CPFilms Inc.
PO Box 5068
Martinsville, VA 24115
(276) 627-3366
Fax: (276) 627-3008

Small Commercial (1)
Demand Analyzer™ Energy Analysis Input Form (rev Oct 2002

(Numbers in parentheses refer to Notes at end of form)

Building & Dealer Information

Film Installation Company Name	Installation Company Contact Name and Phone
Name of Building	Building Contact Name
Building Address	Building Contact Phone
City – State - Zip	Nearest Large City (2):

General

Type of Building (choose from list at bottom of page 2) (3):	Year building was built (4):
Total Building Floorspace Area (5): (total of all floors) Square Ft / Sq Meters (circle appropriate units)	Number of Stories/Floors (6):

Utility Rates And Annual Energy Costs

Electricity Cost per kilowatt hour (7): (Typically 0.03 to 0.20 US $ per kwhr) ______________________

Electricity Cost per KW Demand (8): _______________

Natural Gas Cost per therm (9): (Typically 0.35 to 1.00 US $ per therm) _______________________

Fuel Oil Cost per gallon (10): ______________________

Annual Costs (11): Electricity ___________________ Natural Gas ___________________ Fuel Oil ___________________

Thermostat Settings (12)

Heating Temperature: Day _________ Night _________ Cooling Temperature: Day _________ Night __________

Envelope

	North (13)	East (13)	South (13)	West (13)
Windows Shaded by Adjacent Building (Adjacent Shading) (14)	Yes / No	Yes / No	Yes / No	Yes / No
Window Area (15) (circle appropriate units)	___________Sq Ft / Sq m	___________Sq Ft / Sq m	___________Sq Ft / Sq m	___________Sq Ft / Sq m
Film to be applied to this exposure? (Circle Yes or No)(15)	Yes / No	Yes / No	Yes / No	Yes / No
Window Setback from building exterior (16) (circle appropriate units)	_____________Ft / m	_____________Ft / m	_____________Ft / m	_____________Ft / m
Window Shading Used (Drapes or Blinds) (17)	Yes / No	Yes / No	Yes / No	Yes / No
Window Glass Type (18) (circle appropriate pane thickness, number of panes, glass color, if reflective, and if Low-e windows -circle Low-E type)	1/8 3/16 1/4 3/8 1/2 Single / Double / Triple Clear / Gray / Bronze / Green / Blue Reflective? Yes / No Low-E / Hi Perf Low-E	1/8 3/16 1/4 3/8 1/2 Single / Double / Triple Clear / Gray / Bronze / Green / Blue Reflective? Yes / No Low-E / Hi Perf Low-E	1/8 3/16 1/4 3/8 1/2 Single / Double / Triple Clear / Gray / Bronze / Green / Blue Reflective? Yes / No Low-E / Hi Perf Low-E	1/8 3/16 1/4 3/8 1/2 Single / Double / Triple Clear / Gray / Bronze / Green / Blue Reflective? Yes / No Low-E / Hi Perf Low-E

"Hi Performance Low-E" refers to Low-E windows with substantial summer heat rejection properties, such as Cardinal Low-E Squared, PPG Solarban and Sungate 1000, Pilkington/LOF Solar E, or Viracon SolarScreen 2000 windows. (See CPFilms Tech Bulletin 41F).

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Check with building engineering or maintenance personnel for the next section:

Air Distribution (19)	☐ Check box if Air-side economizer is in use
Central Plant (19)	Check appropriate equipment types **Heating System** (check one only) ☐ Gas Furnace ☐ Electric Furnace ☐ Room Heat Pump ☐ Central Heat Pump ☐ Gas Heat Pump **Cooling System** (check one only) ☐ Central Direct Expansion (DX) Units ☐ Packaged Terminal Units (Rooftop Units) **Cooling Tower Fans** (check one only) ☐ None ☐ Centrifugal ☐ Propeller ☐ 2 speed Propeller ☐ Variable Speed Propeller

Film Types and Job Quote	List the films to include in the report (20) _____ _____ _____ Total Film Square Footage (square meters) (21) _____ Price per square foot (sq m) (22) _____ _____ _____ List the TOTAL JOB QUOTE (23) _____ _____ _____ for each film. (For example: 10,000 sqft @ $3.00 per sqft, enter $30,000)

Project discussed with CPFilms Representative? Yes / No If Yes, Rep's Name: _____

Building types included in Small Commercial category:

1. Small Office - Floor space 5,000 to 50,000 square feet (465 to 4,645 square meters).
2. Small Retail - Floor space 1,000 to 50,000 square feet (93 to 4,645 square meters)
3. Sit-Down Restaurant - Floor space 1,000 to 50,000 square feet (93 to 4,645 square meters)
4. Fast Food Restaurant - Floor space 1,000 to 10,000 square feet (93 to 930 square meters)
5. Grocery Store - Floor space 5,000 to 50,000 square feet (465 to 4,645 square meters)
6. Warehouse - Floor space 5,000 to 500,000 square feet (465 to 46,450 square meters)
7. Primary School - Floor space 10,000 to 200,000 square feet (930 to 18,580 square meters)
8. Motel - Floor space 10,000 to 100,000 square feet (930 to 9,290 square meters)

NOTES:

(1) Demand Analyzer is the energy analysis program used by CPFilms to accurately determine the energy savings from solar film application. There are two input forms available, one for Large Commercial projects and one for Small Commercial projects. See the list of building types at the bottom of page 2 to determine which input form to use. The flow of the input form matches the folders are parameters within the Demand Analyzer program. Therefore, the program user can easily use the input form to transfer information into the program.

(2) Demand Analyzer requires the use of detailed hourly weather information. Only a limited number of cities collect this necessary information, so weather data from a nearby city may need to be used. Enter the name of the nearest large city so that the person creating the model of the building will know which weather data file to use from the limited list of cities available.

(3) The "building type" allows Demand Analyzer to select the default settings for the values used to model the building. The user has available 15 different building types to choose from. The list of available building types is shown at the bottom of the second page of this input form. There are 7 building types that use the "Large Commercial" input form and 8 building types that use the "Small Commercial" input form.

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(4) Demand Analyzer uses this information to determine building construction characteristics that affect building energy consumption, such as type of heating and cooling system and efficiency, amount of insulation in walls and roof, etc.

(5) To create an accurate energy analysis model of a building requires an accurate estimate of the building floor space. Energy usage in a building is obviously closely related to the size of the building, so an accurate value is required to create an accurate model. Also be sure to indicate, by circling the appropriate units, whether the floor space shown is square feet or square meters.

(6) To create an accurate energy analysis model of a building requires an accurate estimate of the number of stories or floors in a building. Energy usage in a building is obviously closely related to the size of the building, so an accurate value is required to create an accurate model.

(7) Most medium to large commercial buildings are charged a kilowatt hour (kwhr) charge AND a kilowatt (KW) demand charge. However, the charges for each often varies by time of day and time of year. To provide a reasonable estimate enter the average cost per kwhr. To do this, you will need at least 3 months of electric bills, and preferably 12 months (you will need the total annual electricity charges for 12 months below also, see Note 11). Determine the total dollar charges for electricity for the bills you have (call this number A), and total the kwhr shown on the exact same bills (call this number B). Divide A by B You should arrive at a cost between $0.03 and $0.20 per kwhr. If you calculate a number outside of this range, recheck your numbers and math (and be sure to use at least 3 months of bills). For example, if the total dollar charges for the bills used is $300,000 and the total kwhr for the same bills is 3,700,000, the average cost per kwhr would be 300,000 divided by 3,700,000 = $0.081

(8) If a relatively simple electricity rate schedule is used, where a single cost per kilowatt hour (kwhr) and a single cost per kilowatt (KW) demand is charged, enter the cost per KW demand here (typically $3.00 to $15.00 per KW). If kwhr and KW demand charges vary based on time of year and time of day, it is best to determine the overall average cost per kwhr (see Note 7) and use only that figure.

(9) Enter the average cost per therm of natural gas. Use at least 3 months of natural gas bills (preferably 12 months) to determine this value. Add the total dollar charges for all months (call this number A). Add the total therms used for the same months (call this number B). Divide A by B to get the dollar cost per therm. Your value should be in the $0.35 to $1.00 range. If not recheck your numbers and math. If the bill uses the units of "mcf" for the amount of natural gas, rather than therms, you will need to divide your final cost per mcf by 10 to get the cost per therm. For example, if your determine the average cost per mcf to be $6.50, the average cost per therm would be $0.65. Also, the cost per therm = Cost per cubic meter x 2.832

(10) Enter the average cost for fuel oil in dollars per gallon, if used as the primary heating fuel. As with electricity and natural gas, use the average value from several months (at least 3 and preferably 12 months). Demand Analyzer cannot use fuel oil as a heating fuel source, so it is necessary to convert this price to an equivalent price for natural gas. See section 6D in the "User's Guide AIMCAL Version" (see note on inside of program CD cover on how to access this User's Guide) or contact CPFilms Technical Services for more information.

(11) The annual costs for each type of energy is required to create an accurate Demand Analyzer model. After creating the initial model of the building without film, create the graph to show the annual cost for each fuel (File, New, Graph, Annual Cost). Compare the cost for each fuel to the actual values from the input form. You may need to adjust certain values in your model to get your model annual cost totals for each fuel to match the actual values. See the FAQ section for Demand Analyzer on the LLumar Technical web site (www.llumartech.com) on how to do this. Be sure to create a model without film that closely reflects (within 15%) the actual annual costs BEFORE creating models with film.

(12) These values represent the temperatures in the building for heating and cooling, during daytime and night-time hours. In Demand Analyzer, setback temperatures are the temperatures for unoccupied hours (night-time hours). The maximum heating temperature is 73 deg F (22.7 deg C) and the minimum cooling temperature is 74 deg F (23.3 deg C).

(13) For exposures that do not face true N, S, E or W divide the window square footage evenly between the appropriate adjacent N, S, E or W exposures. For example, for a SW exposure, include half of the SW square footage in the S column and half of the SW square footage in the W column.

(14) If there is a building that shades one or more of the exposures for the building being analyzed, circle yes where appropriate. For example, if there is a building to the East that shades all or most of the modeled building, then you would circle yes under East. To shade all or most of an exposure, the adjacent building will need to be of equal height (number of floors). Circle yes only if more than 1/2 of the modeled building's exposure is substantially shaded during the day.

(15) Enter the area for all windows on each exposure, even if film is not to be applied to a particular exposure. Circle whether the area is in square feet or square meters. Then, indicate which exposures are to have film applied by circling Yes or No. It is necessary to know the glass area for all exposures to create an accurate Demand Analyzer model.

(16) The "window setback" indicates that the window is either setback into the building from the building exterior (recessed into the building) or that there is an overhang above the window that shades the window.

(17) Indicate whether interior window shading is used (drapes, curtains, or blinds) for each exposure. If interior shading devices are used, in Demand Analyzer use a Window Shading (SC) value of 0.80. If no interior shading devices are used, use a Window Shading (SC) value of 1.15 in Demand Analyzer.

(18) For the windows on each exposure, indicate precisely what type of windows exist by circling the appropriate: pane thickness, number of panes, whether clear or tinted (and color of tint), whether reflective, and if high performance solar control low-e or standard low-e coating is used.

(19) To create an accurate model of the building requires that detailed information about the type of heating, ventilating and air-conditioning (HVAC) system be determined. This information includes the type of air distribution system (variable or constant volume), if an air-side economizer is in use, the type of heating system, the type of chiller used to create chilled water for cooling, and the type of cooling tower. You should check with building engineering or maintenance personnel to determine which description most closely matches the HVAC system in the building.

(20) Indicate which films are to be used in the energy analysis, such as N1020, R20, R35 etc. Use a maximum of three films.

(21) Indicate the total amount of film to be installed. This area should match the window area that is to be filmed for all exposures from page 1 of the form. Check to make sure both totals match. Indicate whether square feet or square meters.

(22) Indicate the installed price per square foot (or square meter) for each film. Be sure to include the effect of any utility rebate in this cost. For example, if your quote is $3.50 per square foot, but a utility rebate of $0.50 per square foot will be in effect, show $3.00.
(23) Indicate the total quote for each film, installed. Multiply the total film square footage (square meters) by the film cost per square foot (square meter) for each film.