

BC Hydro e.Catalog
Product Acceptance Criteria



BC Hydro e.Catalog
Product Acceptance Criteria

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e.CATALOG MANUFACTURER ACCEPTANCE CRITERIA

The following outlines the criteria that manufacturer's must meet in order for their products to be accepted into the BC Hydro e.Catalog:

- Products must meet local building codes and be approved by local electrical inspectors.
- Products must meet as a minimum Energy Star or the Federal Energy Management Program (FEMP) energy efficiency standard. For details on energy efficiency standards see the BC Hydro e.Catalog Energy Efficiency Criteria listed below.
- Where no standard exists or where data is unavailable BC Hydro applies its own criteria as determined by BC Hydro's Power Smart technical department. The product review process assesses each case individually and considers the following:
 - Products must be commercially available and both technically and economically feasible
 - Priority is given to products which consume electrical power to operate and meet high energy efficiency criteria
 - Resource constraints require BC Hydro to focus on the most obvious commercial electrical energy consuming products that have energy efficiency criteria
 - Products are rejected when technology is unproven. We rely on having criteria for e.Catalog approval because BC Hydro does not have resources to endorse or test vendor claims. Exceptions are made only when the Power Smart Technical department is comfortable with approving the product as is in the case where the technology is proven and product is clearly far more energy efficient than what is normally used.
 - Currently fuel substitution products are not accepted
- Manufacturers must have authorized distributors who are registered with the Power Smart Alliance and are available and responsive regarding after sales service and warranty support as shown by:
 - local (British Columbia) contact information (phone and address),
 - demonstrated ability to follow up with customers on site, and
 - demonstrated ability to respond to customer issues within 48 hours.
- Manufacturers must not sell products exclusively online.
- Manufacturers must have been in business for a minimum of 3 years.
- Exceptions to these guidelines may be considered by BC Hydro on a case-by-case basis only.
- Manufacturer must be willing to invest the time and resources required to keep their product data current.
- BC Hydro makes no representation, guarantee or warranty to any third party regarding the intellectual or other property rights of any person or party in any of the products listed on e.Catalog.
- BC Hydro reserves the right to remove any products from e.Catalog at any time if, in BC Hydro's opinion, the product acceptance criteria are not met, or for any other reason as BC Hydro determines necessary for the proper administration of e.Catalog.

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INCENTIVE PROGRAMS OVERVIEW

All products eligible for incentive funding under the applicable programs are listed and identified in the BC Hydro e.Catalog. Manufacturers confirm that their products meet these minimum guidelines and based on their declaration, their product is added to the list of eligible products in e.Catalog.

BC Hydro reserves the right to remove any products from e.Catalog at any time if, in BC Hydro's opinion, the product acceptance criteria are not met, or for any other reason as BC Hydro determines necessary for the proper administration of e.Catalog.

BC Hydro makes no representation, guarantee or warranty to any third party regarding the intellectual or other property rights of any person or party in any of the products listed on e.Catalog.

In the future, new products will be evaluated and if they meet program requirements, they will be added to the applicable program's product list. This document will be modified as program updates occur.

PRODUCT INCENTIVE PROGRAM

The Power Smart Product Incentive Program ("Program") is intended to provide incentives for simple retrofits with energy-efficient products to BC Hydro business customers with no key account manager and who spend less than \$200,000 annually on electricity. This document establishes the minimum acceptable technical and product requirements for the Program.

POWER SMART PARTNER EXPRESS PROGRAM

The Power Smart Partner (PSP) Express program offers an online self-serve application with quick and easy financial incentives for your simple retrofit projects. Only BC Hydro commercial, government and institutional customers with a Key Account Manager are eligible.

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LIGHTING

GENERAL SPECIFICATIONS FOR ELIGIBLE LIGHTING PRODUCTS

- The objective of the Power Smart Product Incentive Program is to provide incentive for simple retrofits where one product is removed and replaced with another more energy-efficient product. It is not intended to involve situations where a lighting design is necessary.
- All products must be listed in the BC Hydro e.Catalog to be eligible for incentives.
- When retrofitting a luminaire, a lamp and ballast from e.Catalog must be used in order to qualify for a Program incentive.
- All products shall be new, of current manufacture and CSA approved or certified by an accredited independent organization such as Intertek-ETL or Underwriters Laboratory (UL) as required by the current Canadian Electrical Code with the exception of lamps without an integral ballast or power supply.
- All retrofitted luminaires shall be suitably identified with appropriate labeling, listing the related parameters. Where the use of retrofit kits requires fixture modification and re-certification it is the responsibility of the customer and/or installing contractor to ensure that the retrofit kits are re-certified or approved by an accredited third party laboratory for the specific application, and in full compliance with the building codes. Please consult with the electrical inspection branch in your jurisdiction for more information on re-certification.
- In delamping situations, the customer/contractor shall remove the unused T12 sockets from the luminaire. If new T8 sockets are provided, they should be centered in the fixture as far as is practical.
- In redesign situations, removing existing luminaire means disconnection and total removal of the luminaire. Where removals require extensive, costly labor or lifting equipment, the luminaires can remain in location, but be total disconnected from the electrical circuit/ distribution. Note that light levels should meet IES and WorkSafe BC standards
- Average lighting levels and measurements of the same shall comply with Illuminating Engineering Society of North America (IESNA) recommended practice and Worker's Compensation Board (WCB) regulations. BC Hydro will **not** monitor lighting levels but reserves the right to occasionally check levels and design quality. Lighting levels before and after the retrofit must meet the requirements of the end user and be to the satisfaction of all approving authorities having jurisdiction for specific applications.
 - *In specific applications, the Contractor or Supplier must make the end user aware where there is a potential reduction in light levels, and confirm that the lighting levels will meet the minimum regulatory requirements.*
 - These applications include but are not limited to:*
 - *Reduced number of lamps in retrofit luminaire;*
 - *Conversions from 2-lamp, 8' T12 high output lamps to 4-lamp, 4' T8 lamps with low power input ballast*
 - *Conversions from High Pressure Sodium lamps/luminaires to Metal Halide lamps/luminaires*
 - *Conversions from High Intensity Discharge luminaires to new high efficient fluorescent, induction or LED luminaires*
 - *It is the end users responsibility to ensure that the light levels meet the minimum regulatory requirements.*
- In any installation, in the event of abnormally high product failure rates within the first year of operation (in excess of 5%) BC Hydro reserves the right to reject specific products from the Program and from e.Catalog. Where applicable, products shall be constructed of individually replaceable compatible lighting components, such as ballasts, starters, capacitors, sockets and lamps so as not to invalidate any of the components' warranties.

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- Lighting retrofits shall be designed for optimum energy efficiency. All eligible products shall be represented by an authorized local representative or distributor, who is capable of providing after sales service. Manufacturers must have an approved local representative in B.C. with authority from the manufacturer to handle warranty claims and after sales support.
- All products must have a valid warranty within the province of British Columbia.
- BC Hydro reserves the right to request manufactures to provide independent laboratory results certifying the parameters such as lamp life, lumen output, input watts etc are as specified by the manufacturer and at the cost of the manufacturer

In addition to the General Specifications for the products, each of the eligible products is warranted by the Suppliers to meet the following minimum requirements:

T8 FLUORESCENT LIGHTING

The Program incentive applies only to the replacement of T12 or T8 fluorescent lamps using electromagnetic or hybrid/ electronic ballast with T8 lamps using electronic ballasts. It also applies to replacements of T12 technology complete luminaires with new T8 technology luminaires (T8 lamps and electronic ballasts).

Following are the technical criteria for T8 lamps and electronic ballasts:

- It is the responsibility of the customer and/or installing contractor to ensure that the retrofit luminaires are CSA certified or approved by an accredited third party laboratory for the specific application, and in full compliance with the building codes.
- Incentive applies to new T8 luminaires at any mounting type provided the ballasts are meeting the technical criteria specified below.
- T8 Lamps
 - All makes and models of T8 lamps are eligible.
 - Color rendering index (CRI) shall be 80 minimum. There is no restriction on lamp color temperature.
 - Energy saving (ES) T8 lamps represent all makes of T8 technology lamps with nominal wattage lesser than the industry standard. For example, in the 4-foot T8 range ES lamps could be anything lesser than 32W, respectively: 30, 28 and 25W. Note that ES T8 lamps usually have some limitations (such as min. 60°F operating temperature and restricted dimming abilities) that have to be considered when choosing the suitable retrofit measure for the given application.
 - T8 lamps may be remote tandem mounted as recommended by the ballast manufacturer (usually up to 20 feet).
- T8 Ballasts
 - Ballasts shall be dedicated only for T8 systems and shall be high frequency electronic type. Ballasts shall operate lamps between 20 kHz and 60 kHz.
 - Power factor shall be 0.95 minimum (lead or lag).
 - Instant Start ballasts are not recommended in applications where the lamps are turned on and off frequently (i.e. with occupancy sensors) because they may shorten lamp life. Programmed Start ballasts are recommended for these applications.
 - Programmed Start ballasts are eligible for incentives. Rapid Start non-dimming ballasts are not eligible for incentives as they are currently replaced by Programmed Start ballasts.

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- For the standard ballast, Total harmonic distortion (THD) limits for the electronic T8 ballast shall not exceed 20% at either rated 5% above and 5% below nominal primary voltage. For high efficiency electronic ballasts, THD shall be less than 10%.
- 4 foot T8 ballast (120, 277, and 347V) must be on the current approved list of the Consortium for Energy Efficiency (CEE) Commercial Lighting Systems Initiative. Refer to the CEE for details www.cee1.org
- 2, 3 and 8 foot Instant Start electronic ballasts shall have **low ballast factor for 2 to 4 lamp ballasts**
The input wattage shall not exceed (for 120/277V ballasts):

Maximum Input Watts (standard efficiency)				
Lamp Length	LBF or NBF	LBF		
	1 lamp	2 lamp	3 lamp	4 lamp
2 foot	18W	29W	47W	56W
3 foot	26W	42W	60W	78W
8 foot	65W	102W	N/A	N/A

- 2, 3 and 8 foot High efficiency instant start electronic ballasts shall provide a minimum 3W energy savings over comparable standard efficiency electronic ballasts of similar ballast factor.

Maximum Input Watts (high efficiency)			
Lamp Length	NBF		
	2 Lamp	3 lamp	4 lamp
2 foot	30W	45W	56W
3 foot	42W	68W	84W
8 foot	108W	N/A	N/A

- Above mentioned maximum input wattages do not apply for 2, 3, or 8 foot 347V ballasts. However, 347V ballasts need to be either LBF or high efficient NBF for 2 to 4 lamp ballasts. When 347V ballasts are used to drive lesser lamps than they are built for, it is acceptable as long as the ballasts meet the basic criteria.
- High Ballast Factor Instant Start ballasts for T8 lamps are only accepted for T12HO retrofits
- Standard Normal Ballast Factor and High Ballast Factor Instant Start ballasts for T8 lamps are only accepted for T12VHO and HO retrofits

Minimum MLPW (mean system efficacy) for T8 lamps and electronic ballasts		IS	PS
8'	T8 (59W)	88	
	T8HO (86W)	82	78

- Above minimum MLPW does not apply to T8HO 8' 1 lamp system.
- When retrofitting T12HO and T12VHO luminaires in cold-temperature application, T8HO ballasts have to be rated for -20°F (-30°C) minimum starting temperature. May only be used in environments that reach sub-zero temperatures for extended periods of time. This includes:
 - Outdoor areas in the BC Interior and North regions. Lower mainland and Vancouver Island regions do not meet this criteria for outdoor applications.
 - Indoor applications such as cold storage/refrigerated warehouse, walk-in refrigerated coolers etc.

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T8 DIMMING BALLASTS

- Dimming T8 ballasts (rapid or program start) are allowed for incentives only when controlled by individual or group photo sensors/ photocells for daylight harvesting.
- Photocells for daylight harvesting –close and open loop, group/ field or individual/ luminaire installed. Photocells to be of the appropriate type (and installation procedure) for the application. Initial calibration and continuous maintenance is required when installing photocells.
- Dimming ballasts can be step or continuous dimming with a reduction in input power of at least 60%.
- Dimming T8 Ballasts shall have the following minimum specifications:
 - Dimming luminaires shall be on the current approved list of the Consortium for Energy Efficiency (CEE) High Performance Commercial Lighting Systems Initiative. Refer to the CEE for details www.cee1.org
 - Operate without visible flicker through the operating dimming range. All lamps shall remain on at minimum light levels.
 - Be compatible with power line carrier systems.
 - Operate fixed or continuous level control and/or daylight harvest dimming control with at minimum the use of integral or external photocell controls.
 - High ballast factor dimming ballasts as direct replacements are not accepted for the present rebate program

T5 FLUORESCENT LUMINAIRES

The Program incentive applies to the replacement of luminaires that use T12 and T8 fluorescent or incandescent technology with new high efficient fluorescent luminaires complete with T5 lamps and electronic ballasts.

For T12 luminaires (any mounting):

- T12 fluorescent luminaires with 4 lamps can be replaced with new T5 fluorescent luminaires equipped with:
 - up to two T5 standard lamps (ex: 14W lamp for 2ft-long luminaires, 28W for 4ft-long luminaires)
 - one T5HO lamp (ex: 24W lamp for 2ft-long luminaires, 54W for 4ft-long luminaires).
 - one TT5 lamp (bi-ax) of 40W or 50W – for 2-foot luminaires. This selection does not apply to T5 retrofit kits.
 - Two energy saver TT5 lamp of 25W for 2-foot luminaires

For T8 luminaires (whole fixture):

- T8 fluorescent luminaires with 4 lamps can be replaced with new T5 fluorescent luminaires equipped with:
 - up to two T5 standard lamps (ex: 14W lamp for 2ft-long luminaires, 28W for 4ft-long luminaires)
 - one T5HO lamp (ex: 24W lamp for 2ft-long luminaires, 54W for 4ft-long luminaires).

For Incandescent luminaires:

- Incandescent luminaires greater than 100W can be replaced with new T5 fluorescent luminaires equipped with:
 - up to two T5 standard lamps (ex: 14W lamp for 2ft-long luminaires, 28W for 4ft-long luminaires)
 - one T5HO lamp (ex: 24W lamp for 2ft-long luminaires, 54W for 4ft-long luminaires).

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Following are technical criteria for T5 retrofits:

- All T5 lamps are eligible
- New general illumination T5 luminaires (except decorative luminaires) shall have an efficiency of minimum 70% to qualify for product incentives.

BI-LEVEL STAIRWELL LIGHTING SYSTEM

Existing	Retrofit
2' 2 lamp T12, magnetic ballast	2' 2 lamp T8, electronic ballast bi-level
4' 1 lamp T12, magnetic ballast	2' 2 lamp T8, electronic ballast bi-level
4' 2 lamp T12, magnetic ballast	4' 2 lamp T8, electronic ballast LBF, bi-level
2x26W CFL	4' 2 lamp T8, electronic ballast LBF, bi-level
2x26W CFL	2x26W CFL bi-level

Only complete, new fluorescent luminaires with program start electronic ballasts and lamps or compact fluorescent luminaires that meet requirements listed in above table qualify.

- Qualifying fixtures must be manufactured with fixture integrated occupancy sensors that control the individual fixture and meet safety requirements
- All lamps must be pin-based fluorescent or other permanent installed technology.
- For linear fluorescent luminaires ballasts shall be program start type.
- Must include a passive infrared and/or ultrasonic occupancy sensor with a fail safe feature in case lamp fails due to a sensor failure.
- The fixture must operate in low-standby light level during vacancy and switch to full light output upon occupancy.
- The fixture cannot exceed 35% of full wattage during unoccupied periods.
- Only for 24/7 illuminated interior stairwells.

Exclusions:

- Luminaires whose settings can be overridden are not eligible.
- Screw-in lamps are not eligible.
- Not eligible for additional rebates through the “Occupancy Sensors” or “High Performance T8 or T5 Linear Fluorescent Lamps with Electronic Ballasts” categories.

Installation Process:

- Low mode setting should be chosen so that the surface illuminate levels are building code compliant.

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LOW/ HIGH-BAY FLUORESCENT LUMINAIRES

The Program incentive applies to the replacement of the low/high-bay luminaires that use incandescent or HID technology with new high efficient fluorescent luminaires.

- The Low/High-bay fluorescent luminaire conversion must save a minimum of 80 input watts per luminaire.
- It is the responsibility of the customer and/or installing contractor to ensure that the new luminaires are CSA certified or approved by an accredited third party laboratory for the specific application, and in full compliance with the building codes.
- Accepted lamps for low/high-bay fluorescent luminaires are: T8, T5, T5HO and CFL. Ballasts shall be high power factor electronic and suitable for the lamp type.
- High-bay fluorescent luminaires shall be capable of multiple switching.

HIGH INTENSITY DISCHARGE LIGHTING

The Program incentive applies to both interior and exterior lighting systems for new and retrofitted luminaires.

- Pulse start metal halide and high pressure sodium luminaries are eligible for incentives when displacing mercury vapor luminaires of higher wattage.
- Pulse Start Metal Halide retrofit kits are eligible for an incentive if they replace standard mercury vapor of higher wattage.
- Pulse start metal halide fixtures installed under the Program should be totally enclosed on interior installations or use a protective shroud to contain an arc tube rupture. This requirement also applies to ceramic metal halide lamps.
- All HID ballasts shall have a ballast factor of 0.95 minimum and a high power factor (0.90 minimum).
- A lamp replacement table is included to illustrate the expected lamp wattages from incandescent/mercury vapor to pulse start metal halide or high pressure sodium. Refer to *Table 1: Lamp Replacement Guideline*.

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MERCURY VAPOUR LAMP REPLACEMENT GUIDE

The following table is intended to illustrate the expected wattages for lamp changes from mercury vapour lamps to either compact fluorescent, metal halide pulse start or high pressure sodium lamps.

Table 1: Lamp Replacement Guideline

Lamp Replacement Guideline											
Existing Lamp			Potential Replacement Lamp								
Lamp Wattage	Fixture Wattage	Mean Lumen Output	Compact Fluorescent			Metal Halide Pulse Start			High Pressure Sodium		
			Lamp Wattage	Fixture Wattage	Mean Lumen Output	Lamp Wattage	Fixture Watts	Mean Lumen Output	Lamp Wattage	Fixture Watts	Mean Lumen Output
Standard Incandescent											
40 watt	40	415	9 watt	10	500						
50 watt	50	545	11 watt	13	680						
60 watt	60	900	15 watt	18	900						
75 watt	75	1,200	20 watt	23	1,200						
100 watt	100	1,600	25 watt	33	1,530						
150 watt	150	2,400	34 watt	41	2,100	39 watt	57	2,800	35 watt	46	2,000
200 watt	200	3,600	42 watt	48	2,720	50 watt	68	3,200	50 watt	66	3,600
250 watt	250	3,750	50 watt	60	3,870						
300 watt	300	6,000	80 watt	90	5,400	70 watt	90	5,400	70 watt	95	5,450
500 watt	500	9,500				150 watt	190	10,000	100 watt	138	8,500
620 watt	620	11,000				175 watt	208	11,200			
750 watt	750	15,000				250 watt	288	16,600	150 watt	188	14,000
1000 watt	1000	24,000				350 watt	400	27,000	250 watt	295	27,000
1500 watt	1500	31,000				400 watt	456	30,000	310 watt	365	33,000
Typical Rated Avg. Lamp Life 1,000 to 2,000hrs											
Mercury Vapour											
50 watt	63	1,260	20 watt	23	1,200						
75 watt	95	2,250	34 watt	41	2,100				35 watt	46	2,000
100 watt	125	3,400	50 watt	60	3,870	50 watt	68	3,200	50 watt	66	3,600
175 watt	210	7,400	105 watt	115	6,900	100 watt	125	7,000	100 watt	138	8,500
250 watt	290	10,500				150 watt	190	10,000	150 watt	188	14,000
400 watt	450	19,000				320 watt	365	22,000	200 watt	250	19,800
700 watt	775	33,600				400 watt	456	30,000	310 watt	365	33,000
1000 watt	1100	45,000							400 watt	465	45,000
Typical Rated Avg. Lamp Life 24,000hrs											

Notes:

- The lumen output values shown in table are intended as a guideline only. These values are an average of various manufacturers published data. It is not to be relied on for detail design.
- The lumen output of all the lamps will vary depending on the exact lamp selected.
- A lighting designer should be consulted to ensure the correct application of lamps is selected to meet the required lighting levels, lamp life, colour rendition etc..
- The lighting output values shown are **mean** not initial lumens.

Standard Wattage and Lumen Output for Various Lamp Styles

Compact Fluorescent			Metal Halide Pulse Start			High Pressure Sodium		
Lamp Wattage	Fixture Wattage	Mean Lumen Output	Lamp Wattage	Fixture Wattage	Mean Lumen Output	Lamp Wattage	Fixture Wattage	Mean Lumen Output
9 watt	10	500	39 watt	57	2,800	35 watt	46	2,000
11 watt	13	680	50 watt	68	3,200	50 watt	66	3,600
15 watt	18	900	70 watt	90	5,400	70 watt	95	5,450
18 watt	21	1,100	100 watt	125	7,000	100 watt	138	8,500
20 watt	23	1,200	150 watt	190	10,000	150 watt	188	14,000
25 watt	33	1,530	175 watt	208	11,200	200 watt	250	19,800
34 watt	41	2,100	250 watt	288	16,600	250 watt	295	25,000
42 watt	48	2,720	320 watt	365	22,000	310 watt	365	33,000
50 watt	60	3,870	350 watt	400	27,000	360 watt	414	42,800
65 watt	75	4,200	400 watt	456	30,000	400 watt	465	45,000
80 watt	90	5,400	750 watt	810	60,000	600 watt	660	81,000
105 watt	115	6,900	1000 watt	1075	96,000	750 watt	810	99,000
						1000 watt	1100	112,000
Typical Rated Avg. Lamp Life 6,000 to 10,000hrs			Typical Rated Avg. Lamp Life: <= 150 W : 9,000 to 12,000hrs > 150W : 15,000 to 20,000 hrs			Typical Rated Avg. Lamp Life 24,000hrs		

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ENERGY-EFFICIENT METAL HALIDE LAMP

The Program incentive applies to the replacement of the:

- 175W metal halide lamp with the 150W energy saving metal halide lamp. No ballast change is required for the lamp.
- 250W metal halide lamp with the 225W or 205W energy saving metal halide lamp. No ballast change is required for the lamp.
- 400W metal halide lamp with the 360W energy saving metal halide lamp. No ballast change is required for the lamp.

PULSE START/ CERAMIC METAL HALIDE LAMPS WITH MAGNETIC BALLASTS

The Program incentive applies to the replacement of the:

- 75W and 90W Halogen PAR38 incandescent lamps with the 25W, PAR 38 integrated ceramic metal halide lamp and magnetic ballast unit
- 175W metal halide lamp in overlit areas with 100W pulse start metal halide
- 175W metal halide lamp with the 125W/150W pulse start metal halide lamp.
- 250W metal halide lamp with the 150W/175W/200W pulse start metal halide lamp
- 400W metal halide lamp with the 320W pulse start metal halide lamp or 330W metal halide lamp
- 400W metal halide lamp in overlit areas with the 250W pulse start metal halide lamp
- 1000W metal halide lamp with the 750W/775W/875W pulse start metal halide lamp
- 150W high pressure lamp with the 100W pulse start metal halide lamp and magnetic ballast
- 200W/250W high pressure lamp with the 175W pulse start metal halide lamp and magnetic ballast
- 400W high pressure lamp with the 320W/350W pulse start metal halide lamp and magnetic ballast
- 1000W high pressure lamp with the 750W/875W pulse start metal halide lamp and magnetic ballast

For the replacements above, except for the integrated lamps, the appropriate magnetic ballast must be used with the retrofitted lamp.

HIGH INTENSITY DISCHARGE ELECTRONIC BALLASTS

The Program incentive applies to high pressure sodium and pulse start metal halide/ceramic metal halide electronic ballasts, low-frequency or high-frequency.

HID electronic ballasts must:

- Meet all ANSI requirements
- CSA , ULC or equivalent approved
- Ballast Factor of 0.85 to 1.0
- Power Factor > 0.9
- Total Harmonic Distortion of < 32%.
- minimum ballast efficiency of 90 percent for lamp wattages <= 250W
- minimum ballast efficiency of 92 percent for lamp wattages > 250W

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HIGH INTENSITY DISCHARGE LIGHTING FOR ORNAMENTAL STREET LIGHTING

The Program incentive applies to street lighting systems for new and retrofitted luminaires.

- High intensity discharge luminaires are eligible for incentives when displacing mercury vapor, metal halide or high pressure sodium luminaires of higher wattage.
- Optical improved HPS retrofit kits are eligible for an incentive if they retrofit high pressure sodium luminaires of higher wattage.
- All new replacement energy efficient luminaires or (optical improved) retrofit kits must be flat lens.
- Any new replacement luminaires and/or retrofit kits should be minimum 15% more efficient than the one it replaces.
- The replacing energy efficient new/ retrofitted luminaires have to provide a suitable lighting output meeting the required IESNA and/or any federal, provincial or municipal codes that apply.

The Program incentive applies to the replacement of the following high intensity discharge streetlights (including retrofit kits):

- 100W HPS unit with the 70W energy efficient unit completed with flat lens.
- 150W HPS unit with the 100W energy efficient unit completed with flat lens.
- 200W HPS unit with the 150W energy efficient unit completed with flat lens.
- 250W HPS unit with the 150W or 200W energy efficient unit completed with flat lens.
- 400W HPS unit with the 250W energy efficient unit completed with flat lens.
- 100W MH unit with the 70W or 75W energy efficient HPS or MH unit with flat lens.
- 150W MH unit with the 100W energy efficient HPS or MH unit with flat lens.
- 175W MH unit with the 150W energy efficient HPS or MH unit with flat lens.
- 250W MH unit with the 150W energy efficient HPS or 175W energy efficient MH unit with flat lens.
- 175W MV unit with the 100W energy efficient HPS or MH unit with flat lens.
- 250W MV unit with the 150W energy efficient HPS or MH unit with flat lens.
- 400W MV unit with the 250W energy efficient HPS or MH unit with flat lens.

INDUCTION LUMINAIRES

The program incentive applies to the replacement of interior and street/ area luminaires that use induction (electrodeless) technology.

- Induction luminaires or retrofit kits are eligible for incentives when displacing mercury vapour, metal halide or high pressure sodium high intensity discharge (HID) luminaires of higher wattage
- The luminaire conversion must save a minimum of:
 - 50W if the replaced HID lamp is under 175W
 - 100W if the replaced HID lamp is greater than or equal to 175W
- The induction lamp and ballast must be rated for an operating ambient temperature of between -20°C and +40°C or better
- The ballast must have a Power Factor > 0.95 and Total Harmonic Distortion of <= 20%.
- Induction lamp and ballast must have at least a 5-year maintenance warranty

BC Hydro e.Catalog
Product Acceptance Criteria

LED EXIT SIGNS

The Program incentive applies to the replacement of existing incandescent or CFL exit signs with new LED exit signs.

To be eligible for an incentive, the retrofit must:

- Meet Energy Star guidelines,
- Comply with CSA standards C22.2 No. 9.0 and C860; (Note if the retrofitted sign cannot comply it must be replaced),
- Consume a maximum of 3.5 input watts.

LIGHT EMITTING DIODE (LED) LAMPS AND FIXTURES

General

All LED Lamps and Luminaires, whether screw-in or hardwired, shall meet all of the following criteria:

- It is the responsibility of the customer and/or installing contractor to ensure that the new LED lamps, luminaire or retrofit kits meet the current Canadian Electrical Code requirements and have CSA or ULC (or equivalent) certification
- Lighting levels after the retrofit must meet the requirements of the end user and be to the satisfaction of all approving authorities having jurisdiction for specific applications.
- LED retrofit kits or new luminaires to be provided with LED modules/ kits, optical/ reflector installations, protective lenses, integral connectivity wiring, mounting accessories, power supply/ driver and controls as per the manufacturer specifications. New or retrofitted outdoor use LED luminaires to be sealed and suitable for wet locations as required by electrical code.

Energy Star and Design Lights Consortium Product Categories

All LED lamps and luminaires must fall under an *Energy Star* or *Design Lights Consortium* (DLC) lighting product (current active) category to qualify for BC Hydro Incentive funding.

In general, integral lamps are more likely to fall under Energy Star, while fixtures are more likely to fall under Design Lights Consortium. However, not all the listed product categories are approved for incentives by BC Hydro. Please refer below for the approved BCH product categories.

The LED products must meet **at least one of the following** Measurement / Approval criteria as described below:

- The product is approved and listed on the **Energy Star Qualified Commercial LED Lighting List** www.energystar.gov/
- The product is approved and listed on the **Design Lights Consortium List (DLC List)** www.designlights.org/

BC Hydro e.Catalog
Product Acceptance Criteria

LED REPLACEMENTS FOR INCANDESCENT LAMPS AND LUMINAIRES

The Program incentive applies to:

- LED direct replacements for MR Halogen Dichroic lamps.
 - LED MR16 lamps greater than 200 lumen to replace MR halogen (or HIR) lamps greater than or equal to 20W
- LED replacements for all screw-base, incandescent/ halogen lamps, or new LED luminaires when replacing incandescent/ halogen luminaires.
 - Ominidirectional LED lamp with minimum 450 lumen to replace 40W/60W incandescent lamps
 - Decorative LED lamp with less than 450 lumen to replace decorative 25W/35W incandescent lamps
 - LED Reflector lamp (BR, R, PAR lamps) with maximum 600 lumen (check below chart for minimum light output for each lamp type) to replace halogen reflector lamps less than or equal to 60W
 - LED Reflector lamp (BR, R, PAR lamps) with greater than 600 lumen to replace halogen reflector lamps greater than 60W and less than or equal to 100W
 - maximum 15W LED luminaires to replace maximum 60W incandescent/ halogen
 - LED luminaires greater than 15W are allowed to replace incandescent/ halogen greater than 60W

Following are technical criteria for LED lamps:

- LED MR(16) lamps can be standard 2 pin MR16 GX 5.3 base (12V AC/DC) or GU10 (120V) screw-in base.
- Screw-in replacements LED lamps shall have screw-in or pin base similar with the replaced incandescent/ halogen lamps.
- Screw-in replacements LED retrofit kits shall have screw-in or pin connectivity similar with the replaced incandescent/ halogen lamps.
- For LED luminaires, or direct replacement LED lamps, the total input wattage has to include the losses to the source.
- LED lamps can be white or coloured.

LARGE WATTAGE LED LUMINAIRES FOR INDOOR AND AREA LIGHTING

The Program incentive applies to:

- Complete large wattage (higher than 5W) LED direct replacements of HID (Metal Halide, High Pressure Sodium) technology for indoor and outdoor area applications.
- Suggested LED direct replacements of HID technology: 50W to 250W for indoor (parking and low-bay) and 50W to 400W for outdoor area lighting
- The LED luminaire conversion must save a minimum of:
 - 50W if the replaced HID lamp is up to and including 150W
 - 100W if the replaced HID lamp is greater than or equal to 175W
- Following are the BC Hydro approved LED New Luminaires categories from the DLC List:
 - Outdoor pole/ arm mounted area luminaires (excluding roadway)
 - Outdoor pole/ arm mounted decorative luminaires (excluding roadway)
 - Outdoor wall-mounted luminaires
 - Bollards
 - Wall-wash luminaires
 - Parking Garage luminaires
 - Fuel Pump Canopy
 - Low/high bay luminaires for Commercial and Industrial applications
 - High-bay aisle lighting

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Product Acceptance Criteria

- Following are the BC Hydro approved LED Retrofit Kits categories from the DLC List:
 - Outdoor area luminaires (excluding roadway)
 - Outdoor decorative luminaires (excluding roadway)
- All LED retrofit kits need to be tested within specified typical enclosures as defined by the DLC's criteria.

LED COMMERCIAL AND ARCHITECTURAL SIGNS

The Program incentive applies to:

- Direct replacements for hardwired commercial neon signs of the linear or channel letters type and for architectural linear neon or cold cathode luminaires. Where the length of the existing sign differs from the length of the replacement sign, the incentive is calculated on the shorter length.
- Replacements for commercial hardwired fluorescent illuminated box signs. LED replacements modules will be considered as replacing individual rows of fluorescent lamps. Calculations will consider the linear length of the modules as a multiplication of the length of fluorescent rows times the number of rows.
 - *For example:* for a fluorescent sign size 4'x9' containing 2 x 8'- T12 lamps, incentives will be based on a total LED linear length of 16'.
- It is the responsibility of the customer and/or installing contractor to ensure that the new lamps meet the current Canadian Electrical Code requirements.
- LED Retrofit kits or new commercial and/or architectural signs are to be permanently hardwired and an electrical permit needs to be provided for projects involving LED signs. Plug-in LED signs are not acceptable for incentives.
- Signs to be provided with all LED modules, integral connectivity wiring, mounting accessories, power supply/ driver and controls as per the manufacturer specifications. New or retrofitted tubes or case sign to be sealed and suitable for outdoor wet locations as required by electrical code. Under work conditions as specified by manufacturers, LED modules will have an average rated lamp life of:
 - over 50,000 hours for red, orange and yellow/ amber
 - over 20,000 hrs for green, blue and white
 - and a minimum warranty of 3 years
- The program incentives do not apply to awning or canopy lighting. Fluorescent lighting retrofits under awnings or canopy's can be considered for incentives under the fluorescent lighting category when it meets the general fluorescent T8/T5 lighting criteria.
- LED tubes are not accepted under architectural signage. No alternative technologies, other than those described in this section, may be applied to signage in order to receive incentives from this program.

LED REFRIGERATED LIGHTING

The program applies to:

- LED luminaires used for Vertical Refrigerated Case Lighting for enclosed, front window door, product displays in grocery stores, and convenience stores.
- Refrigerated LED luminaires are direct replacements for T12 HO and T10 VHO refrigerated lighting systems.

LIGHTING CONTROLS

The Program incentive applies to the following lighting controls:

- Timers (switch plate mounted) – add interior space where no automated controls existed. Incentive is offered per circuit.
- Occupancy/motion sensors – add to interior space where no automated controls existed. Incentive is offered per circuit and hardwired only with or without an override mechanism.
- Photocells with timers – add to outdoor high intensity discharge luminaires where only photocell existed. Incentive is offered per luminaire.
- Photocells for daylight harvesting – refer to Fluorescent T8 Dimming ballasts.

BC Hydro e.Catalog
Product Acceptance Criteria

HVAC

VARIABLE FREQUENCY DRIVE

A Variable Frequency Drive (VFD) is an add-on for an HVAC fan or pump with a 10 HP and greater motor.

In regards to installation requirements, the VFD supplier must visit the site and recommend the appropriate VFD drive, filters and line/load reactors suitable for the existing motor to avoid premature motor failure.

VFD incentives are for fan and pump applications on HVAC distribution systems. The maximum fan size is 100 HP. The installation of a VFD on a HVAC fan or pumps is eligible for a rebate only if throttling devices, such as inlet vanes, bypass dampers and throttling valves, are removed or permanently disabled.

VARIABLE SPEED ELECTRONICALLY COMMUTATED MOTOR (ECM) BASED PUMPS

The pump utilises an electronically commutated motor (ECM) technology and an integral variable speed drive to deliver up to 75% energy savings compared to a conventional single speed pump. It provides automatic adjustment of pump performance to the continually changing hydraulic system load conditions. The pump has an Energy Efficiency Class A rating in the European Energy labelling scheme.

The incentive applies to ECM-based pumps that are 1 to 2 HP and used in heating applications. This product may be used in large residential buildings, apartment blocks, housing developments, commercial real-estate complexes, hospitals, schools, as well as industrial and institutional buildings.

The circulating pumps are used to circulate liquids in

- Warm or hot water heating systems, not cooling systems
- Closed circulation systems

Careful pump sizing should be encouraged when selecting a replacement to ensure that the sizing range of the system falls within the duty range of the pump.

HVAC OCCUPANCY SENSOR

The Program incentive applies to the HVAC occupancy sensor control for a packaged terminal air conditioning unit or a heat pump unit, with built-in electric resistance heater. The program offers incentive per packaged terminal air conditioning unit or heat pump unit controlled by the sensor. This incentive is only eligible to applications in hotel/motel and strata units.

Recommended features of the occupancy sensor:

- Dual sensing technology – passive infrared (PIR) and motion sensing
- At least three possible temperature settings (unoccupied, occupied, sleep, unsold)
- Pre-programmed with default setpoint temperatures – published in the specification sheet and made available to customers

BC Hydro e.Catalog
Product Acceptance Criteria

TEMPERATURE SENSORS FOR ECONOMIZERS

The new replacement dry bulb temperature sensor:

- Has a changeover dead band of no more than 2 degrees Fahrenheit, providing greater accuracy for when and when not to use outdoor air for cooling.
- Has selectable temperature settings.
- Is easy to replace in the field.
- Is to be used with single temperature change over with the sensor located in the outdoor air.
- Is compatible with existing economizer logic modules.
- The rooftop units that will have the temperature sensor replaced should have 7.5 tons cooling capacity or greater.

REFRIGERATION

LOW TEMPERATURE VERTICAL DISPLAY CASE

Replace an existing open low temperature vertical display case with a new low temperature vertical display case equipped with glass or acrylic doors, new electronically commutated fan motor(s) (ECM), T8 lamps, and electronic ballasts. Additional separate rebates cannot be claimed for new ECM fan motor(s) or T8 lamps and electronic ballasts. New case length must be equal or shorter than the original case. The rebate is limited to low temperature vertical display cases with a case temperature below -18°C (0°F). The rebate for this measure applies to self-contained or remote cases. Rebate is based on the linear footage (horizontal length) of the cases installed.

ADDING GLASS DOORS TO LOW TEMPERATURE VERTICAL DISPLAY CASE

Install glass or acrylic doors on existing low temperature open vertical display cases to reduce the loss of cold air and infiltration of warm air. The rebate is limited to low temperature vertical display cases with a case temperature below -18°C (0°F). The rebate for this measure applies to self-contained or remote cases. Rebate is based on linear footage (horizontal length) of the doors installed.

ANTI-SWEAT HEATER (ASH) HUMIDISTAT CONTROL FOR VERTICAL DISPLAY CASE

Install a device that reduces the operation of the anti-sweat heaters by at least 50% (from 100%) for the glass door and door frame. Technologies that reduce or turn off anti-sweat heaters based on simple timing or by sensing humidity or condensation qualify. Timer must not be equipped with a "hold-on" feature. This rebate does not apply to the Special Doors with No Anti-Sweat Heat Controls (ASH) measure. The rebate for this measure applies to remote cases only. Rebate is based on the number of doors controlled.

EVAPORATOR FAN MOTOR (ECM)

Applicable to existing shaded pole or permanent split capacitor evaporative fan motor on low or medium temperature display cases and fan coil system of low or medium temperature walk-ins. The rebate for this measure applies to remote cases and remote walk-ins only. Rebate is a fixed amount per motor installed. This rebate cannot be claimed in conjunction with the low temperature vertical display case rebate. The existing fan motor must be replaced by an electronically commutated motor(s) (ECM) with the following efficiencies:

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Product Acceptance Criteria**

Existing Configuration	Retrofit ECM Efficiency
Walk in coolers (low and medium temperature)	> 70% efficiency
Reach-in refrigerated cases (Low and medium temperature)	> 65% efficiency

NIGHT COVERS FOR OPEN VERTICAL DISPLAY CASE (LOW OR MEDIUM TEMPERATURE)

Install a cover on an otherwise open low or medium temperature vertical display case to decrease infiltration of warm air into the case at night. The case manufacturer must have no objections to the use of such front covers. It is recommended that film type covers have small, perforated holes to decrease moisture buildup. The rebate for this measure applies to self-contained or remote cases. Rebate is based on linear footage (horizontal length) of night cover installed.

NIGHT COVERS FOR OPEN LOW TEMPERATURE HORIZONTAL DISPLAY CASE

Install a cover on an otherwise open horizontal display case to decrease infiltration of warm air into the case at night. The case manufacturer must have no objections to the use of such covers. It is recommended that film type covers have small, perforated holes to decrease moisture build-up. The rebate is limited to low temperature horizontal display cases with a case temperature below -18°C (0°F). The rebate for this measure applies to remote cases only. Rebate is based on linear footage (horizontal length) of night cover installed.

STRIP CURTAINS FOR WALK-INS (LOW OR MEDIUM TEMPERATURE)

Install new strip curtains on doorways of low or medium temperature walk-ins. The rebate for this measure applies to self-contained or remote walk-ins that currently do not have curtains. Rebate is based on square footage of strip curtain installed.

COMMERCIAL KITCHEN

ELECTRIC GRIDDLE

This incentive applies towards the replacement to energy efficient electric griddles. Used or rebuilt equipment and fuel switching applications are not eligible for incentives. Customers must provide proof that the appliance is Energy Star Tier 2 rated.

ELECTRIC PRESSURELESS STEAMER

This incentive applies towards the replacement to energy efficient electric steamers (fuel switching applications are not eligible). Used or rebuilt equipment is not eligible. Customers must provide proof that the appliance is Energy Star® rated.

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Product Acceptance Criteria

ELECTRIC CONVECTION OVEN

This incentive applies towards the replacement to energy efficient electric convection ovens (fuel switching applications are not eligible). Customers must provide proof that the appliance is Energy Star rated. Used or rebuilt equipment is not eligible.

ELECTRIC COMBINATION OVEN

This incentive applies towards the replacement to energy efficient electric combination ovens for heavy load cooking energy efficiency ASTM F1639-05 $\geq 60\%$

DEMAND VENTILATION CONTROLS

This incentive applies towards the retrofit to demand ventilation controls for dedicated (single zone) commercial kitchen exhaust and make-up air systems. The control system must be used in conjunction with variable speed fan motor controls.

INSULATED HOT FOOD HOLDING CABINET

This incentive applies towards the replacement to energy efficient commercial electric hot food holding cabinets. This measure does not include cook and hold equipments. All measures must be electric hot food cabinets that are fully insulated and have solid doors in half sizes (internal volume less than or equal to 10 ft³) and full sizes (internal volume less than or equal to 20 ft³ and greater than 15 ft³). Used or rebuilt equipment is not eligible. Eligible products must be Energy Star rated.

REFRIGERATORS AND FREEZER

This incentive applies towards the replacement to energy efficient refrigerators or freezers. Used or rebuilt equipment is not eligible. Customers must provide proof the appliance is Energy Star Version 2.0 rated. Incentives are eligible for the following refrigerator sizes:

- Solid door freezer
 - < 15 cu. Ft.
 - 15-30 cu. Ft.
 - 31-50 cu. Ft.
 - >50 cu. Ft.
- Glass door refrigerator
 - 31-50 cu. Ft.
 - >50 cu. Ft.

ICE MAKING MACHINES

This incentive applies towards the replacement to energy efficient air cooled ice machines that are CEE Tier 2 rated. The ice machine harvest rate must be equal to or exceed 450 lbs ice/day. Customers must provide proof that the appliance is CEE Tier 2 rated. Used or rebuilt equipment is not eligible.

BC Hydro e.Catalog
Product Acceptance Criteria

COMMERCIAL DISHWASHER

This incentive applies towards the replacement of an existing standard efficiency commercial dishwasher to an energy efficient commercial dishwasher. Used or rebuilt equipment is not eligible. Only eligible for dishwashers connected to an electrically heated domestic hot water supply. Customers must provide proof that the new appliance is Energy Star® rated.

OTHERS

LOW-E CEILING

The Program incentive applies to a foil faced radiant barrier ceiling material rated for ice arena applications. The emissivity rating must be between 0.03-0.05 (tested to ASTM #E408) with a temperature rating from – 60F (15C) to 180F (82C) and has the approved Building Code flame rating.

FIXED SPEED REDUCED FLOW PUMPS

The brine pump pony motor and variable frequency drive are add-on products used in ice arenas and curling rinks to reduce energy consumption. The Program incentive applies to the following:

- 5HP brine pump pony motor added to a 15HP brine pump
- 7.5HP brine pump pony motor added to a 20HP brine pump or 25HP brine pump
- 10HP brine pump pony motor added to a 30HP brine pump

- 15HP VFD added to a 15HP brine pump
- 20HP VFD added to a 20HP brine pump
- 25HP VFD added to a 25HP brine pump
- 30HP VFD added to a 30HP brine pump

LIVESTOCK WATERER

Energy Efficient Livestock Waterers

- These must have a minimum 2” of R10 Insulation.
- These must have electrical heater elements of $\leq 350W$.
- Each energy efficient livestock waterer should be ≤ 50 US gallons (190L) in water holding capacity.

Energy Free Livestock Waterers

- These must have a minimum of 3.5” of R25 Insulation.
- Each energy free livestock waterer should be ≤ 50 US gallons (190L) in water holding capacity.