in any filings necessary to secure approval of this arrangement by the Public Utilities Commission of Ohio, and comply with any information and compliance reporting requirements imposed by rule or as part of that approval.

Ohio Power Company

By: Jon F. Williams

Title: Manager

Date: October 20, 2011

MIDWEST INDUSTRIES INC

By: Kevin M. Smith (Kevin M. Smith)

Title: Electrical Engineering Supervisor

Date: 10-20-11

gridSMART From AEP OHIO

Self-Direct Program Project Application

Jan 2011 - Dec 2011

Step 1: Check Project and Equipment Eligibility

- ✓ Project must be a facility improvement that results in a *permanent* reduction in electrical energy usage (kWh).
- ✓ *All installed equipment must meet or exceed the specifications given in the application* and be installed in facilities served by AEP Ohio: Customer must have a valid AEP Ohio account number on an eligible AEP Ohio non-residential rate (see terms and conditions for list of eligible rates eligibility requirements).

Step 2: Submit Application

- ✓ Fill out the Customer Information form and the Worksheet for the measures that you are installing. You may submit the application via mail, fax or e-mail.

Submit your application to:
AEP Ohio Business Incentives for Energy Efficiency
2740 Airport Drive Suite 160
Columbus, OH 43219
Call: (877)-607-0739
Fax: (877)-607-0740
Email: gridsmartohio@kema.com
Visit our web site at gridsmartohio.com

- ✓ Submit a completed application prior to Oct 1st for any projects prior to Jan 1, 2009, and Nov 15th for any projects completed Jan 1, 2009 or later. Any applications received after the deadlines may not be submitted to the PUCO by December 31, 2011 and could jeopardize approval of any incentive. Complete the checklist page and attach the documentation listed: customer information page, a signed Agreement and Signature page, measure worksheet, scope of work (type, quantity and wattage of old and new equipment), dated and itemized invoices for the purchase and installation of all equipment installed and specification sheets for all equipment installed showing that it meets the program specifications.

Step 3: Project Review

- ✓ The program team will review your Application. For some projects, an inspection will be part of the review, and you will be contacted to schedule it.
- ✓ After approval by AEP Ohio, the customer will be sent an Overview and Commitment form to sign for all self-direct projects. After the Overview and Commitment form is returned the project will be submitted to the Public Utilities Commission of Ohio (PUCO) for consideration. The PUCO will assign a case number and review the project details that were prepared by AEP Ohio. The PUCO may request additional information, approve or reject the energy efficiency credits.

Step 4: Receive Energy Efficiency Credits

- ✓ The program team will issue the energy efficiency credits, within four to six weeks after PUCO project approval.
- ✓ In lieu of a one-time energy efficiency credit, you may elect to seek an exemption from the Energy Efficiency / Peak Demand Reduction (EE/ PDR) Rider for the associated electric accounts(s) for a defined period of time as stated on this Application. For this exemption the Energy Efficiency Credit amount (Option 1) is compared to the estimated value of the estimated EE/PDR Rider obligation (Option 2), as calculated by AEP Ohio. The value of Option 2 will be approximately equal to the value of Option 1. If exemption is elected, the affective account is not eligible for other programs offered by AEP Ohio during the exemption period. Unless additional resources are committed, you will, after the specified number of months exempted, be again subject to the EE/ PDR Rider. New Construction projects are not eligible to elect Option 2. Major Renovation projects that do not have a representative billing history for three years prior to the project installation are also not eligible to elect Option 2.
- ✓ If the energy efficiency credit is elected, you remain in the EE/ PDR rider for the period of time that an exemption would have been in effect and may also participate in the AEP Ohio programs. However, during that period of time, you will not be allowed to elect the Option 2 exemption for any additional self-direct projects for the same account number.
- ✓ You are allowed and encouraged to consider using all or a portion of the energy credits, as received from AEP Ohio under this program, to help fund other energy efficiency and demand reduction projects you choose to initiate in the future. Future projects can also qualify for credits under the Prescriptive or Custom programs.

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Self-Direct Program
Project Application

APPLICATION CHECKLIST

APPLICATION

Required Attachments

- ☐ Customer/Contractor Information
- ☐ Completed Energy Efficiency Credits Requested Section of Agreement and Signature Page
- ☐ Itemized Invoices
- ☐ Equipment Specifications
- ☐ Scope of Work

Worksheets

- ☐ Lighting
- ☐ HVAC
- ☐ Refrigeration
- ☐ Motors and VFD
- ☐ Custom

Application Date: _____

Completion Date: _____

Project Incremental Cost _____

**Incomplete applications will delay processing and energy efficiency credits.*

Please complete and submit forms for above checked boxes.

Please fill out if this is a revised submittal

ORIGINAL SUBMITTAL DATE: _____

APPLICATION NUMBER (IF KNOWN): _____

AEP Ohio Business Incentives Program for Energy Efficiency
2740 Airport Drive Suite 160
Columbus, OH 43219

Phone: (877)-607-0739
Fax: (877)-607-0740
gridsmartohio@kema.com
www.gridsmartohio.com

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Self-Direct Program
Project Application

TERMS AND CONDITIONS

Columbus Southern Power and Ohio Power Company are collectively known as AEP Ohio (AEP Ohio). AEP Ohio is offering Prescriptive and Custom energy efficiency credits under the AEP Ohio Business Incentives Program for Energy Efficiency to credit the implementation of past cost-effective energy-efficiency improvements for non-residential (commercial and industrial) customers. AEP Ohio provides energy efficiency credits (EEC) for the purchase and installation of qualifying cost effective equipment in the customer's facility under the Terms and Conditions provided in this application and subject to regulatory approvals. Energy efficiency credits will only be provided in the form of a check or an Energy Efficiency/Peak Demand Reduction (EE/PDR) Rider exemption under this program.

All applications are subject to review and approval by AEP Ohio, its contractor(s)/agent(s), and the Public Utility Commission of Ohio (PUCO) prior to any EEC payments or exemptions from the EE/PDR rider in this program. Funds are limited and subject to availability.

Program Effective Dates

The AEP Ohio Business Incentives for Energy Efficiency program EEC are offered until approved funds are exhausted or Dec 31 of each program year, whichever comes first. The effective dates of Year 3 of the program and application submittal requirements are as follows:

- Self-direct projects are projects completed since 1/1/2008. Self-direct projects are eligible to apply for EEC with this application. Future projects that are not yet completed should apply on the Prescriptive/Custom application.
- All 2011 AEP Ohio Business Incentives for Energy Efficiency program Applications should be received no later than Oct 1st for any projects completed prior to Jan 1, 2009, and Nov 15th for any projects completed Jan 1, 2009 or later. Any applications received after the deadlines may not be submitted to the PUCO by December 31, 2011 and could jeopardize approval of any incentive. AEP Ohio reserves the right to extend or shorten this timeline.
- Subsequent program year plans will be made available toward the end of the existing program year. At the current time, AEP Ohio has a commitment to provide this program through the 2011 program year.

Program and Project Eligibility

The Self-Direct Program applies to customer facilities served by AEP Ohio's retail electric rates who meet the minimum energy usage requirements of 700,000 kWh per year or who are part of a national account involving multiple facilities in one or more states.

The AEP Ohio Business Incentives for Energy Efficiency program offers both Prescriptive energy efficiency credits for some of the more common energy efficiency measures and Custom energy efficiency credits for those eligible improvements not included on the list of Prescriptive measures. Program credits are available under the AEP Ohio Business Incentives for Energy Efficiency program to non-residential customers served at AEP Ohio's regulated retail rates, where qualifying projects are installed in a facility in AEP Ohio's electric service territory. These credits are available to all non residential customers who pay into the (EE/PDR) rider and receive their electricity over AEP Ohio wires, regardless of which retail electric supplier the customer has chosen to purchase power from.

Custom projects must involve measures that result in a reduction in electric energy usage due to an improvement in system efficiency. Projects that result in reduced energy consumption without an improvement in system efficiency are not eligible for a Custom credit. However, projects that involve an automated control technology such as energy management system programming may be eligible for a credit. All projects must meet AEP Ohio's cost-effectiveness requirements. The project simple payback prior to the credit must pass the utility cost effectiveness test(s) determined by AEP Ohio, to qualify for credit. Normally, most projects with a simple payback prior to the credit greater than one year and less than seven years generally pass the utility cost effectiveness test(s). The peak demand hours are defined as weekdays, non-holidays 3:00 PM to 6:00 PM, June through August.

Projects involving measures covered by the Prescriptive energy efficiency credit portion of the program are not eligible for a Custom energy efficiency credit. However, the applicant has the option to apply for a Custom energy efficiency credit for whole building integrated projects or systems even if they include Prescriptive measures.

The energy efficiency credits are calculated in the following Prescriptive or Custom worksheets.

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Self-Direct Program
Project Application

TERMS AND CONDITIONS

Project requirements under the AEP Ohio Business Incentives Program for Energy Efficiency include the following:

- Projects must involve a facility improvement that results in a permanent reduction in electrical energy usage (kWh)
- Projects that are NOT eligible for a credit include the following:
  - Fuel switching (e.g. electric to gas or gas to electric)
  - Changes in operational and/or maintenance practices or simple control modifications not involving capital costs
  - Removal or termination of existing processes, facilities, and/or operations
  - On-site electricity generation
  - Projects involving gas-driven equipment in place of or to replace electric equipment (such as a chiller)
  - Projects focused primarily on power factor improvement;
  - Projects that involve peak-shifting (and not kWh savings)
  - Renewables
  - Are required by state or federal law, building or other codes, or are standard industry practice
  - Are easily reverted/removed or are installed entirely for reasons other than improving energy efficiency
  - Include other conditions to be determined by AEP Ohio.
- Any measures installed at a facility must produce **verifiable** and **persistent** energy reduction. Measures must be sustainable and provide 100% of the energy benefits as stated in the Application for a period of at least five (5) years or for the life of the product, whichever is less. If the Customer ceases to be a delivery service customer of AEP Ohio or removes the equipment or systems at any time during the 5-year period or the life of the product, the Customer may be required to return a prorated amount of credit funds to AEP Ohio.
- Customer can not apply for incentives for future projects and elect after the fact to apply for credits under this program.
- Confidential information contained in any documents associated with this application will be protected from public filings. However, this information may be disclosed to the Public Utilities Commission of Ohio for further review and approval.
- All equipment must be new. Used or rebuilt equipment is only eligible for energy efficiency credits if the energy efficiency rating of the used equipment is the same energy efficiency level of new equipment.
- All installed equipment must meet state, federal, or local codes and requirements when applicable.
- Costs associated with internal labor are not eligible.
- Projects must be installed on the AEP Ohio electric account listed on the application
- Equipment must be purchased, installed, and operating (or capable of operating in the case of seasonal uses) prior to submitting an application for energy efficiency credits
- The energy efficiency credits are paid as a one-time, one-program offer and cannot be combined with incentive payments from other AEP Ohio programs. The customer may be eligible to participate in other programs offered by AEP Ohio, as long as no project receives more than one incentive/credit.

PROGRAM ENERGY EFFICIENCY CREDITS	
Energy efficiency credit levels for one-year energy savings	See tables for prescriptive credits Custom credits $0.08/kWh x 75%
Minimum / Maximum simple payback before energy efficiency credit applied	Must pass cost effectiveness test(s) (determined by AEP Ohio) Generally 1 year Min / 7 year Max
Maximum payout	75% of 50% of the Incremental project cost (additional caps may also apply)
Energy efficiency credit levels for projects completed since 1/1/2008	Calculated amount on the Prescriptive or Custom worksheets attached and subject to funding limits
Credit Limit	Calculated credits greater than $160,000 per project are subject to a sliding scale credit tiering calculation.
Credit Calculation Order	Measure credit caps are applied first Project cost credit limits are applied second Credit tiering is applied third 75% factor applied to credit last

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Self-Direct Program
Project Application

TERMS AND CONDITIONS

Energy Efficiency Credit Limits

For both the Prescriptive and Custom measures in this application, the total energy efficiency credits shall be 75% of the lesser of: 1) The calculated credit as approved by AEP Ohio, or 2) 50% of the incremental project cost with larger projects subject to the following limits and credit reductions. In calculating the savings and energy efficiency credits for Custom measures, please contact the AEP Ohio Business Incentives for Energy Efficiency Program office to determine appropriate baseline for savings.

Funding is limited

- The limit for each self-direct project is $225,000.
- The limit for each business entity (corporation, LLC, partnership, etc) in the Self-Direct Program is based on their tariff, as indicated below:

TARIFF	LIMIT PER BUSINESS ENTITY
General Service Tariffs 1, 2, & 3	$450,000 per year
Any Other Tariff General Service Tariff 4	$450,000 overall for years 2009-2011

- A business entity with facilities in both categories can qualify for both limits. All facilities served in one category for a business entity are combined to determine the limit.
- Limits are utility-specific, so there is a separate limit for facilities served by Ohio Power and those served by Columbus Southern Power.
- A sliding scale credit reduction will be incorporated when the calculated energy efficiency credits exceed $160,000 per project.

Application

Applications should be submitted by Oct 1st for any projects completed prior to Jan 1, 2009, and Nov 15th for any projects completed Jan 1, 2009 or later. Any applications received after the deadlines may not be submitted to the PUCO by December 31, 2011 and could jeopardize approval of any incentive. Project documentation, such as copies of dated invoices for the purchase and installation of the measures and/or product specification sheets, is required. AEP Ohio reserves the right to request additional backup information, supporting detail, calculations, manufacturer specification sheets or any other information prior to any credit payment.

The location or business name on the invoice must be consistent with the application information. Applications and all required supporting documentation should be received by November 15, 2011 to be applicable for the 2011 program year.

A signed application with documentation verifying installation of the project including, but not limited to, equipment, invoices, approvals, and other related information must be submitted to AEP Ohio prior to application approval.

The project invoice should provide sufficient detail to separate the incremental project cost from the cost of other services such as repairs and building code compliance. AEP Ohio reserves the right to request additional supporting documentation as deemed necessary to ensure measure eligibility and verify that the expected energy savings will occur. Confidential information contained in any documents associated with this application will be protected from public filings. However, this information may be disclosed to the Public Utilities Commission of Ohio for further review and approval. Requested information could include: equipment purchase dates, installation dates, proof that the equipment is operational, manufacturer specifications, warranty information, and proof of customer co-payment.

The customer understands and agrees that all other terms and conditions, as specified in the application, including all attachments and exhibits attached to this application, serves as a contract for the customer's commitment of energy resources to AEP Ohio, shall apply.

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Self-Direct Program
Project Application

TERMS AND CONDITIONS

Application Review Process

AEP Ohio will review Applications for eligibility and completeness. Completed applications will be reviewed in the order received. Funds are reserved for the project when AEP Ohio receives a complete application and determines that the project meets the program eligibility requirements. Applicants who submit incomplete applications will be notified of deficiencies upon review of the application, and could lose their place in line in the review process until all requested information is received. Applications must be completed and all information received by the deadlines defined above to begin processing. Applicants are encouraged to call the program hotline if they have any questions about documentation requirements.

Inspections

AEP Ohio reserves the right to inspect all projects to verify compliance with the program rules and verify the accuracy of project documentation. This may include installation inspections, verification of detailed lighting layout descriptions, metering, data collection, interviews, and utility bill data analysis. The customer must allow access to project documents and the facility where the measures were installed for a period of five years after receipt of energy efficiency credits by AEP Ohio. Customer understands and agrees that Program installations may also be subject to inspections by the PUCO or their designee, and photographs of installation may be required.

Requirements for Custom Project Electricity Savings Calculation

The annual electricity savings must be calculated for Custom projects using industry accepted engineering algorithms or simulation models. The applicant must estimate the annual electricity usage of both the equipment removed (and baseline) and equipment installed based on the current operation of the facility. A listing of the pre-existing information requirements is provided at the end of the custom application section. If the previous equipment was at the end of its useful life, the applicant must use, as the baseline, the equipment that would meet the applicable federal and local energy codes unless an “as found” baseline is being used by the applicant. If the applicant is using an “as found” baseline, additional specific information on the pre-existing information must be provided.

The applicant must be able to clearly describe the method used to calculate the savings. The applicant must provide all assumptions used in the calculations and document the source for these assumptions. The method and assumptions used by the applicant to calculate the annual savings will be reviewed by AEP Ohio. AEP Ohio is solely responsible for the final determination of the annual energy savings to be used in calculating the energy efficiency credit amount. AEP Ohio also reserves the right to require specific measurement and verification activities including monitoring the retrofit and determining the credit. Verification of the preexisting consumption may also be required.

AEP Ohio may need to conduct inspections of projects to verify equipment and operation conditions. For Custom and “as-found” projects, the applicant is required to provide information in order to allow AEP Ohio to verify the baseline usage of the pre-existing equipment.. Customers are encouraged to submit projects that warrant special treatment (i.e., non-typical projects) to be considered on a case-by-case basis by AEP Ohio.

Tax Liability

Credits are taxable and, if more than $600, will be reported to the IRS unless the customer is exempt. AEP Ohio is not responsible for any taxes that may be imposed on the Payee as a result of the receipt of the energy efficiency credits.

Disclaimer

AEP Ohio does not guarantee the energy savings and does not make any warranties associated with the measures eligible for energy efficiency credits under this program. AEP Ohio has no obligations regarding and does not endorse any claims, promises, work, or equipment made, performed, or furnished by any contractors or equipment vendors or manufacturers that sell or install any energy efficiency measures and does not endorse or guarantee same . AEP Ohio is not responsible for the proper disposal/recycling of any waste generated as a result of this project. AEP Ohio is not liable for any damage caused by the operation or malfunction of the installed equipment.

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Self-Direct Program Project Application

Important: Please read the terms and conditions before signing and submitting this application.
You must complete all information and provide required additional documentation to avoid processing delays.

CUSTOMER INFORMATION

Business Type *(select one)*

- LARGE OFFICE ☐
- SMALL OFFICE ☐
- SCHOOL ☐
- SMALL RETAIL/SERVICE ☐
- LARGE RETAIL/SERVICE ☐
- HOTEL/MOTEL ☐
- MEDICAL - Hospital ☐
- MEDICAL - Nursing Home ☐
- ASSEMBLY/MEETING PLACE ☐
- RESTAURANT ☐
- GROCERY ☐
- CONDITIONED WAREHOUSE ☐
- UNCONDITIONED WAREHOUSE ☐
- INDUSTRIAL/MANUFACTURING ☐
- COLLEGE/UNIVERSITY ☐
- GOVERNMENT/MUNICIPAL ☐
- OTHER/MISCELLANEOUS _____

Tax Status *(from W9)*

- CORPORATION (Inc., PC, Etc.) ☐
- TAX EXEMPT ☐
- INDIVIDUAL ☐
- OTHER (may receive 1099) _____

Operating Days

- Seven days/week ☐
- Five days/week ☐

Operating Hours

- One shift (8h /day) ☐
- Two shifts (16h/day) ☐
- Three shifts (24h/day) ☐

Building Operating Hours _____

How Did You Hear?

- AEP Account Representative ☐
- Contractor ☐
- Website ☐
- Other _____

Square Footage

Affected Area S.F. _____

NAME OF APPLICANT'S BUSINESS		PROJECT NAME (IF APPLICABLE)		
NAME AS IT APPEARS ON UTILITY BILL	AEP OHIO ACCT #*	APPLICANT TAXPAYER ID # (SSN/FEDERAL ID)		
MAILING ADDRESS		CITY	STATE	ZIP
INSTALLATION ADDRESS		CITY	STATE	ZIP

CUSTOMER CONTACT

Please provide all contacts we may need to process for this project.

NAME OF CONTACT PERSON - *Preferred Contact for Documentation*			TITLE OF CONTACT
CONTACT PHONE #	EXT.	CONTACT FAX #	CONTACT EMAIL ADDRESS

CONTRACTOR INFORMATION

NAME OF CONTRACTING COMPANY

NAME OF CONTACT PERSON			TITLE OF CONTACT PERSON		
CONTACT PHONE #	EXT.	CONTACT FAX #	CONTACT EMAIL ADDRESS		
MAILING ADDRESS			CITY	STATE	ZIP

If there are questions about the application who should we contact? **Customer** ☐ **Contractor** ☐

As an eligible customer, I verify the information is correct and request consideration for participation under this program.

CUSTOMER SIGNATURE (AEP OHIO CUSTOMER)	PRINT NAME
TOTAL INCENTIVE REQUESTED**	DATE
COMPLETION DATE	PROJECT COST

* AEP Ohio Account Number where measure is installed

** Incentive cannot exceed 50 percent of the total Incremental cost or other caps described in the Terms and Conditions.

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Self-Direct Program
Project Application

SELF-DIRECT APPLICATION AGREEMENT

As an eligible AEP Ohio customer, I certify that the installation of the indicated energy efficiency measures, which will be demonstrated by the supporting documentation required by AEP Ohio. I certify that the work, was completed on this project on or after January 1, 2008. The energy efficiency measures are for use on-site and not for resale. I understand that project documentation, including copies of dated invoices for the purchase and installation of the measures and product specification sheets, is required. Further documentation requirements can be found at the program website www.gridsmartohio.com or by calling the program hotline.

I understand that the location or business name on the invoice must be consistent with the application information. Final Applications and all required supporting documentation should be received by **Oct 1st for any projects completed prior to Jan 1, 2009, and Nov 15th for any projects completed Jan 1, 2009 or later. Any applications received after the deadlines may not be submitted to the PUCO by December 31, 2011 and could jeopardize approval of any incentive by the PUCO**.

I agree to verification by the utility or their representatives of both sales transactions and equipment installation.

I understand that these energy efficiency credits are available to all eligible customers who pay the Energy Efficiency and Peak Demand Reduction (EE/PDR) rider and receive their electricity over AEP Ohio wires regardless of which retail electric supplier the customer has chosen to purchase power from.

I certify that the information on this application is true and correct, and that the Taxpayer ID Number and tax status is the applicant's. I understand that incentives over $600 will be reported to the IRS unless the applicant is exempt. I understand that energy efficiency credits assume related energy benefits over a period of 5 years or for the life of the product, whichever is less.

I agree that if: I remove the related product(s) identified in my application before a period of 5 years or the end of the product life, whichever is less, I shall refund a prorated amount of energy efficiency credits to AEP Ohio based on the actual period of time in which the related product(s) were installed and operating. This is necessary to assure that the project's related energy benefits will be achieved.

I understand that the program may be modified or terminated without prior notice.

AEP Ohio reserves the right to refuse payment and participation if the customer or contractor violates Program rules and requirements. AEP Ohio is not liable for energy efficiency credits promised to customers as a result of misrepresentation of the Program.

Customer and customer's contractor shall be responsible to comply with any applicable codes or ordinances.

All submissions become the property of AEP Ohio. Keep a copy for your records.

I understand that the Application and all required documentation should be received by the AEP Ohio Business Incentives for Energy Efficiency program prior to **Oct 1st for any projects completed prior to Jan 1, 2009, and Nov 15th for any projects completed Jan 1, 2009 or later. Any applications received after the deadlines may not be submitted to the PUCO by December 31, 2011 and could jeopardize approval of any incentive by the PUCO**. All equipment must be fully operational.

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Self-Direct Program
Project Application

SELF-DIRECT APPLICATION AGREEMENT

I understand that this project must involve a facility improvement that results in improved energy efficiency. I also understand that all materials removed, including lamps and PCB ballasts, must be permanently taken out of service and disposed of in accordance with local codes and ordinances. Equipment can not under any circumstances be resold for reuse. I understand it is my responsibility to be aware of any applicable codes or ordinances. Information about hazardous waste disposal can be found at: http://www.epa.gov/osw/hazwaste.htm.

AEP Ohio will pay 75% of the lesser of: 1) The calculated credit as approved by AEP Ohio subject to funding limits or 2) 50% of the incremental project cost (subject to application caps). I understand that AEP Ohio or their representatives have the right to ask for additional information at any time. AEP Ohio's Business Incentives Program for Energy Efficiency will make the final determination of energy efficiency credit levels for this project.

The program has a limited budget. Applications will be processed within the budget limits. Applications and all supporting documentation required should be received by November 15, 2011 to be eligible for funding under the current program period.

Customer understands and agrees that all other terms and conditions, as specified in the application, including all attachments and exhibits attached to this application which will serve as a contract for the Customer's commitment of energy and demand resources to AEP Ohio shall apply.

I understand that AEP Ohio does not guarantee the energy savings and does not make any warranties associated with the measures eligible for energy efficiency credits under this program, and, further, that AEP Ohio has no obligations regarding any claims, promises, work, or equipment made, performed, or furnished by any contractors or equipment vendors that sell or install any energy efficiency measures and does not endorse or guarantee same.

Energy efficiency credits will be based upon the final application and program terms and conditions, as well as the availability of funds.

Any and all energy savings generated by the project described in this application are hereby committed to AEP Ohio in order to count against its respective companies' benchmark requirements in S.B. 221.

ENERGY EFFICIENCY CREDITS REQUESTED

I have read and understand the program requirements and Measure Specifications and Terms and Conditions set forth in this application and agree to abide by those requirements. Furthermore, I concur that I must meet all eligibility criteria in order to be paid under this program.

ALL EQUIPMENT MUST BE INSTALLED AND OPERATIONAL. A CUSTOMER SIGNATURE IS REQUIRED FOR PAYMENT. SIGNED APPLICATIONS RECEIVED BY FAX OR EMAIL WILL BE TREATED THE SAME AS ORIGINAL APPLICATIONS RECEIVED BY MAIL. All submissions become the property of AEP Ohio. Keep a copy for your records.

TOTAL PROJECT COST	TOTAL ENERGY EFFICIENCY CREDITS REQUESTED

CUSTOMER SIGNATURE (AEP CUSTOMER)

PRINT NAME	DATE	ACTUAL COMPLETION DATE

LITHONIA LIGHTING®

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE — The I-BEAM fluorescent high bay is an ideal one-for-one replacement of common metal halide high bay systems. The unique Cool Running Technology provides trouble-free operation in ambient spaces up to 65°C. Applications include manufacturing, warehousing, commercial facilities and retail. The fluorescent I-BEAM fixture performs at mounting heights from 15'-40'. **Certain airborne contaminants can diminish integrity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.**

CONSTRUCTION — I-BEAM fixtures features Cool Running Technology for ambient operation up to 65°C. Backed by a full five-year ballast warranty at 55°C, three-year ballast warranty at 65°C. Designed for optimum performance using T5HO fluorescent lamps. The I-BEAM fixture provides the best option for applications requiring a rugged fixture construction coupled with excellent fixture performance. Optical designs for your choice of narrow distribution for aisles or wide distribution for general lighting. Typical arrangement provides over 90% luminaire efficiency. Available with four- or six-lamp cross-section with your choice of full direct component or with uplight. Easy two-point mounting with convenient aircraft cable provides reliable installation, eliminates fixture sag and provides sturdy installation. Single-point mounting available. Available in MVOLT (120-277V) or HVOLT (347-480V).

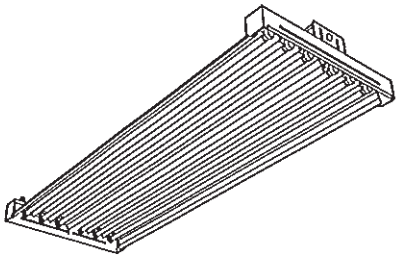
Channel is formed of heavy-duty code-gauge steel to stand up to the most demanding elements. Lamp holder assembly protects from incidental damage to reflectors during installation. Sockets include secure positioning rotating collars with enclosed contacts. Access plate on the back of the channel housing allows quick and easy wiring.

Finish: Channel is high-gloss white baked enamel; five-stage iron phosphate pretreatment ensures superior paint adhesion and rust resistance.

OPTICS — Two optical systems are available. Narrow distribution (ND) is ideal for narrow or aisle lighting applications and features precision-formed segmented optics utilizing Alanod Miro® 4 specular aluminum reflector. Provides 95% reflectivity and warranted for 25 years. Wide distribution (WD) includes high-reflectance white finish for general or open areas.

ELECTRICAL — Thermally protected, resetting, Class P, HPF, A+ sound-rated electronic ballast. AWM TFM or THHN wire used throughout rated for required temperatures. Ballast disconnect (BDP) is standard unless EL14 or cordset is requested.

INSTALLATION — Suitable for suspension by chain, cable, hook monopoint or pendant monopoint. Fixture should be mounted at a minimum plenum height of 18 inches.



I-BEAM® FLUORESCENT HIGH BAY LIGHTING

IB

Fluorescent High Bay
4-, 6- or 8-lamp T5

COOL RUNNING TECHNOLOGY

PATENT PENDING

T5 Technology

Specifications

Length: 48 3/8 (1,227)
Width: 17 5/8 (448)
Depth: 4 3/8 (111)
Weight: 17 lbs. (7.71 kg)

All dimensions are inches (millimeters).
Specifications subject to change without notice.

LISTINGS — UL/C-UL listed to US and Canadian safety standards for ambient operation up to 65°C. Suitable for damp locations. NOM Certified (see Options.)

WARRANTY — Guaranteed for one year against mechanical defects in manufacturing.

Ballast warranty: Five years when operated in 55°C or less ambient conditions, three years when operated in 65°C or less ambient conditions. (Four- and six-lamp fixtures only.)

ORDERING INFORMATION

For shortest lead times, configure product using **standard options (shown in bold).**
Example: IB 454L

IB

Series
IB I-BEAM

Number of lamps/wattage
Lamps installed[1]
454L 4-lamp 54W T5HO
654L 6-lamp 54W T5HO
854L 8-lamp 54W T5HO
Unlamped
454 4-lamp 54W T5HO
654 6-lamp 54W T5HO
854 8-lamp 54W T5HO

Distribution
(blank) **Narrow distribution with uplight**
NDS Narrow distribution, no uplight <3%
WD Wide distribution with uplight
WDS Wide distribution, no uplight <3%

Voltage
(blank) **MVOLT; 120V-277V**
HVOLT 347V-480V

Ballast configuration
(blank) **Standard configuration**[2]
2/3 Two, three-lamp ballasts
2/2 Two, two-lamp ballasts

Ballast
(blank) **Program start, 1.0 BF**
LCR90 Less Cool Running[3]

Lamps installed
(blank) **F54T5HO/841**
LP835 F54T5HO/835
LP830 F54T5HO/830
LP865 F54T5HO/865
Amalgam lamps[4]
LP841A F54T5HO/841
LP835A F54T5HO/835
LP830A F54T5HO/830
LP850A F54T5HO/850

Options
EL14 Emergency battery pack (900 lumens)[5,6]
MSI Motion sensor pre-wired[6]
MSI360 360° motion sensor pre-wired[6]
OCS RELOC® OnePass® 5' installed[6]
FSP Integral side panels
NOM NOM Certified
PMP Pendant monopoint[7]
Cords: See reverse.

NOTES:
1 Lamps installed are F54T5HO/841.
2 Ballast included:
6-lamp = (1) 2-lamp ballast and (1) 4-lamp ballast
4-lamp = (1) 4-lamp ballast
3 54T5HO only ballast configuration, 1/4 1/2. Not recommended for ambient temperatures greater than 45°C. Five-year limited warranty provided by ballast manufacturer.
4 Not for use with motion sensors or EL14.
5 UL Listed for 55°C. Output in emergency mode varies with ambient temperature (approx. 944 lumens at 25°C and 911 lumens at 45°C). Single-lamp operation only. Not available with HVOLT or MVOLT. Requires some assembly in field for 6-lamp fixtures.
6 Specify voltage.
7 Fixture must be ordered with PMP for channel modification. Splice box ships separately. Requires two ballasts. Conduit must be minimum of 18". Not field-installable.

Accessories:

Order as a separate catalog number.

IBAC120 M20	Aircraft cable 10' Y hanger (one pair)
IBAC240 M20	Aircraft cable 20' Y hanger (one pair)
WGIBZ	Wireguard, zinc-coated
HC36	Chain hanger, 36"
IBHMP	Hook monopoint
IBPMP	Pendant monopoint[7]

I-BEAM Fluorescent High Bay, T5

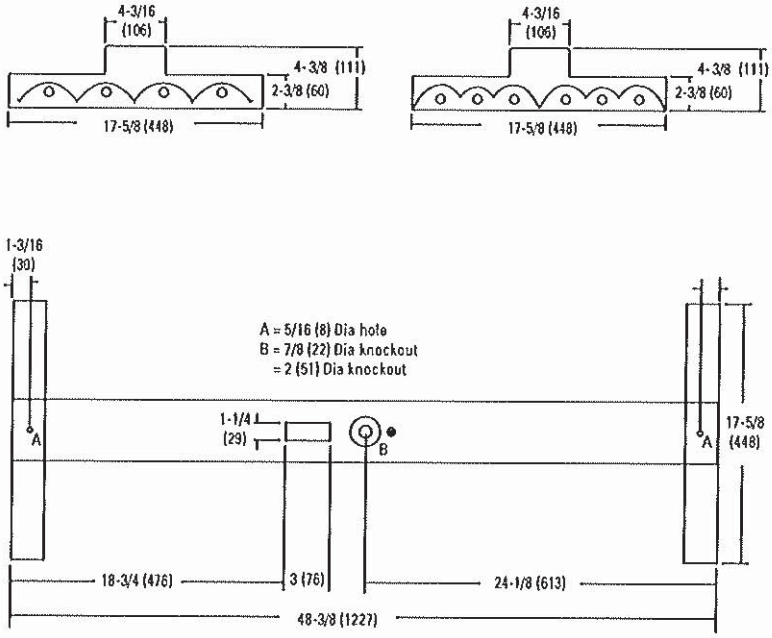
DIMENSIONS

Inches (millimeters). Subject to change without notice.

Cord Set Option:

Add suffix to end of catalog number, specify voltage.
All cord sets are 6', black unless otherwise noted.
Other configurations available, consult factory.

Suffix	Description
CS1	Straight plug, 120V
CS3	Twist lock, 120V
CS7	Straight plug, 277V
CS11	Twist-lock, 277V
CS25	Twist-lock, 347V
CS97	Twist-lock, 480V
CS93	600V SO white cord, no plug



PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. All data based on 25°C. Full photometric data on these and other configurations available upon request.

IB 454

Report: LTL14006
LUMENS PER LAMP 4400

Coefficients of Utilization

pf		20%								
pc		80%			50%			30%		
	pw	70%	50%	30%	50%	30%	10%	50%	30%	10%
RCR	0	118	118	118	107	107	107	101	101	101
	1	109	104	101	96	93	91	91	89	87
	2	100	92	86	85	81	77	81	77	74
	3	92	82	75	76	71	66	73	68	64
	4	85	74	66	69	62	57	66	60	56
	5	78	67	59	62	56	51	60	54	50
	6	73	61	53	57	50	45	55	49	44
	7	68	56	48	52	46	41	51	45	40
	8	64	51	43	49	42	37	47	41	37
	9	60	48	40	45	39	34	44	38	33
	10	57	44	37	42	36	31	41	35	31

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	6218	35.3	35.3
0° - 40°	9065	51.5	51.4
0° - 60°	13684	77.7	77.6
0° - 90°	16413	93.3	93.1
90° - 180°	1214	6.9	6.9
0° - 180°	17626	100.1	100.0

IB 454 WD

Report: LTL14005
LUMENS PER LAMP 4400

Coefficients of Utilization

pf		20%								
pc		80%			50%			30%		
	pw	70%	50%	30%	50%	30%	10%	50%	30%	10%
RCR	0	110	110	110	100	100	100	94	94	94
	1	100	96	92	88	85	82	83	80	78
	2	91	83	77	76	71	67	72	68	64
	3	83	73	65	67	61	56	63	58	54
	4	75	64	56	59	52	47	56	50	46
	5	69	57	49	53	46	40	50	44	39
	6	64	51	43	47	40	35	45	39	34
	7	59	46	38	43	36	31	41	35	30
	8	55	42	34	39	32	28	37	31	27
	9	51	39	31	36	29	25	34	29	24
	10	48	36	28	33	27	22	32	26	22

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	3911	22.2	23.6
0° - 40°	6432	36.5	38.8
0° - 60°	11655	66.2	70.3
0° - 90°	15190	86.3	91.7
90° - 180°	1381	7.8	8.3
0° - 180°	16571	94.2	100.0

IB 654

Report: LTL14055
LUMENS PER LAMP 4400

Coefficients of Utilization

pf		20%								
pc		80%			50%			30%		
	pw	70%	50%	30%	50%	30%	10%	50%	30%	10%
RCR	0	117	117	117	108	108	108	102	102	102
	1	108	103	99	95	92	89	90	88	86
	2	98	90	84	84	79	75	80	76	72
	3	90	80	72	74	68	63	71	66	62
	4	83	71	63	67	60	55	64	58	53
	5	77	64	56	60	53	48	58	52	47
	6	71	58	50	55	48	42	53	46	42
	7	66	53	45	50	43	38	48	42	37
	8	62	49	41	46	39	34	45	38	34
	9	58	45	37	43	36	31	41	35	31
	10	54	42	34	40	33	29	39	32	28

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	8275	31.3	31.5
0° - 40°	12681	48.0	48.2
0° - 60°	20122	76.2	76.5
0° - 90°	25014	94.8	95.2
90° - 180°	1272	4.8	4.8
0° - 180°	26287	99.6	100.0

LITHONIA LIGHTING®
An AcuityBrands Company

Sheet #: IB-T5

Lithonia Lighting
Industrial
One Lithonia Way, Conyers, GA 30012
Phone: 770-922-9000 Fax: 770-981-8141
www.lithonia.com

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for use in cold storage, food processing, manufacturing, industrial, schools, gymnasiums and exterior retail environments. Fiberglass enclosure protects fixture while remaining easy to service and clean. Certain airborne contaminants can diminish integrity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.

CONSTRUCTION — One-piece SVA rated fiberglass housing with continuous poured-in-place, closed-cell gasket. Tool-less ballast and wiring access.

OPTICS — Injection-molded, impact-resistant clear acrylic diffuser with frosted ends and linear prisms is standard (.080" thick). UV stabilized polycarbonate diffuser option also is available (.080" thick). Stainless steel latches (12) included. Reflectors are precision-formed, high-performance, segmented optics utilizing premium specular aluminum. Provides 95% reflectivity and warranted for 25 years.

ELECTRICAL — Ballasts: Thermally protected, resetting, Class P, HPF, Sound Rating A+. UL listed wire, rated for required temperatures, used throughout. Cool Running Plus 90°C rated ballast standard for T5HO. T8 ballast starting temperature is -18°C (0°F) and T5HO starting temperature is -29°C (-20°F).
Lamps: 4100K lamps standard. Secured with rotary locking lampholders for ease of re-lamping and to minimize disconnection due to vibration or incidental contact.

INSTALLATION — Surface conduit entry provisions with watertight plugs are standard. Stainless steel mounting brackets included for suspension with aircraft cable (cable not included). Optional stainless steel V-hooks available for chain hanging (chain not included).

LISTING — UL/C-UL listed to US and Canadian Safety Standard. NOM Certified (see Options). UL listed for 40°C ambient (except six-lamp S4T5HO, which is UL listed at 35°C ambient). Suitable for wet location. IP65, IP66 and IP67 rated and certified to meet NSF Splash Zone 2. NEMA 4X. 1500 PSI hose-down.

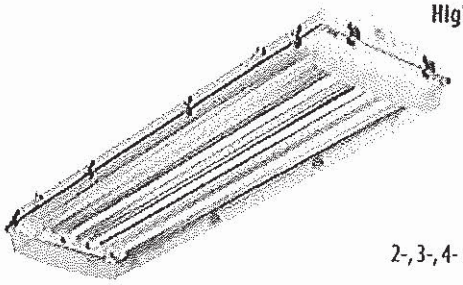
WARRANTY — Guaranteed for one year against mechanical defects in manufacturing.

Note: Specifications subject to change without notice.

High-Pressure Hose-Down

FHE

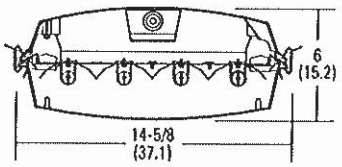
FOOD PROCESSING
2-, 3-, 4- or 6-lamp, T5HO, T5 or T8



Specifications

Length: 52.0 (132.0)
Width: 14-5/8 (37.1)
Depth: 6 (15.2)
Weight: 26.2 lbs. (11.88 kg)

All dimensions are inches (centimeters) unless otherwise specified.



ORDERING INFORMATION

For shortest lead times, configure products using bolded options.

Example: FHE 454L 1/4

FHE							
Series	**Lamp type**[1]			**Shielding**	**Distribution**	**Voltage**	**Ballast configuration** ›››
FHE 15"X4'	T5HO lamps	T5 lamps	T8 lamps	(blank) Clear acrylic	White ballast cover	(blank) MVOLT; 120-277V	(blank) All two-lamp ballasts
	254L 2 lamps, 54W	228T5L 2 lamps, 28W	232L 2 lamps, 32W	PCL Clear polycarbonate[2]	(blank) General distribution	HVOLT 347-480V[3]	1/3 One, three-lamp ballast[3]
	354L 3 lamps, 54W	328T5L 3 lamps, 28W	332L 3 lamps, 32W		Specular reflector		1/4 One, four-lamp ballast[3]
	454L 4 lamps, 54W	428T5L 4 lamps, 28W	432L 4 lamps, 32W		ND Narrow distribution		2/3 Two, three-lamp ballasts[3]
	654L 6 lamps, 54W	628T5L 6 lamps, 28W	632L 6 lamps, 32W		SD Spread distribution		1/41/2 One, four-lamp and one, two-lamp ballast[3]

Ballast		Lamps installed[1]		Options[5]			
T5/T5HO		(blank)	85 CRI, 841	CX	6' white cord, 18/3, no plug	RMK	Rigid mount kit, 18 gauge stainless steel
(blank)	1.0 BF, PRS	LP830	85 CRI, 830	CXL12	12' white cord, 18/3, no plug	PMP	Pendant monopoint[11]
T8		LP835	85 CRI, 835	EL14DW	Emergency lighting (1400 lumens)[6,7]	WLF	Wet location fitting (two pre-installed, 40" off centers)
(blank)	1.18 BF, IS	LP850	85 CRI, 850	MHKB	Stainless steel V-hook and brackets	MSI__	Wet location 360° motion sensor[8,9]
GEB10IS	.88 BF, IS			SMB	Surface mounting bracket	TRS	Tamper-resistant screws[10]
GEB10ISL	.76 BF, IS			EMK	End mount supension bracket	NOM	Meets Mexican standards
GEB10PS	.88 BF, PRS						

Accessories: *Order as separate catalog number.*

FHEMHKB	Stainless steel V-hook and brackets
MH CH 36	3' double chain[12]
MHYTGB10	10' adjustable aircraft cable, Y, 2-toggle
MHHK120	10' adjustable aircraft cable, single hook[13]
RK1T10DRV	Torx® T10 screwdriver for TRS option

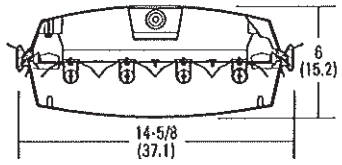
Notes

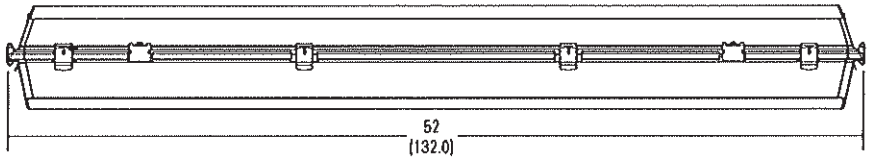
1. To order fixtures WITHOUT lamps, remove the "L" from the description (EX: FHE 454).
2. Recommended for school and gymnasium applications.
3. Not available with 28T5.
4. Alternate lamp color need only be specified if pre-installed lamps are provided.
5. For additional options consult factory.
6. Must specify voltage.
7. 900 lumens for T5HO. UL listed for 55°C. Output in emergency mode varies with ambient temperature (approx. 944 lumens at 25°C and 911 lumens at 45°C. Single-lamp operation only. Not available with HVOLT.
8. For mounting up to 20', specify MSI20; for mounting up to 40', specify MSI40.
9. GEB10PS recommended.
10. Stainless steel Torx® T10 screws with center reject pin.
11. Housing pre-drilled with WLF in center; additional support cables required.
12. For use with MHKB option.
13. For use with EMK option.

FHE Fluorescent High-Pressure Hose-Down, T5, T5HO and T8

DIMENSIONS

Inches (centimeters). Subject to change without notice.





PHOTOMETRICS

Consult factory for photometric information.

TEST NO: ABA200972
LUMINAIRE CATALOG NO.: FHE 654L ND
LUMENS PER LAMP: 4450

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	77	77	77	75	75	75	71	71	71
	1	67	64	61	65	62	60	62	59	57
	2	58	53	49	57	52	49	54	50	47
	3	51	45	41	50	45	41	47	43	40
	4	45	39	35	44	39	35	42	38	34
	5	41	35	30	40	34	30	38	33	29
	6	37	31	26	36	30	26	34	29	26
	7	33	28	23	33	27	23	31	27	23
	8	30	25	21	30	25	21	29	24	21
	9	28	23	19	27	22	19	27	22	19
	10	26	21	17	25	21	17	25	20	17

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	4789.4	17.9	27.4
0° - 40°	7621.2	28.5	43.5
0° - 60°	12733.3	47.7	72.7
0° - 90°	16817.2	63.0	96.0
90° - 180°	691.9	2.6	4.0
0° - 180°	17509.1	65.6	100.0

TEST NO: ABA200975
LUMINAIRE CATALOG NO.: FHE 454L ND
LUMENS PER LAMP: 4450

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	93	93	93	90	90	90	86	86	86
	1	80	77	74	78	75	73	75	72	70
	2	71	65	61	69	64	60	66	62	58
	3	62	56	51	61	55	51	58	54	49
	4	56	49	44	55	48	43	52	47	43
	5	50	43	38	49	43	38	47	42	37
	6	45	39	34	45	38	34	43	37	33
	7	41	35	30	41	34	30	39	34	30
	8	38	32	27	37	31	27	36	31	27
	9	35	29	25	35	29	25	34	28	24
	10	33	26	22	32	26	22	31	26	22

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	4370.5	24.6	31.4
0° - 40°	6760.0	38.0	48.6
0° - 60°	10724.0	60.2	77.1
0° - 90°	13579.4	76.3	97.6
90° - 180°	338.7	1.9	2.4
0° - 180°	13918.1	78.2	100.0

TEST NO: ABA200978
LUMINAIRE CATALOG NO.: FHE 632L ND
LUMENS PER LAMP: 2950

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	90	90	90	88	88	88	83	83	83
	1	78	74	71	76	73	70	72	69	67
	2	68	62	57	66	61	57	63	58	55
	3	59	53	48	58	52	47	55	50	46
	4	52	45	40	51	45	40	49	43	39
	5	47	40	34	46	39	34	44	38	33
	6	42	35	30	41	34	30	39	34	29
	7	38	31	26	37	31	26	36	30	26
	8	35	28	24	34	28	23	33	27	23
	9	32	25	21	31	25	21	30	25	21
	10	29	23	19	29	23	19	28	23	19

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	3399.9	19.2	25.1
0° - 40°	5527.2	31.2	40.8
0° - 60°	9869.8	55.8	72.9
0° - 90°	13023.2	73.6	96.2
90° - 180°	508.1	2.9	3.8
0° - 180°	13531.3	76.4	100.0

TEST NO: ABA200981
LUMINAIRE CATALOG NO.: FHE 432L ND
LUMENS PER LAMP: 2950

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	104	104	104	101	101	101	96	96	96
	1	90	86	82	88	84	81	83	80	78
	2	78	72	67	76	71	66	73	68	64
	3	69	62	56	67	61	55	64	59	54
	4	61	54	48	60	53	47	57	51	46
	5	55	47	41	54	46	41	52	45	40
	6	50	42	36	49	41	36	47	40	35
	7	45	37	32	44	37	32	43	36	31
	8	41	34	29	41	34	29	39	33	28
	9	38	31	26	37	31	26	36	30	26
	10	35	28	24	35	28	24	33	27	23

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	2914.9	24.7	28.2
0° - 40°	4642.9	39.3	44.8
0° - 60°	7769.6	65.8	75.1
0° - 90°	10026.8	85.0	96.9
90° - 180°	325.4	2.8	3.1
0° - 180°	10352.3	87.7	100.0

LITHONIA LIGHTING®
An AcuityBrands Company

SPECIAL APPLICATIONS: One Lithonia Way Conyers, GA 30012 Phone: 800-315-4963 Fax: 770-981-8191 www.lithonia.com

T5 High Output Energy Advantage

F54T5/841 HO EA A ALTO 49W

Philips Energy Advantage T5 HO 49W lamps are environmentally-responsible, ultra-slim and have extraordinary light output with increased energy savings.

Product data

- General Characteristics

Base	Miniature Bipin
Bulb	T5 [16 mm]
Rated Avg. Life	25000 hr
Life to 10% fail	21000 hr
Preheat EL,3h	
LSF HF Preheat 20000h Rated,3h	92 %
LSF HF Preheat 16000h Rated,3h	95 %
LSF HF Preheat 12000h Rated,3h	95 %
LSF HF Preheat 8000h Rated,3h	97 %
LSF HF Preheat 6000h Rated,3h	98 %
LSF HF Preheat 4000h Rated,3h	98 %
LSF HF Preheat 2000h Rated,3h	99 %

- Electrical Characteristics

Watts	49 W
Lamp Voltage EL 25°C	107 V
Lamp Current EL 25°C	0.460 A
Dimmable	Yes
Lamp Wattage EL 35°C	49.0 W
Lamp Current EL 35°C	0.460 A
Lamp Voltage EL 35°C	107 V
Lamp Wattage EL 25°C, Rated	49.2 W
Lamp Wattage EL 25°C, Nominal	49 W

- Environmental Characteristics

Mercury (Hg) Content	2.2 mg

- Light Technical Characteristics

Color Code	841 [CCT of 4100K]
Color Rendering Index	82 Ra8
Color Designation	Cool White
Color Temperature	4100 K
Chromaticity Coordinate X	383 -
Chromaticity Coordinate Y	386 -
Initial Lumens	4950 Lm
Luminance Average EL 25°C	2.6 cd/cm2
Lum Efficacy Rated HF 25°C	89 Lm/W
Lum Efficacy Rated HF 35°C	101 Lm/W
LLMF HF 20000h Rated	88 %
LLMF HF 16000h Rated	90 %
LLMF HF 12000h Rated	91 %
LLMF HF 8000h Rated	93 %
LLMF HF 6000h Rated	94 %

PHILIPS
sense and simplicity

T5 High Output Energy Advantage

LLMF HF 4000h Rated	95 %
LLMF HF 2000h Rated	96 %
Luminous Flux EL 25°C, Rated	4400 Lm
Luminous Flux EL 25°C, Nominal	4400 Lm
Design Temperature	20 (min), 75 (max) C

• Product Dimensions

Base Face to Base Face A	1149.0 (max) mm
Insertion Length B	1153.7 (min), 1156.1 (max) mm
Overall Length C	1163.2 (max) mm
Diameter D	17 (max) mm

• Product Data

Product number	407304
Full product name	F54T5/841 HO EA A ALTO 49W
Short product name	F54T5/841/A/EA/ALTO 49W 40/1
Pieces per Sku	1
eop_pck_cfg	40
Skus/Case	40
Bar code on pack	46677407308
Bar code on case	50046677407303
Logistics code(s)	927995184022
eop_net_weight_pp	162.900 gr

** Average life under engineering data with lamps turned off and restarted once every 12 operating hours.
§ 5W saved x 40000 hrs (rated average life) / 1000 x .10 kWh rate. kWh rate may vary.
◊ Pico calculation: mercury content (mg) * 1,000,000,000 / (RAL x design lumens) = picogram per lumen hour
‡ For more information on LEED, visit www.usgbc.org

www.philips.com/lighting

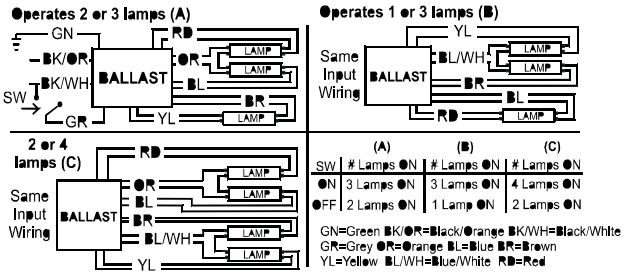
PHILIPS ADVANCE

HCN4S5490C2LSG@480	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
Input Voltage	347-480
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F54T5/HO/ES (49W)	1	49	-20/-29	0.15	63	1.09	10	0.98	1.7	1.73
F54T5/HO/ES (49W)	2	49	-20/-29	0.25	110	1.00	10	0.98	1.7	0.91
F54T5/HO/ES (49W)	3	49	-20/-29	0.39	172	1.04	10	0.98	1.7	0.60
* F54T5/HO/ES (49W)	4	49	-20/-29	0.50	218	1.00	10	0.98	1.7	0.46

Wiring Diagram



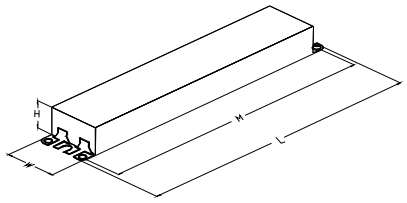
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White		0
Blue	54	137.2
Red	51	129.5
Yellow	60	152.4
Gray	32	81.3
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White	42	106.7
Brown	60	152.4
Orange	42	106.7
Orange/Black	32	81.3
Black/White	32	81.3
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
16.7 "	1.7 "	1.18 "	16.34 "
16 7/10	1 7/10	1 9/50	16 17/50
42.4 cm	4.3 cm	3 cm	41.5 cm

Revised 03/11/2009

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

PHILIPS LIGHTING ELECTRONICS N.A.
10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018
Tel: 800-322-2086 · Fax: 888-423-1882 · www.philips.com/advance
Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

PHILIPS ADVANCE

HCN4S5490C2LSG@480	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
Input Voltage	347-480
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads or poke-in wire trap connectors color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Programmed Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 50/60 Hz input source of _____ (120V through 277V or 347V through 480V) with sustained variations of +/- 10% (voltage and frequency).

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 for primary lamp.

2.6 Ballast shall have a minimum ballast factor of 1.00 for primary lamp application.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of _____ {-18C (0F) or -28C (-20F)} for primary lamp. Consult lamp manufacturer for temperature versus light output characteristics.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions.

2.13 Four-lamp ballast shall have (semi-independent or independent) lamp operation.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

3.6 Ballast shall comply with UL Type CC rating.

3.7 Ballast shall comply with NEMA 410 for in-rush current limits.

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a "90C" designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90C.

4.3 Manufacturer shall have a twenty-year history of producing electronic ballasts for the North American market.

Revised 03/11/2009

PHILIPS LIGHTING ELECTRONICS N.A.
10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018
Tel: 800-322-2086 · Fax: 888-423-1882 · www.philips.com/advance
Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

LITHONIA LIGHTING®

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE — The I-BEAM fluorescent high bay is an ideal one-for-one replacement of common metal halide high bay systems. The unique Cool Running Technology provides trouble-free operation in ambient spaces up to 65°C. Applications include manufacturing, warehousing, commercial facilities and retail. The fluorescent I-BEAM fixture performs at mounting heights from 15'-40'. **Certain airborne contaminants can diminish integrity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.**

CONSTRUCTION — I-BEAM fixtures features Cool Running Technology for ambient operation up to 65°C. Backed by a full five-year ballast warranty at 55°C, three-year ballast warranty at 65°C. Designed for optimum performance using T5HO fluorescent lamps. The I-BEAM fixture provides the best option for applications requiring a rugged fixture construction coupled with excellent fixture performance. Optical designs for your choice of narrow distribution for aisles or wide distribution for general lighting. Typical arrangement provides over 90% luminaire efficiency. Available with four- or six-lamp cross-section with your choice of full direct component or with uplight. Easy two-point mounting with convenient aircraft cable provides reliable installation, eliminates fixture sag and provides sturdy installation. Single-point mounting available. Available in MVOLT (120-277V) or HVOLT (347-480V).

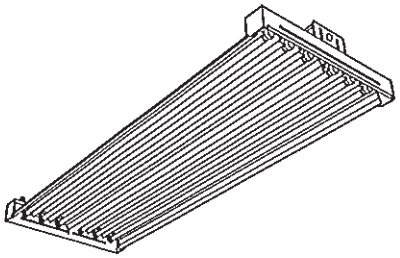
Channel is formed of heavy-duty code-gauge steel to stand up to the most demanding elements. Lamp holder assembly protects from incidental damage to reflectors during installation. Sockets include secure positioning rotating collars with enclosed contacts. Access plate on the back of the channel housing allows quick and easy wiring.

Finish: Channel is high-gloss white baked enamel; five-stage iron phosphate pretreatment ensures superior paint adhesion and rust resistance.

OPTICS — Two optical systems are available. Narrow distribution (ND) is ideal for narrow or aisle lighting applications and features precision-formed segmented optics utilizing Alanod Miro® 4 specular aluminum reflector. Provides 95% reflectivity and warranted for 25 years. Wide distribution (WD) includes high-reflectance white finish for general or open areas.

ELECTRICAL — Thermally protected, resetting, Class P, HPF, A+ sound-rated electronic ballast. AWM TFM or THHN wire used throughout rated for required temperatures. Ballast disconnect (BDP) is standard unless EL14 or cordset is requested.

INSTALLATION — Suitable for suspension by chain, cable, hook monopoint or pendant monopoint. Fixture should be mounted at a minimum plenum height of 18 inches.



I-BEAM® FLUORESCENT HIGH BAY LIGHTING

IB

Fluorescent High Bay
4-, 6- or 8-lamp T5

COOL RUNNING TECHNOLOGY

PATENT PENDING

T5 Technology

Specifications

Length: 48 3/8 (1,227)
Width: 17 5/8 (448)
Depth: 4 3/8 (111)
Weight: 17 lbs. (7.71 kg)

All dimensions are inches (millimeters).
Specifications subject to change without notice.

LISTINGS — UL/C-UL listed to US and Canadian safety standards for ambient operation up to 65°C. Suitable for damp locations. NOM Certified (see Options.)

WARRANTY — Guaranteed for one year against mechanical defects in manufacturing.

Ballast warranty: Five years when operated in 55°C or less ambient conditions, three years when operated in 65°C or less ambient conditions. (Four- and six-lamp fixtures only.)

ORDERING INFORMATION

For shortest lead times, configure product using **standard options (shown in bold).**
Example: IB 454L

IB

Series
IB I-BEAM

Number of lamps/wattage
Lamps installed[1]
454L 4-lamp 54W T5HO
654L 6-lamp 54W T5HO
854L 8-lamp 54W T5HO
Unlamped
454 4-lamp 54W T5HO
654 6-lamp 54W T5HO
854 8-lamp 54W T5HO

Distribution
(blank) **Narrow distribution with uplight**
NDS Narrow distribution, no uplight <3%
WD Wide distribution with uplight
WDS Wide distribution, no uplight <3%

Voltage
(blank) **MVOLT; 120V-277V**
HVOLT 347V-480V

Ballast configuration
(blank) **Standard configuration**[2]
2/3 Two, three-lamp ballasts
2/2 Two, two-lamp ballasts

Ballast
(blank) **Program start, 1.0 BF**
LCR90 Less Cool Running[3]

Lamps installed
(blank) **F54T5HO/841**
LP835 F54T5HO/835
LP830 F54T5HO/830
LP865 F54T5HO/865
Amalgam lamps[4]
LP841A F54T5HO/841
LP835A F54T5HO/835
LP830A F54T5HO/830
LP850A F54T5HO/850

Options
EL14 Emergency battery pack (900 lumens)[5,6]
MSI Motion sensor pre-wired[6]
MSI360 360° motion sensor pre-wired[6]
OCS RELOC® OnePass® 5' installed[6]
FSP Integral side panels
NOM NOM Certified
PMP Pendant monopoint[7]
Cords: See reverse.

NOTES:
1 Lamps installed are F54T5HO/841.
2 Ballast included:
6-lamp = (1) 2-lamp ballast and (1) 4-lamp ballast
4-lamp = (1) 4-lamp ballast
3 54T5HO only ballast configuration, 1/4 1/2. Not recommended for ambient temperatures greater than 45°C. Five-year limited warranty provided by ballast manufacturer.
4 Not for use with motion sensors or EL14.
5 UL Listed for 55°C. Output in emergency mode varies with ambient temperature (approx. 944 lumens at 25°C and 911 lumens at 45°C). Single-lamp operation only. Not available with HVOLT or MVOLT. Requires some assembly in field for 6-lamp fixtures.
6 Specify voltage.
7 Fixture must be ordered with PMP for channel modification. Splice box ships separately. Requires two ballasts. Conduit must be minimum of 18". Not field-installable.

Accessories:

Order as a separate catalog number.

IBAC120 M20	Aircraft cable 10' Y hanger (one pair)
IBAC240 M20	Aircraft cable 20' Y hanger (one pair)
WGIBZ	Wireguard, zinc-coated
HC36	Chain hanger, 36"
IBHMP	Hook monopoint
IBPMP	Pendant monopoint[7]

I-BEAM Fluorescent High Bay, T5

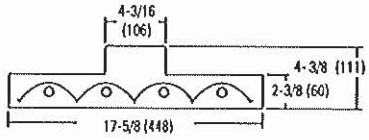
DIMENSIONS

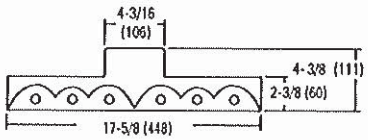
Inches (millimeters). Subject to change without notice.

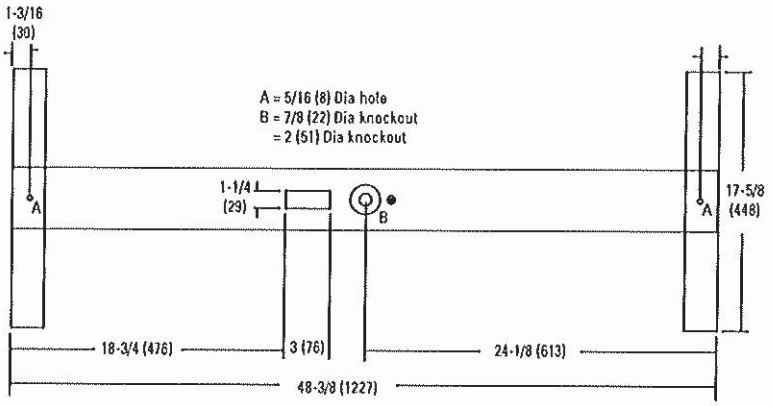
Cord Set Option:

Add suffix to end of catalog number, specify voltage.
All cord sets are 6', black unless otherwise noted.
Other configurations available, consult factory.

Suffix	Description
CS1	Straight plug, 120V
CS3	Twist lock, 120V
CS7	Straight plug, 277V
CS11	Twist-lock, 277V
CS25	Twist-lock, 347V
CS97	Twist-lock, 480V
CS93	600V SO white cord, no plug







PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. All data based on 25°C. Full photometric data on these and other configurations available upon request.

IB 454

Report: LTL14006
LUMENS PER LAMP 4400

Coefficients of Utilization

RCR	pf 20% pc 80% pw 70%	80% 50%	80% 30%	50% 50%	50% 30%	50% 10%	30% 50%	30% 30%	30% 10%
0	118	118	118	107	107	107	101	101	101
1	109	104	101	96	93	91	91	89	87
2	100	92	86	85	81	77	81	77	74
3	92	82	75	76	71	66	73	68	64
4	85	74	66	69	62	57	66	60	56
5	78	67	59	62	56	51	60	54	50
6	73	61	53	57	50	45	55	49	44
7	68	56	48	52	46	41	51	45	40
8	64	51	43	49	42	37	47	41	37
9	60	48	40	45	39	34	44	38	33
10	57	44	37	42	36	31	41	35	31

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	6218	35.3	35.3
0° - 40°	9065	51.5	51.4
0° - 60°	13684	77.7	77.6
0° - 90°	16413	93.3	93.1
90° - 180°	1214	6.9	6.9
0° - 180°	17626	100.1	100.0

IB 454 WD

Report: LTL14005
LUMENS PER LAMP 4400

Coefficients of Utilization

RCR	pf 20% pc 80% pw 70%	80% 50%	80% 30%	50% 50%	50% 30%	50% 10%	30% 50%	30% 30%	30% 10%
0	110	110	110	100	100	100	94	94	94
1	100	96	92	88	85	82	83	80	78
2	91	83	77	76	71	67	72	68	64
3	83	73	65	67	61	56	63	58	54
4	75	64	56	59	52	47	56	50	46
5	69	57	49	53	46	40	50	44	39
6	64	51	43	47	40	35	45	39	34
7	59	46	38	43	36	31	41	35	30
8	55	42	34	39	32	28	37	31	27
9	51	39	31	36	29	25	34	29	24
10	48	36	28	33	27	22	32	26	22

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	3911	22.2	23.6
0° - 40°	6432	36.5	38.8
0° - 60°	11655	66.2	70.3
0° - 90°	15190	86.3	91.7
90° - 180°	1381	7.8	8.3
0° - 180°	16571	94.2	100.0

IB 654

Report: LTL14055
LUMENS PER LAMP 4400

Coefficients of Utilization

RCR	pf 20% pc 80% pw 70%	80% 50%	80% 30%	50% 50%	50% 30%	50% 10%	30% 50%	30% 30%	30% 10%
0	117	117	117	108	108	108	102	102	102
1	108	103	99	95	92	89	90	88	86
2	98	90	84	84	79	75	80	76	72
3	90	80	72	74	68	63	71	66	62
4	83	71	63	67	60	55	64	58	53
5	77	64	56	60	53	48	58	52	47
6	71	58	50	55	48	42	53	46	42
7	66	53	45	50	43	38	48	42	37
8	62	49	41	46	39	34	45	38	34
9	58	45	37	43	36	31	41	35	31
10	54	42	34	40	33	29	39	32	28

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	8275	31.3	31.5
0° - 40°	12681	48.0	48.2
0° - 60°	20122	76.2	76.5
0° - 90°	25014	94.8	95.2
90° - 180°	1272	4.8	4.8
0° - 180°	26287	99.6	100.0

LITHONIA LIGHTING®
An AcuityBrands Company

Sheet #: IB-T5

Lithonia Lighting
Industrial
One Lithonia Way, Conyers, GA 30012
Phone: 770-922-9000 Fax: 770-981-8141
www.lithonia.com

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for use in cold storage, food processing, manufacturing, industrial, schools, gymnasiums and exterior retail environments. Fiberglass enclosure protects fixture while remaining easy to service and clean. Certain airborne contaminants can diminish integrity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.

CONSTRUCTION — One-piece SVA rated fiberglass housing with continuous poured-in-place, closed-cell gasket. Tool-less ballast and wiring access.

OPTICS — Injection-molded, impact-resistant clear acrylic diffuser with frosted ends and linear prisms is standard (.080" thick). UV stabilized polycarbonate diffuser option also is available (.080" thick). Stainless steel latches (12) included. Reflectors are precision-formed, high-performance, segmented optics utilizing premium specular aluminum. Provides 95% reflectivity and warranted for 25 years.

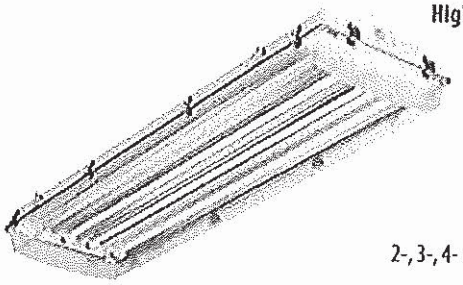
ELECTRICAL — Ballasts: Thermally protected, resetting, Class P, HPF, Sound Rating A+. UL listed wire, rated for required temperatures, used throughout. Cool Running Plus 90°C rated ballast standard for T5HO. T8 ballast starting temperature is -18°C (0°F) and T5HO starting temperature is -29°C (-20°F).
Lamps: 4100K lamps standard. Secured with rotary locking lampholders for ease of re-lamping and to minimize disconnection due to vibration or incidental contact.

INSTALLATION — Surface conduit entry provisions with watertight plugs are standard. Stainless steel mounting brackets included for suspension with aircraft cable (cable not included). Optional stainless steel V-hooks available for chain hanging (chain not included).

LISTING — UL/C-UL listed to US and Canadian Safety Standard. NOM Certified (see Options). UL listed for 40°C ambient (except six-lamp S4T5HO, which is UL listed at 35°C ambient). Suitable for wet location. IP65, IP66 and IP67 rated and certified to meet NSF Splash Zone 2. NEMA 4X. 1500 PSI hose-down.

WARRANTY — Guaranteed for one year against mechanical defects in manufacturing.

Note: Specifications subject to change without notice.



High-Pressure Hose-Down

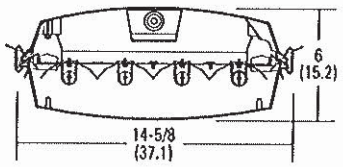
FHE

FOOD PROCESSING
2-, 3-, 4- or 6-lamp, T5HO, T5 or T8

Specifications

Length: 52.0 (132.0)
Width: 14-5/8 (37.1)
Depth: 6 (15.2)
Weight: 26.2 lbs. (11.88 kg)

All dimensions are inches (centimeters) unless otherwise specified.



ORDERING INFORMATION

For shortest lead times, configure products using bolded options.

Example: FHE 454L 1/4

FHE							
Series	**Lamp type**[1]			**Shielding**	**Distribution**	**Voltage**	**Ballast configuration** ›››
FHE 15"X4'	T5HO lamps	T5 lamps	T8 lamps	(blank) Clear acrylic	White ballast cover	(blank) MVOLT; 120-277V	(blank) All two-lamp ballasts
	254L 2 lamps, 54W	228T5L 2 lamps, 28W	232L 2 lamps, 32W	PCL Clear polycarbonate[2]	(blank) General distribution	HVOLT 347-480V[3]	1/3 One, three-lamp ballast[3]
	354L 3 lamps, 54W	328T5L 3 lamps, 28W	332L 3 lamps, 32W		Specular reflector		1/4 One, four-lamp ballast[3]
	454L 4 lamps, 54W	428T5L 4 lamps, 28W	432L 4 lamps, 32W		ND Narrow distribution		2/3 Two, three-lamp ballasts[3]
	654L 6 lamps, 54W	628T5L 6 lamps, 28W	632L 6 lamps, 32W		SD Spread distribution		1/41/2 One, four-lamp and one, two-lamp ballast[3]

Ballast		Lamps installed[1]		Options[5]			
IS/TSHO		(blank)	85 CRI, 841	CX	6' white cord, 18/3, no plug	RMK	Rigid mount kit, 18 gauge stainless steel
(blank)	1.0 BF, PRS	LP830	85 CRI, 830	CXL12	12' white cord, 18/3, no plug	PMP	Pendant monopoint[11]
T8		LP835	85 CRI, 835	EL14DW	Emergency lighting (1400 lumens)[6,7]	WLF	Wet location fitting (two pre-installed, 40° off centers)
(blank)	1.18 BF, IS	LP850	85 CRI, 850	MHKB	Stainless steel V-hook and brackets	MSI__	Wet location 360° motion sensor[8,9]
GEB10IS	.88 BF, IS			SMB	Surface mounting bracket	TRS	Tamper-resistant screws[10]
GEB10ISL	.76 BF, IS			EMK	End mount supension bracket	NOM	Meets Mexican standards
GEB10PS	.88 BF, PRS						

Accessories: *Order as separate catalog number.*

FHEMHKB	Stainless steel V-hook and brackets
MH CH 36	3' double chain[12]
MHYTGB10	10' adjustable aircraft cable, Y, 2-toggle
MHHK120	10' adjustable aircraft cable, single hook[13]
RK1T10DRV	Torx® T10 screwdriver for TRS option

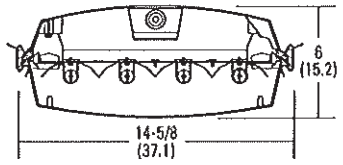
Notes

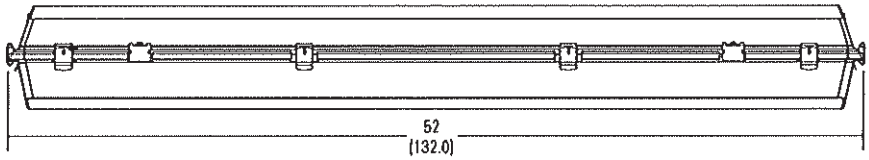
1. To order fixtures WITHOUT lamps, remove the "L" from the description (EX: FHE 454).
2. Recommended for school and gymnasium applications.
3. Not available with 28T5.
4. Alternate lamp color need only be specified if pre-installed lamps are provided.
5. For additional options consult factory.
6. Must specify voltage.
7. 900 lumens for T5HO. UL listed for 55°C. Output in emergency mode varies with ambient temperature (approx. 944 lumens at 25°C and 911 lumens at 45°C. Single-lamp operation only. Not available with HVOLT.
8. For mounting up to 20', specify MSI20; for mounting up to 40', specify MSI40.
9. GEB10PS recommended.
10. Stainless steel Torx® T10 screws with center reject pin.
11. Housing pre-drilled with WLF in center; additional support cables required.
12. For use with MHKB option.
13. For use with EMK option.

FHE Fluorescent High-Pressure Hose-Down, T5, T5HO and T8

DIMENSIONS

Inches (centimeters). Subject to change without notice.





PHOTOMETRICS

Consult factory for photometric information.

TEST NO: ABA200972
LUMINAIRE CATALOG NO.: FHE 654L ND
LUMENS PER LAMP: 4450

Coefficients of Utilization

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	77	77	77	75	75	75	71	71	71
1	67	64	61	65	62	60	62	59	57
2	58	53	49	57	52	49	54	50	47
3	51	45	41	50	45	41	47	43	40
4	45	39	35	44	39	35	42	38	34
5	41	35	30	40	34	30	38	33	29
6	37	31	26	36	30	26	34	29	26
7	33	28	23	33	27	23	31	27	23
8	30	25	21	30	25	21	29	24	21
9	28	23	19	27	22	19	27	22	19
10	26	21	17	25	21	17	25	20	17

RCR

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	4789.4	17.9	27.4
0° - 40°	7621.2	28.5	43.5
0° - 60°	12733.3	47.7	72.7
0° - 90°	16817.2	63.0	96.0
90° - 180°	691.9	2.6	4.0
0° - 180°	17509.1	65.6	100.0

TEST NO: ABA200975
LUMINAIRE CATALOG NO.: FHE 454L ND
LUMENS PER LAMP: 4450

Coefficients of Utilization

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	93	93	93	90	90	90	86	86	86
1	80	77	74	78	75	73	75	72	70
2	71	65	61	69	64	60	66	62	58
3	62	56	51	61	55	51	58	54	49
4	56	49	44	55	48	43	52	47	43
5	50	43	38	49	43	38	47	42	37
6	45	39	34	45	38	34	43	37	33
7	41	35	30	41	34	30	39	34	30
8	38	32	27	37	31	27	36	31	27
9	35	29	25	35	29	25	34	28	24
10	33	26	22	32	26	22	31	26	22

RCR

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	4370.5	24.6	31.4
0° - 40°	6760.0	38.0	48.6
0° - 60°	10724.0	60.2	77.1
0° - 90°	13579.4	76.3	97.6
90° - 180°	338.7	1.9	2.4
0° - 180°	13918.1	78.2	100.0

TEST NO: ABA200978
LUMINAIRE CATALOG NO.: FHE 632L ND
LUMENS PER LAMP: 2950

Coefficients of Utilization

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	90	90	90	88	88	88	83	83	83
1	78	74	71	76	73	70	72	69	67
2	68	62	57	66	61	57	63	58	55
3	59	53	48	58	52	47	55	50	46
4	52	45	40	51	45	40	49	43	39
5	47	40	34	46	39	34	44	38	33
6	42	35	30	41	34	30	39	34	29
7	38	31	26	37	31	26	36	30	26
8	35	28	24	34	28	23	33	27	23
9	32	25	21	31	25	21	30	25	21
10	29	23	19	29	23	19	28	23	19

RCR

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	3399.9	19.2	25.1
0° - 40°	5527.2	31.2	40.8
0° - 60°	9869.8	55.8	72.9
0° - 90°	13023.2	73.6	96.2
90° - 180°	508.1	2.9	3.8
0° - 180°	13531.3	76.4	100.0

TEST NO: ABA200981
LUMINAIRE CATALOG NO.: FHE 432L ND
LUMENS PER LAMP: 2950

Coefficients of Utilization

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	104	104	104	101	101	101	96	96	96
1	90	86	82	88	84	81	83	80	78
2	78	72	67	76	71	66	73	68	64
3	69	62	56	67	61	55	64	59	54
4	61	54	48	60	53	47	57	51	46
5	55	47	41	54	46	41	52	45	40
6	50	42	36	49	41	36	47	40	35
7	45	37	32	44	37	32	43	36	31
8	41	34	29	41	34	29	39	33	28
9	38	31	26	37	31	26	36	30	26
10	35	28	24	35	28	24	33	27	23

RCR

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	2914.9	24.7	28.2
0° - 40°	4642.9	39.3	44.8
0° - 60°	7769.6	65.8	75.1
0° - 90°	10026.8	85.0	96.9
90° - 180°	325.4	2.8	3.1
0° - 180°	10352.3	87.7	100.0

T5 High Output Energy Advantage

F54T5/841 HO EA A ALTO 49W

Philips Energy Advantage T5 HO 49W lamps are environmentally-responsible, ultra-slim and have extraordinary light output with increased energy savings.

Product data

- General Characteristics

Base	Miniature Bipin
Bulb	T5 [16 mm]
Rated Avg. Life	25000 hr
Life to 10% fail	21000 hr
Preheat EL,3h	
LSF HF Preheat 20000h Rated,3h	92 %
LSF HF Preheat 16000h Rated,3h	95 %
LSF HF Preheat 12000h Rated,3h	95 %
LSF HF Preheat 8000h Rated,3h	97 %
LSF HF Preheat 6000h Rated,3h	98 %
LSF HF Preheat 4000h Rated,3h	98 %
LSF HF Preheat 2000h Rated,3h	99 %

- Electrical Characteristics

Watts	49 W
Lamp Voltage EL 25°C	107 V
Lamp Current EL 25°C	0.460 A
Dimmable	Yes
Lamp Wattage EL 35°C	49.0 W
Lamp Current EL 35°C	0.460 A
Lamp Voltage EL 35°C	107 V
Lamp Wattage EL 25°C, Rated	49.2 W
Lamp Wattage EL 25°C, Nominal	49 W

- Environmental Characteristics

Mercury (Hg) Content	2.2 mg

- Light Technical Characteristics

Color Code	841 [CCT of 4100K]
Color Rendering Index	82 Ra8
Color Designation	Cool White
Color Temperature	4100 K
Chromaticity Coordinate X	383 -
Chromaticity Coordinate Y	386 -
Initial Lumens	4950 Lm
Luminance Average EL 25°C	2.6 cd/cm2
Lum Efficacy Rated HF 25°C	89 Lm/W
Lum Efficacy Rated HF 35°C	101 Lm/W
LLMF HF 20000h Rated	88 %
LLMF HF 16000h Rated	90 %
LLMF HF 12000h Rated	91 %
LLMF HF 8000h Rated	93 %
LLMF HF 6000h Rated	94 %

PHILIPS
sense and simplicity

T5 High Output Energy Advantage

LLMF HF 4000h Rated	95 %
LLMF HF 2000h Rated	96 %
Luminous Flux EL 25°C, Rated	4400 Lm
Luminous Flux EL 25°C, Nominal	4400 Lm
Design Temperature	20 (min), 75 (max) C

• Product Dimensions

Base Face to Base Face A	1149.0 (max) mm
Insertion Length B	1153.7 (min), 1156.1 (max) mm
Overall Length C	1163.2 (max) mm
Diameter D	17 (max) mm

• Product Data

Product number	407304
Full product name	F54T5/841 HO EA A ALTO 49W
Short product name	F54T5/841/A/EA/ALTO 49W 40/1
Pieces per Sku	1
eop_pck_cfg	40
Skus/Case	40
Bar code on pack	46677407308
Bar code on case	50046677407303
Logistics code(s)	927995184022
eop_net_weight_pp	162.900 gr

** Average life under engineering data with lamps turned off and restarted once every 12 operating hours.
§ 5W saved x 40000 hrs (rated average life) / 1000 x .10 kWh rate. kWh rate may vary.
◊ Pico calculation: mercury content (mg) * 1,000,000,000 / (RAL x design lumens) = picogram per lumen hour
‡ For more information on LEED, visit www.usgbc.org

www.philips.com/lighting

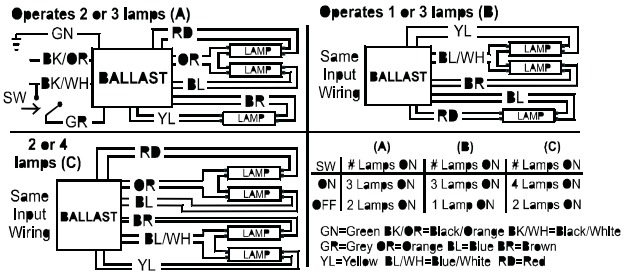
PHILIPS ADVANCE

HCN4S5490C2LSG@480	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
Input Voltage	347-480
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F54T5/HO/ES (49W)	1	49	-20/-29	0.15	63	1.09	10	0.98	1.7	1.73
F54T5/HO/ES (49W)	2	49	-20/-29	0.25	110	1.00	10	0.98	1.7	0.91
F54T5/HO/ES (49W)	3	49	-20/-29	0.39	172	1.04	10	0.98	1.7	0.60
* F54T5/HO/ES (49W)	4	49	-20/-29	0.50	218	1.00	10	0.98	1.7	0.46

Wiring Diagram



SW	(A) # Lamps ON	(B) # Lamps ON	(C) # Lamps ON
ON	3 Lamps ON	3 Lamps ON	4 Lamps ON
OFF	2 Lamps ON	1 Lamp ON	2 Lamps ON

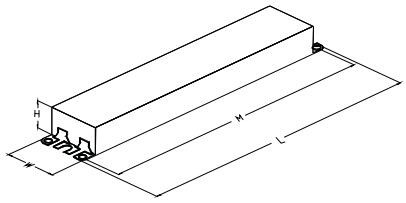
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White		0
Blue	54	137.2
Red	51	129.5
Yellow	60	152.4
Gray	32	81.3
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White	42	106.7
Brown	60	152.4
Orange	42	106.7
Orange/Black	32	81.3
Black/White	32	81.3
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
16.7 "	1.7 "	1.18 "	16.34 "
16 7/10	1 7/10	1 9/50	16 17/50
42.4 cm	4.3 cm	3 cm	41.5 cm

Revised 03/11/2009

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

PHILIPS LIGHTING ELECTRONICS N.A.
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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

PHILIPS ADVANCE

HCN4S5490C2LSG@480	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
Input Voltage	347-480
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads or poke-in wire trap connectors color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Programmed Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 50/60 Hz input source of _____ (120V through 277V or 347V through 480V) with sustained variations of +/- 10% (voltage and frequency).

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 for primary lamp.

2.6 Ballast shall have a minimum ballast factor of 1.00 for primary lamp application.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of _____ {-18C (0F) or -28C (-20F)} for primary lamp. Consult lamp manufacturer for temperature versus light output characteristics.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions.

2.13 Four-lamp ballast shall have (semi-independent or independent) lamp operation.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

3.6 Ballast shall comply with UL Type CC rating.

3.7 Ballast shall comply with NEMA 410 for in-rush current limits.

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a "90C" designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90C.

4.3 Manufacturer shall have a twenty-year history of producing electronic ballasts for the North American market.

Revised 03/11/2009

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LITHONIA LIGHTING®

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE — The I-BEAM fluorescent high bay is an ideal one-for-one replacement of common metal halide high bay systems. The unique Cool Running Technology provides trouble-free operation in ambient spaces up to 65°C. Applications include manufacturing, warehousing, commercial facilities and retail. The fluorescent I-BEAM fixture performs at mounting heights from 15'-40'. **Certain airborne contaminants can diminish integrity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.**

CONSTRUCTION — I-BEAM fixtures features Cool Running Technology for ambient operation up to 65°C. Backed by a full five-year ballast warranty at 55°C, three-year ballast warranty at 65°C. Designed for optimum performance using T5HO fluorescent lamps. The I-BEAM fixture provides the best option for applications requiring a rugged fixture construction coupled with excellent fixture performance. Optical designs for your choice of narrow distribution for aisles or wide distribution for general lighting. Typical arrangement provides over 90% luminaire efficiency. Available with four- or six-lamp cross-section with your choice of full direct component or with uplight. Easy two-point mounting with convenient aircraft cable provides reliable installation, eliminates fixture sag and provides sturdy installation. Single-point mounting available. Available in MVOLT (120-277V) or HVOLT (347-480V).

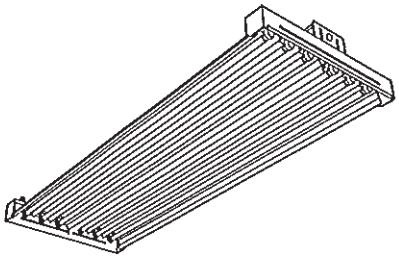
Channel is formed of heavy-duty code-gauge steel to stand up to the most demanding elements. Lamp holder assembly protects from incidental damage to reflectors during installation. Sockets include secure positioning rotating collars with enclosed contacts. Access plate on the back of the channel housing allows quick and easy wiring.

Finish: Channel is high-gloss white baked enamel; five-stage iron phosphate pretreatment ensures superior paint adhesion and rust resistance.

OPTICS — Two optical systems are available. Narrow distribution (ND) is ideal for narrow or aisle lighting applications and features precision-formed segmented optics utilizing Alanod Miro® 4 specular aluminum reflector. Provides 95% reflectivity and warranted for 25 years. Wide distribution (WD) includes high-reflectance white finish for general or open areas.

ELECTRICAL — Thermally protected, resetting, Class P, HPF, A+ sound-rated electronic ballast. AWM TFM or THHN wire used throughout rated for required temperatures. Ballast disconnect (BDP) is standard unless EL14 or cordset is requested.

INSTALLATION — Suitable for suspension by chain, cable, hook monopoint or pendant monopoint. Fixture should be mounted at a minimum plenum height of 18 inches.



I-BEAM® FLUORESCENT HIGH BAY LIGHTING

IB

Fluorescent High Bay
4-, 6- or 8-lamp T5

COOL RUNNING TECHNOLOGY

PATENT PENDING

T5 Technology

Specifications

Length: 48 3/8 (1,227)
Width: 17 5/8 (448)
Depth: 4 3/8 (111)
Weight: 17 lbs. (7.71 kg)

All dimensions are inches (millimeters).
Specifications subject to change without notice.

LISTINGS — UL/C-UL listed to US and Canadian safety standards for ambient operation up to 65°C. Suitable for damp locations. NOM Certified (see Options.)

WARRANTY — Guaranteed for one year against mechanical defects in manufacturing.

Ballast warranty: Five years when operated in 55°C or less ambient conditions, three years when operated in 65°C or less ambient conditions. (Four- and six-lamp fixtures only.)

ORDERING INFORMATION

For shortest lead times, configure product using **standard options (shown in bold).**
Example: IB 454L

IB

Series
IB I-BEAM

Number of lamps/wattage
Lamps installed[1]
454L 4-lamp 54W T5HO
654L 6-lamp 54W T5HO
854L 8-lamp 54W T5HO
Unlamped
454 4-lamp 54W T5HO
654 6-lamp 54W T5HO
854 8-lamp 54W T5HO

Distribution
(blank) **Narrow distribution with uplight**
NDS Narrow distribution, no uplight <3%
WD Wide distribution with uplight
WDS Wide distribution, no uplight <3%

Voltage
(blank) **MVOLT; 120V-277V**
HVOLT 347V-480V

Ballast configuration
(blank) **Standard configuration**[2]
2/3 Two, three-lamp ballasts
2/2 Two, two-lamp ballasts

Ballast
(blank) **Program start, 1.0 BF**
LCR90 Less Cool Running[3]

Lamps installed
(blank) **F54T5HO/841**
LP835 F54T5HO/835
LP830 F54T5HO/830
LP865 F54T5HO/865
Amalgam lamps[4]
LP841A F54T5HO/841
LP835A F54T5HO/835
LP830A F54T5HO/830
LP850A F54T5HO/850

Options
EL14 Emergency battery pack (900 lumens)[5,6]
MSI Motion sensor pre-wired[6]
MSI360 360° motion sensor pre-wired[6]
OCS RELOC® OnePass® 5' installed[6]
FSP Integral side panels
NOM NOM Certified
PMP Pendant monopoint[7]
Cords: See reverse.

NOTES:
1 Lamps installed are F54T5HO/841.
2 Ballast included:
6-lamp = (1) 2-lamp ballast and (1) 4-lamp ballast
4-lamp = (1) 4-lamp ballast
3 54T5HO only ballast configuration, 1/4 1/2. Not recommended for ambient temperatures greater than 45°C. Five-year limited warranty provided by ballast manufacturer.
4 Not for use with motion sensors or EL14.
5 UL Listed for 55°C. Output in emergency mode varies with ambient temperature (approx. 944 lumens at 25°C and 911 lumens at 45°C). Single-lamp operation only. Not available with HVOLT or MVOLT. Requires some assembly in field for 6-lamp fixtures.
6 Specify voltage.
7 Fixture must be ordered with PMP for channel modification. Splice box ships separately. Requires two ballasts. Conduit must be minimum of 18". Not field-installable.

Accessories:

Order as a separate catalog number.

IBAC120 M20	Aircraft cable 10' Y hanger (one pair)
IBAC240 M20	Aircraft cable 20' Y hanger (one pair)
WGIBZ	Wireguard, zinc-coated
HC36	Chain hanger, 36"
IBHMP	Hook monopoint
IBPMP	Pendant monopoint[7]

I-BEAM Fluorescent High Bay, T5

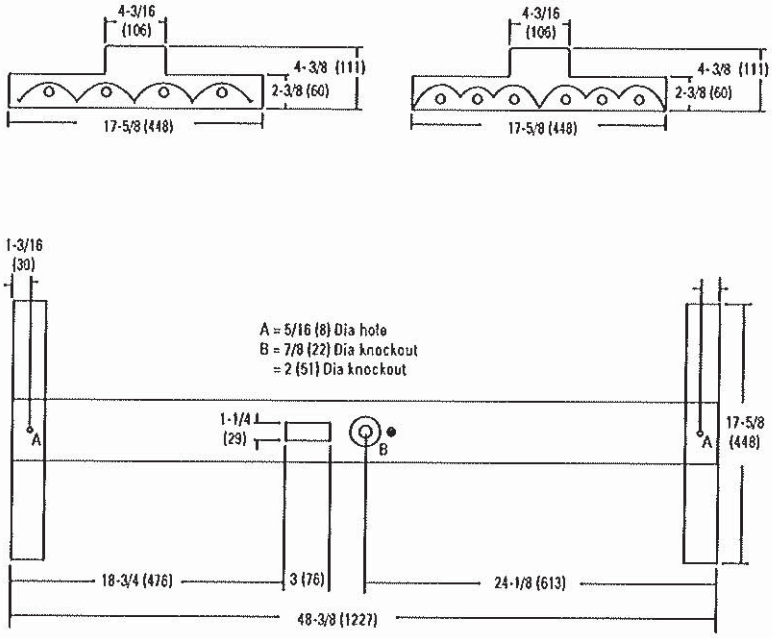
DIMENSIONS

Inches (millimeters). Subject to change without notice.

Cord Set Option:

Add suffix to end of catalog number, specify voltage.
All cord sets are 6', black unless otherwise noted.
Other configurations available, consult factory.

Suffix	Description
CS1	Straight plug, 120V
CS3	Twist lock, 120V
CS7	Straight plug, 277V
CS11	Twist-lock, 277V
CS25	Twist-lock, 347V
CS97	Twist-lock, 480V
CS93	600V SO white cord, no plug



PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. All data based on 25°C. Full photometric data on these and other configurations available upon request.

IB 454

Report: LTL14006
LUMENS PER LAMP 4400

Coefficients of Utilization

pf		20%								
pc		80%			50%			30%		
	pw	70%	50%	30%	50%	30%	10%	50%	30%	10%
RCR	0	118	118	118	107	107	107	101	101	101
	1	109	104	101	96	93	91	91	89	87
	2	100	92	86	85	81	77	81	77	74
	3	92	82	75	76	71	66	73	68	64
	4	85	74	66	69	62	57	66	60	56
	5	78	67	59	62	56	51	60	54	50
	6	73	61	53	57	50	45	55	49	44
	7	68	56	48	52	46	41	51	45	40
	8	64	51	43	49	42	37	47	41	37
	9	60	48	40	45	39	34	44	38	33
	10	57	44	37	42	36	31	41	35	31

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	6218	35.3	35.3
0° - 40°	9065	51.5	51.4
0° - 60°	13684	77.7	77.6
0° - 90°	16413	93.3	93.1
90° - 180°	1214	6.9	6.9
0° - 180°	17626	100.1	100.0

IB 454 WD

Report: LTL14005
LUMENS PER LAMP 4400

Coefficients of Utilization

pf		20%								
pc		80%			50%			30%		
	pw	70%	50%	30%	50%	30%	10%	50%	30%	10%
RCR	0	110	110	110	100	100	100	94	94	94
	1	100	96	92	88	85	82	83	80	78
	2	91	83	77	76	71	67	72	68	64
	3	83	73	65	67	61	56	63	58	54
	4	75	64	56	59	52	47	56	50	46
	5	69	57	49	53	46	40	50	44	39
	6	64	51	43	47	40	35	45	39	34
	7	59	46	38	43	36	31	41	35	30
	8	55	42	34	39	32	28	37	31	27
	9	51	39	31	36	29	25	34	29	24
	10	48	36	28	33	27	22	32	26	22

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	3911	22.2	23.6
0° - 40°	6432	36.5	38.8
0° - 60°	11655	66.2	70.3
0° - 90°	15190	86.3	91.7
90° - 180°	1381	7.8	8.3
0° - 180°	16571	94.2	100.0

IB 654

Report: LTL14055
LUMENS PER LAMP 4400

Coefficients of Utilization

pf		20%								
pc		80%			50%			30%		
	pw	70%	50%	30%	50%	30%	10%	50%	30%	10%
RCR	0	117	117	117	108	108	108	102	102	102
	1	108	103	99	95	92	89	90	88	86
	2	98	90	84	84	79	75	80	76	72
	3	90	80	72	74	68	63	71	66	62
	4	83	71	63	67	60	55	64	58	53
	5	77	64	56	60	53	48	58	52	47
	6	71	58	50	55	48	42	53	46	42
	7	66	53	45	50	43	38	48	42	37
	8	62	49	41	46	39	34	45	38	34
	9	58	45	37	43	36	31	41	35	31
	10	54	42	34	40	33	29	39	32	28

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	8275	31.3	31.5
0° - 40°	12681	48.0	48.2
0° - 60°	20122	76.2	76.5
0° - 90°	25014	94.8	95.2
90° - 180°	1272	4.8	4.8
0° - 180°	26287	99.6	100.0

LITHONIA LIGHTING®
An AcuityBrands Company

Sheet #: IB-T5

Lithonia Lighting
Industrial
One Lithonia Way, Conyers, GA 30012
Phone: 770-922-9000 Fax: 770-981-8141
www.lithonia.com

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for use in cold storage, food processing, manufacturing, industrial, schools, gymnasiums and exterior retail environments. Fiberglass enclosure protects fixture while remaining easy to service and clean. Certain airborne contaminants can diminish integrity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.

CONSTRUCTION — One-piece SVA rated fiberglass housing with continuous poured-in-place, closed-cell gasket. Tool-less ballast and wiring access.

OPTICS — Injection-molded, impact-resistant clear acrylic diffuser with frosted ends and linear prisms is standard (.080" thick). UV stabilized polycarbonate diffuser option also is available (.080" thick). Stainless steel latches (12) included. Reflectors are precision-formed, high-performance, segmented optics utilizing premium specular aluminum. Provides 95% reflectivity and warranted for 25 years.

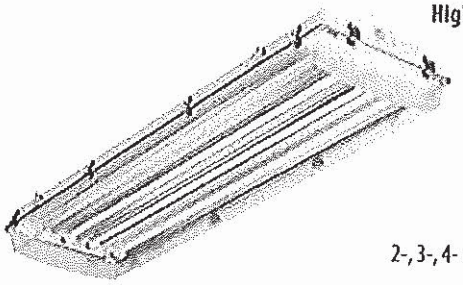
ELECTRICAL — Ballasts: Thermally protected, resetting, Class P, HPF, Sound Rating A+. UL listed wire, rated for required temperatures, used throughout. Cool Running Plus 90°C rated ballast standard for T5HO. T8 ballast starting temperature is -18°C (0°F) and T5HO starting temperature is -29°C (-20°F).
Lamps: 4100K lamps standard. Secured with rotary locking lampholders for ease of re-lamping and to minimize disconnection due to vibration or incidental contact.

INSTALLATION — Surface conduit entry provisions with watertight plugs are standard. Stainless steel mounting brackets included for suspension with aircraft cable (cable not included). Optional stainless steel V-hooks available for chain hanging (chain not included).

LISTING — UL/C-UL listed to US and Canadian Safety Standard. NOM Certified (see Options). UL listed for 40°C ambient (except six-lamp S4T5HO, which is UL listed at 35°C ambient). Suitable for wet location. IP65, IP66 and IP67 rated and certified to meet NSF Splash Zone 2. NEMA 4X. 1500 PSI hose-down.

WARRANTY — Guaranteed for one year against mechanical defects in manufacturing.

Note: Specifications subject to change without notice.



High-Pressure Hose-Down

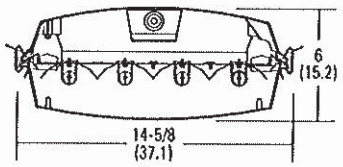
FHE

FOOD PROCESSING
2-, 3-, 4- or 6-lamp, T5HO, T5 or T8

Specifications

Length: 52.0 (132.0)
Width: 14-5/8 (37.1)
Depth: 6 (15.2)
Weight: 26.2 lbs. (11.88 kg)

All dimensions are inches (centimeters) unless otherwise specified.



ORDERING INFORMATION

For shortest lead times, configure products using bolded options.

Example: FHE 454L 1/4

FHE							
Series	**Lamp type**[1]			**Shielding**	**Distribution**	**Voltage**	**Ballast configuration** ›››
FHE 15"X4'	T5HO lamps	T5 lamps	T8 lamps	(blank) Clear acrylic	White ballast cover	(blank) MVOLT; 120-277V	(blank) All two-lamp ballasts
	254L 2 lamps, 54W	228T5L 2 lamps, 28W	232L 2 lamps, 32W	PCL Clear polycarbonate[2]	(blank) General distribution	HVOLT 347-480V[3]	1/3 One, three-lamp ballast[3]
	354L 3 lamps, 54W	328T5L 3 lamps, 28W	332L 3 lamps, 32W		Specular reflector		1/4 One, four-lamp ballast[3]
	454L 4 lamps, 54W	428T5L 4 lamps, 28W	432L 4 lamps, 32W		ND Narrow distribution		2/3 Two, three-lamp ballasts[3]
	654L 6 lamps, 54W	628T5L 6 lamps, 28W	632L 6 lamps, 32W		SD Spread distribution		1/41/2 One, four-lamp and one, two-lamp ballast[3]

Ballast		Lamps installed[1]		Options[5]			
IS/TSHO		(blank)	85 CRI, 841	CX	6' white cord, 18/3, no plug	RMK	Rigid mount kit, 18 gauge stainless steel
(blank)	1.0 BF, PRS	LP830	85 CRI, 830	CXL12	12' white cord, 18/3, no plug	PMP	Pendant monopoint[11]
T8		LP835	85 CRI, 835	EL14DW	Emergency lighting (1400 lumens)[6,7]	WLF	Wet location fitting (two pre-installed, 40" off centers)
(blank)	1.18 BF, IS	LP850	85 CRI, 850	MHKB	Stainless steel V-hook and brackets	MSI__	Wet location 360° motion sensor[8,9]
GEB10IS	.88 BF, IS			SMB	Surface mounting bracket	TRS	Tamper-resistant screws[10]
GEB10ISL	.76 BF, IS			EMK	End mount supension bracket	NOM	Meets Mexican standards
GEB10PS	.88 BF, PRS						

Accessories: *Order as separate catalog number.*	
FHEMHKB	Stainless steel V-hook and brackets
MH CH 36	3' double chain[12]
MHYTGB10	10' adjustable aircraft cable, Y, 2-toggle
MHHK120	10' adjustable aircraft cable, single hook[13]
RK1T10DRV	Torx® T10 screwdriver for TRS option

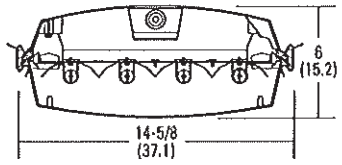
Notes

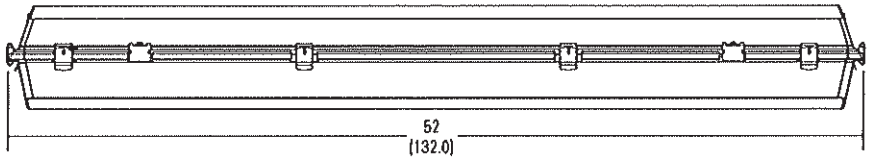
1. To order fixtures WITHOUT lamps, remove the "L" from the description (EX: FHE 454).
2. Recommended for school and gymnasium applications.
3. Not available with 28T5.
4. Alternate lamp color need only be specified if pre-installed lamps are provided.
5. For additional options consult factory.
6. Must specify voltage.
7. 900 lumens for T5HO. UL listed for 55°C. Output in emergency mode varies with ambient temperature (approx. 944 lumens at 25°C and 911 lumens at 45°C. Single-lamp operation only. Not available with HVOLT.
8. For mounting up to 20', specify MSI20; for mounting up to 40', specify MSI40.
9. GEB10PS recommended.
10. Stainless steel Torx® T10 screws with center reject pin.
11. Housing pre-drilled with WLF in center; additional support cables required.
12. For use with MHKB option.
13. For use with EMK option.

FHE Fluorescent High-Pressure Hose-Down, T5, T5HO and T8

DIMENSIONS

Inches (centimeters). Subject to change without notice.





PHOTOMETRICS

Consult factory for photometric information.

TEST NO: ABA200972
LUMINAIRE CATALOG NO.: FHE 654L ND
LUMENS PER LAMP: 4450

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	77	77	77	75	75	75	71	71	71
	1	67	64	61	65	62	60	62	59	57
	2	58	53	49	57	52	49	54	50	47
	3	51	45	41	50	45	41	47	43	40
	4	45	39	35	44	39	35	42	38	34
	5	41	35	30	40	34	30	38	33	29
	6	37	31	26	36	30	26	34	29	26
	7	33	28	23	33	27	23	31	27	23
	8	30	25	21	30	25	21	29	24	21
	9	28	23	19	27	22	19	27	22	19
	10	26	21	17	25	21	17	25	20	17

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	4789.4	17.9	27.4
0° - 40°	7621.2	28.5	43.5
0° - 60°	12733.3	47.7	72.7
0° - 90°	16817.2	63.0	96.0
90° - 180°	691.9	2.6	4.0
0° - 180°	17509.1	65.6	100.0

TEST NO: ABA200975
LUMINAIRE CATALOG NO.: FHE 454L ND
LUMENS PER LAMP: 4450

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	93	93	93	90	90	90	86	86	86
	1	80	77	74	78	75	73	75	72	70
	2	71	65	61	69	64	60	66	62	58
	3	62	56	51	61	55	51	58	54	49
	4	56	49	44	55	48	43	52	47	43
	5	50	43	38	49	43	38	47	42	37
	6	45	39	34	45	38	34	43	37	33
	7	41	35	30	41	34	30	39	34	30
	8	38	32	27	37	31	27	36	31	27
	9	35	29	25	35	29	25	34	28	24
	10	33	26	22	32	26	22	31	26	22

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	4370.5	24.6	31.4
0° - 40°	6760.0	38.0	48.6
0° - 60°	10724.0	60.2	77.1
0° - 90°	13579.4	76.3	97.6
90° - 180°	338.7	1.9	2.4
0° - 180°	13918.1	78.2	100.0

TEST NO: ABA200978
LUMINAIRE CATALOG NO.: FHE 632L ND
LUMENS PER LAMP: 2950

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	90	90	90	88	88	88	83	83	83
	1	78	74	71	76	73	70	72	69	67
	2	68	62	57	66	61	57	63	58	55
	3	59	53	48	58	52	47	55	50	46
	4	52	45	40	51	45	40	49	43	39
	5	47	40	34	46	39	34	44	38	33
	6	42	35	30	41	34	30	39	34	29
	7	38	31	26	37	31	26	36	30	26
	8	35	28	24	34	28	23	33	27	23
	9	32	25	21	31	25	21	30	25	21
	10	29	23	19	29	23	19	28	23	19

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	3399.9	19.2	25.1
0° - 40°	5527.2	31.2	40.8
0° - 60°	9869.8	55.8	72.9
0° - 90°	13023.2	73.6	96.2
90° - 180°	508.1	2.9	3.8
0° - 180°	13531.3	76.4	100.0

TEST NO: ABA200981
LUMINAIRE CATALOG NO.: FHE 432L ND
LUMENS PER LAMP: 2950

Coefficients of Utilization

pf		20%								
pc		80%			70%			50%		
pw		50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	0	104	104	104	101	101	101	96	96	96
	1	90	86	82	88	84	81	83	80	78
	2	78	72	67	76	71	66	73	68	64
	3	69	62	56	67	61	55	64	59	54
	4	61	54	48	60	53	47	57	51	46
	5	55	47	41	54	46	41	52	45	40
	6	50	42	36	49	41	36	47	40	35
	7	45	37	32	44	37	32	43	36	31
	8	41	34	29	41	34	29	39	33	28
	9	38	31	26	37	31	26	36	30	26
	10	35	28	24	35	28	24	33	27	23

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	2914.9	24.7	28.2
0° - 40°	4642.9	39.3	44.8
0° - 60°	7769.6	65.8	75.1
0° - 90°	10026.8	85.0	96.9
90° - 180°	325.4	2.8	3.1
0° - 180°	10352.3	87.7	100.0

SPECIAL APPLICATIONS: One Lithonia Way Conyers, GA 30012 Phone: 800-315-4963 Fax: 770-981-8191 www.lithonia.com

T5 High Output Energy Advantage

F54T5/841 HO EA A ALTO 49W

Philips Energy Advantage T5 HO 49W lamps are environmentally-responsible, ultra-slim and have extraordinary light output with increased energy savings.

Product data

• General Characteristics

Base	Miniature Bipin
Bulb	T5 [16 mm]
Rated Avg. Life	25000 hr
Life to 10% fail	21000 hr
Preheat EL,3h	
LSF HF Preheat 20000h Rated,3h	92 %
LSF HF Preheat 16000h Rated,3h	95 %
LSF HF Preheat 12000h Rated,3h	95 %
LSF HF Preheat 8000h Rated,3h	97 %
LSF HF Preheat 6000h Rated,3h	98 %
LSF HF Preheat 4000h Rated,3h	98 %
LSF HF Preheat 2000h Rated,3h	99 %

• Electrical Characteristics

Watts	49 W
Lamp Voltage EL 25°C	107 V
Lamp Current EL 25°C	0.460 A
Dimmable	Yes
Lamp Wattage EL 35°C	49.0 W
Lamp Current EL 35°C	0.460 A
Lamp Voltage EL 35°C	107 V
Lamp Wattage EL 25°C, Rated	49.2 W
Lamp Wattage EL 25°C, Nominal	49 W

• Environmental Characteristics

Mercury (Hg) Content	2.2 mg

• Light Technical Characteristics

Color Code	841 [CCT of 4100K]
Color Rendering Index	82 Ra8
Color Designation	Cool White
Color Temperature	4100 K
Chromaticity Coordinate X	383 -
Chromaticity Coordinate Y	386 -
Initial Lumens	4950 Lm
Luminance Average EL 25°C	2.6 cd/cm2
Lum Efficacy Rated HF 25°C	89 Lm/W
Lum Efficacy Rated HF 35°C	101 Lm/W
LLMF HF 20000h Rated	88 %
LLMF HF 16000h Rated	90 %
LLMF HF 12000h Rated	91 %
LLMF HF 8000h Rated	93 %
LLMF HF 6000h Rated	94 %

PHILIPS
sense and simplicity

T5 High Output Energy Advantage

LLMF HF 4000h Rated	95 %
LLMF HF 2000h Rated	96 %
Luminous Flux EL 25°C, Rated	4400 Lm
Luminous Flux EL 25°C, Nominal	4400 Lm
Design Temperature	20 (min), 75 (max) C

• Product Dimensions

Base Face to Base Face A	1149.0 (max) mm
Insertion Length B	1153.7 (min), 1156.1 (max) mm
Overall Length C	1163.2 (max) mm
Diameter D	17 (max) mm

• Product Data

Product number	407304
Full product name	F54T5/841 HO EA A ALTO 49W
Short product name	F54T5/841/A/EA/ALTO 49W 40/1
Pieces per Sku	1
eop_pck_cfg	40
Skus/Case	40
Bar code on pack	46677407308
Bar code on case	50046677407303
Logistics code(s)	927995184022
eop_net_weight_pp	162.900 gr

** Average life under engineering data with lamps turned off and restarted once every 12 operating hours.
§ 5W saved x 40000 hrs (rated average life) / 1000 x .10 kWh rate. kWh rate may vary.
◊ Pico calculation: mercury content (mg) * 1,000,000,000 / (RAL x design lumens) = picogram per lumen hour
‡ For more information on LEED, visit www.usgbc.org

www.philips.com/lighting

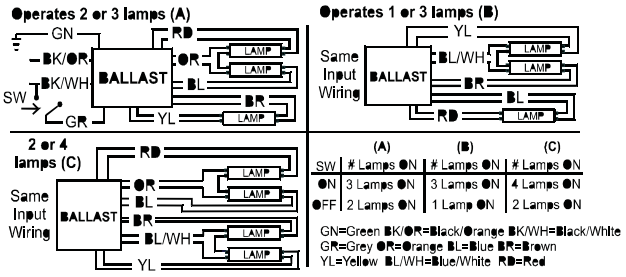
PHILIPS ADVANCE

HCN4S5490C2LSG@480	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
Input Voltage	347-480
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F54T5/HO/ES (49W)	1	49	-20/-29	0.15	63	1.09	10	0.98	1.7	1.73
F54T5/HO/ES (49W)	2	49	-20/-29	0.25	110	1.00	10	0.98	1.7	0.91
F54T5/HO/ES (49W)	3	49	-20/-29	0.39	172	1.04	10	0.98	1.7	0.60
* F54T5/HO/ES (49W)	4	49	-20/-29	0.50	218	1.00	10	0.98	1.7	0.46

Wiring Diagram



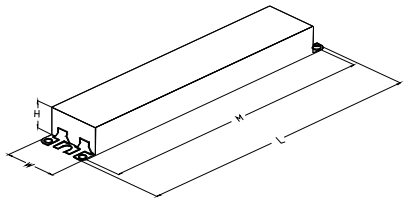
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White		0
Blue	54	137.2
Red	51	129.5
Yellow	60	152.4
Gray	32	81.3
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White	42	106.7
Brown	60	152.4
Orange	42	106.7
Orange/Black	32	81.3
Black/White	32	81.3
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
16.7 "	1.7 "	1.18 "	16.34 "
16 7/10	1 7/10	1 9/50	16 17/50
42.4 cm	4.3 cm	3 cm	41.5 cm

Revised 03/11/2009

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

PHILIPS LIGHTING ELECTRONICS N.A.
10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018
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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

PHILIPS ADVANCE

HCN4S5490C2LSG@480	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
Input Voltage	347-480
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads or poke-in wire trap connectors color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Programmed Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 50/60 Hz input source of _____ (120V through 277V or 347V through 480V) with sustained variations of +/- 10% (voltage and frequency).

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 for primary lamp.

2.6 Ballast shall have a minimum ballast factor of 1.00 for primary lamp application.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of _____ {-18C (0F) or -28C (-20F)} for primary lamp. Consult lamp manufacturer for temperature versus light output characteristics.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions.

2.13 Four-lamp ballast shall have (semi-independent or independent) lamp operation.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

3.6 Ballast shall comply with UL Type CC rating.

3.7 Ballast shall comply with NEMA 410 for in-rush current limits.

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a "90C" designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90C.

4.3 Manufacturer shall have a twenty-year history of producing electronic ballasts for the North American market.

Revised 03/11/2009

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in

Case No(s). 11-1557-EL-EEC

Summary: Application and Ohio Power Company for approval of a special arrangement agreement with a mercantile customer electronically filed by Anne M Vogel on behalf of Ohio Power Company