APPLIED LINK LTD

adapT5®

Product Guide

Overview and Specification

50% Energy Saving & Better Light with AdapT5.

Out with the old fat T12's & T8's and in with new energy saving T5 tubes. For a realistic estimation just look up at the ceiling now and count £10 per tube (2ft 4ft 5ft are the most common sizes) saved every year when you've changed to adapT5 and use new flicker free low mercury, energy efficient T5 tubes.

Contents

Introduction

AdapT5 is technology that will create the possibilty to save thousands of pounds every year, starting now. Convert exsisting T12 and T8 fluorescents fittings to high efficiency T5 lighting systems.

Out with the old fat T12's & T8's and in with new energy saving T5 tubes. For a realistic estimation just look up at the ceiling now and count £10 per tube (2ft 4ft 5ft are the most common sizes) saved every year when you've changed to adapT5 and use new flicker free low mercury, energy efficient T5 tubes.

50% Energy Saving & Better Light with AdapT5.

The AdapT5 is a British high frequency ECG device (Electronic Control Gear) which allows you to change outdated and inefficient T12 and T8 fluorescent lamps to the new energy saving and environmentally friendly T5 fluorescent lamp, without changing the existing fitting.

A breakthrough in fluorescent technology, AdapT5 is an effective, efficient and simple long term solution which instantly reduces lighting costs.

Simple and easy installation of the AdapT5 components into the old style T8 or T12 fitting enables energy saving T5 fluorescent lamps to be installed and used immediately with up to 50% plus energy savings, improved lighting, lower maintenance costs and with very real recycling and CO2 reduction benefits for the environment .

Designed and certified in the UK to fit all British and European fixtures.

The unique British designed ECG adaptor (patent pending) has been engineered to fit all common and existing T12 and T8 fittings. The unique design enhances the adapT5 beyond all other upgrade products, avoiding any costs of new fittings & fixtures and the cost & inconvenience of installation.

adapT5 Energy Saver

Perform an easy and inexpensive conversion of your existing T12/T8 fluorescent strip lighting to accommodate the newly developed and optimized T5 generation of light tubes.

1. REMOVE INEFFICIENT STARTER & T8/T12 TUBE

2. REPLACE WITH ENERGY SAVING: adapT5

Conversion is done in only a few minutes, with no specialists required. The advantages are immediate: much lower energy consumption, improved illumination, longer maintenance intervals - resulting in significant economic savings!

Adapt to T5 with the safer adapT5:

- ✓ True one piece, no extra wiring or external electrical components needed in starter socket.
- ✓ White coated electrically insulated rail for prevention of hazard of electrical shock or injury.
- ✓ Non perilous.

Improve your lighting efficiency:

- ✓ More efficient warm-up phase and stable, flicker-free illumination during operation.
- ✓ Optimized illumination of the workplace enhances the effectiveness and productivity of your workforce.
- ✓ No perilous 50Hz stroboscopic effect and thus no flickering.

Capitalize on energy savings:

- ✓ Customize and improve your lighting through the use of reflectors.
- ✓ Increase the electricity/light-output ratio from 40%-50% to 80%-90%.
- ✓ Energy savings of up to 70% are possible (depending on local and technical conditions).

Benefit from simple installation:

- ✓ The adapT5 adapter is easily installed and fitted into existing T12 fixtures.
- ✓ Straightforward removal of the conventional starter, no inefficient bridge needed.
- ✓ Conversion is completed in minutes, with no specialist required.

Always protect your environment:

- ✓ T5 tubes contain 38% less glass and phosphorous than T12 tubes and contain only 5mg of mercury.
- ✓ No ray-emission through minimization of the electromagnetic discharge.
- ✓ Low energy consumption, optimized efficiency lead to less strain on energy resources and a reduction in CO_2, SO_2 & NO_2.
- ✓ No PCB emission, thereby anticipating new, future compliance.

Benefit of cost efficiency:

- ✓ Minimal installation costs.
- ✓ No downtime during installation.
- ✓ Significantly lower maintenance costs through much longer use life of T5 tubes with the adapT5 adapter.
- ✓ Elimination of the conventional starter.
- ✓ Optimal lighting conditions reduces visual strain, improving overall productivity levels.
- ✓ More efficient use of energy and improved lighting standards.

Installation of adapT5

Office, Commercial, Retail, School, Healthcare, Hotel/Motel, Restaurant

It is estimated that there are over 1'000'000'000 fluorescent light tubes in operation along the East Coast alone. Every year, over 200'000'000 tubes are replaced.

Generally, there is a mix of T8 and T12 tubes that are being used in the US today. The T12 is the archaic model, which is huge in size, highly inefficient (high energy use with poor light quality) and has a short use life span (<10'000 hrs.). The other is the T8. It is somewhat more efficient, is a bit smaller (diameter), than the T12 and has poor to decent light quality and also has a short use life span (<10'000 hrs.). Neither the T8 nor the T12 are very environmentally friendly, due to their relatively high mercury content.

The fluorescent light tube of the future is the T5, which is already being manufactures by Osram, GE and Philips. It combines all the newest technologies into a sleek 5/8 inch diameter light tube. It is highly efficient, (lower energy costs), provides very good light and boasts a use life span of over 20'000 hours, and it is environmentally friendly (contains 38% less glass and phosphors and only very little mercury). All this in itself would already make the T5 a desirable alternative to the T12. But here is one major problem. The T5 is approx. 2 inches shorter than the T12. What does this mean? It means that if you choose to use T5 tubes in replacement of your T12, you must also replace the fixture (to accommodate the shorter T5 tube) and also the magnetic ballast (CCG). T5 tubes require electronic ballast (ECG). This would result in major expenses. But you don't have to replace your existing T12 fixtures (or ballast) in order to use the T5 tube! How? This is where the invention comes into the picture.

The invention is a new type of ballast or more appropriately called Electronic Control Gear (ECG) that is designed to work specifically with T5 fluorescent light tubes. The adapT5 adapter is designed to bridge that 2 inch gap between the existing T12 fixture and the shorter T5 light tube. Once the adapter has been attached to the T5 tube, so as to extend the total length of the T5 by 2 inches, it can now be installed into existing T12 fixtures. But the adapT5 adapter can do much more.

The technology inside the adapter, together with the brand new T5 tube, can create energy savings of up to 70%*! In addition, since the adapter operates at 35'000Hz (existing magnetic ballasts operate at 50Hz to 100Hz), there is no perilous, stroboscopic flickering. And, attachment of the adapters onto the T5 tube and installation of the converted tube into existing T12 fixtures requires no specialist and is completed in minutes.

These, and even more beneficial features, such as lower operating temperature, dim-ability (in preparation), less maintenance, elimination of conventional starter and increased worker productivity make the adapT5 adapter simply revolutionary. And, depending on your electricity costs, conversion to T5 fluorescent light tubes, the adapT5 can pay for itself in less than one year!

* Depending on local and technical conditions

Contact us today on: 020 3051 5914 www.appliedlink.co.uk sales@appliedlink.co.uk

The Savings

Florescent lighting alternatives	Continued usage of existing T12-CCG- tubes and fittings	Continued usage of existing T8-CCG- tubes and fittings	Installation of complete T5 HE tube system	Use of the **adapT5** adapter in conjunction with T5 HE tubes
Installation Time	0 Min.	0 Min.	approx. 45 Min. (skilled labour)	approx. 3 Min.
Energy Savings	0%	0%	approx. 50%*	approx. 50%*
Life Expectancy/ Maint. Intervals	<10'000 Hrs.	<10'000 Hrs.	approx. 20'000 Hrs.	>20'000 Hrs.
Pay Back Period	N/A	N/A	approx. 5-6 Yrs.	approx. 1 Yr.*

2ft	Continued usage of existing T12-CCG- tubes and fittings	Continued usage of existing T8-CCG- tubes and fittings	Use of the **adapT5** adapter in conjunction with T5 HE tubes
Power Factor	N/A	0.29	0.99
Current (A)	N/A	0.37	0.05
Apparent Power Consumption (VA)	N/A	89	13
Actual Power Consumption (W)	N/A	26	13

4ft	Continued usage of existing T12-CCG- tubes and fittings	Continued usage of existing T8-CCG- tubes and fittings	Use of the **adapT5** adapter in conjunction with T5 HE tubes
Power Factor	0.43	0.44	0.93
Current (A)	0.41	0.41	0.12
Apparent Power Consumption (VA)	97	94	28
Actual Power Consumption (W)	49	40	24

What the Carbon Trust says about T5 retrofit conversion kits

How to use T5 retrofit conversion kits

Introduction

This guidance deals with the retrofit conversion kits that allow T5 fluorescent tubes to be used in light fittings designed to use T8 format tubes. The conversion kits also change fittings with mains frequency ballasts to operate using more energy efficient, high frequency ballasts. These kits are not recommended for fittings that already use high frequency ballasts, due to the reduced potential for energy savings.

Depending on the exact choice of T5 tube, energy savings of up to 45% are achievable (but this may bring with it a reduction in illumination levels).

The Technology

Conversion kits are available which will work in existing fittings containing switch start, mains frequency fluorescent tube ballasts. The kits convert the fittings to use energy efficient, high frequency ballasts and accommodate the smaller diameter T5 tube.

There are two main types of conversion kits (see picture below):

1. Tube end type – kits which include a replacement starter and two separate components to fit over each end of the T5 tube. The tube is then slotted into the existing fitting.

2. Baton type – one piece kits which slot into the existing fitting and into which the T5 tube is placed.

What the Carbon Trust says about T5 retrofit conversion kits

How to use T5 retrofit conversion kits continued...

The following table illustrates the correspondence between the T8 and equivalent T5 fluorescent tubes using the retrofit kits. The power consumed by T5 tubes is less and, although there may be a reduction in brightness, the lifetime of the tubes will typically increase from 15,000 hours to 20,000 hours.

Tube Length (mm)	Mains frequency T8 fluorescent tube		Retrofit kit and high efficiency T5 equivalent		High Frequency T8 fluorescent	
	Power (W)	Light output (Lumens)	Power (W)	Light output (Lumens)	Power (W)	Light Output (Lumens)
1,500	73	5,200	49	4,300	58	5,200
1,200	48	3,350	28	2,900	36	3,350
600	26	1,350	14	1,350	18	1,350

Application

The kits can be used on lighting in many commercial and office settings, as well as other locations such as schools. The conversion kits can accommodate most tube lengths, and allow for changes from T12 and T8 tubes to T5 tubes. They are not currently available for 8 foot fittings. The majority of the savings come from converting from mains frequency to high frequency ballasts. Savings will be significantly reduced if your existing lighting already has high frequency ballasts.

The following table describes the recommended lux levels for a selection of different tasks (Lux is a measure of the brightness produced by the lighting). Given the lux levels required, and the distribution of the light fittings, a selection needs to be made between standard and high efficiency T5 tubes so that the maximum energy saving is made without impairing lighting levels. A supplier should be able to assist with this process.

Lux levels	Task/Activity	Comments
100	Circulation areas, entrance halls, corridors, rest rooms, store and stock rooms, changing rooms.	
150	Stairs	At floor level
200	Toilets, foyers, lounges, plant rooms, switch gear rooms, archives, and dining rooms.	
300	Office (lowest), reception desk, and filing.	
500	First aid rooms, kitchens, writing, typing, reading, data processing, CAD workstations, conference/meeting rooms*, office (highest), switchboard, and post room.	Can be task lighting. *Should be controllable.
750	Technical drawing	

What the Carbon Trust says about T5 retrofit conversion kits

How to use T5 retrofit conversion kits continued...

For an existing lighting installation that is more than 10 years old, it may be more cost effective to completely renew the light fittings (rather than convert them). This will allow the additional benefits of higher light output ratio fittings to be used.

Further guidance is given in the How to implement office lighting refurbishment guide, downloadable from the Carbon Trust website.

Specification checklist

The following table lists the key parameters that you will need to define through discussion with your supplier in order to specify an appropriate retrofit conversion kit and tubes.

Item No.	Parameter	Comments
1	Length of existing fluorescent tubes	Expressed in mm.
2	Fluorescent tube format currently and required for use in the kit	Replace with T5 triphosphor coated tubes
3	Lux lighting levels	The brightness of the lighting required for a particular application.
4	Adapter type	Baton or tube end type.
5	Ballast	Confirm whether the existing fitting has a mains frequency switch start ballast. Switch start fittings have a characteristic cylindrical starter that is normally visible from outside the fitting.

Commissioning procedures

The installation and commissioning of the plug-in retrofit conversion units and tube should be done in accordance with the manufacturer's recommendations. It is however advisable to trial the retrofit units and tubes before switching all fittings to ensure that the specification has been accurate.

Ensure that the correct lighting lux levels are maintained and checked (see Application section).

If electrical wiring is altered electrical checks should include installation and commissioning to the current edition of BS 7671 IEE Electrical Wiring Regulations.

Common problems

Installing the retrofit units is a straightforward process, with few difficulties likely to be encountered.

Converting fluorescent tubes from T8 to T5 may cause a reduction in overall lighting lux levels, which, if lighting levels were previously only just acceptable, may cause them to become unacceptably low. In these situations it is important that in choosing between standard and high efficiency T5 tubes, the higher lumen tubes are selected, maximising the light output.

Some fittings may offer restricted physical access, which may influence the type of adapter chosen.

What the Carbon Trust says about T5 retrofit conversion kits

How to use T5 retrofit conversion kits continued...

Similarly, in some mirror reflector light fittings, the presence of the baton type adapter's "spine" can interfere with light output.

In all cases, it is recommended that a small trial installation is carried out before any bulk orders are placed.

The Business Case

The business case for a typical retrofit conversion unit, installed in an existing 1,500mm mains frequency switchstart fluorescent fitting, is as follows:

The T8 tube plus the mains frequency ballast would use a total power of typically 73W, whereas the T5 tube plus high frequency ballast uses typically 49W, a saving of 2W.

Assuming that the lighting is used 12 hours per day, 5 days per week, 52 weeks per year, a total of 3,120 hours per year changing the lighting would save 75 kWh per year. With a typical electricity cost of 7.9 p/kWh this would save £5.93 per year, leading to a payback period of approximately four years.

There are also savings as the tube life is increased, electrical circuit losses reduced and less demand on the air conditioning due to the lower heat output from more efficient lighting.

However, in this particular case, the light output would be reduced by 17% which may not be acceptable in some cases.

AdapT5 FAQ's

Q.1: What does retro-fitting mean?

A.1 : Retro-fitting means installing Energy Saving (Energy Efficient) lighting products without any modification on the existing fittings. The retrofit concept is to minimize the costs faced by users to achieve energy efficiency.

Q.2 : What does adapT5 stand for?

A.2 : adapT5 is the product name of the energy saving tube light adapters which Green Britain distributes in Europe. adapT5 has been designed on the concept of retro-fitting existing fittings, adapting them to use and benefit from T5 technology..

Q.3 : What are the main highlights of the adapT5 adapter?

A.3 : Conventional T8 tubes consume 36 / 58 Watt, but the magnetic ballast has an additional power loss of about 7 / 14 Watt, hence total system consumption is around 43 / 72 Watt. The system power consumption of the adapT5 adapter is only 31 / 40 Watt including the losses of the magnetic ballast, which can remain inside the fitting.

Q.4 : It is mentioned that adapT5 consumes less wattage i.e. 31 Watt, does this mean that the light output will also be less?

A.4 : Even at a consumption of 31 W , the light output of the adapT5 system is comparable to the conventional T8 tube lights. The light output can be measured using a lux meter.

Q.5: All energy saving products available in the market are very expensive. Is it the same case with the adapT5 adapter?

A.5 : adapT5 can offer an average energy saving of approx. 40%. The average return of investment therefore is around 2 years

Q.6: The savings sound too good to be true. How can the user have such big savings?

A.6 : The additional power losses of T8 and T12 magnetic ballasts are around 20 to 25%, whereby the power losses of the AdapT5 adapters including the remaining magnetic yoke are only around 13%. Furthermore the tube wattages of T8 / T12 are much higher than the tube wattages of T5 tubes. Both together will usually give the user savings of around 40% compared to T8 and T12 fittings with magnetic ballasts.

Q.7: Why can the user not install T5 fluorescent tubes in existing T8 fittings?

A.7 : The T5 fluorescent tube is a different fluorescent tube. It is shorter in length than standard T8 tubes. The tube requires an electronic ballast with pre-heat function to start and to operate it. The adapT5 adapter is designed in such a way that it overcomes the problem of different length, different pin distance and the requirements of an electronic ballast.

Q.8: Why should one use electronic ballasts? What's wrong with the existing magnetic ballasts?

A.8 : As mentioned earlier, adapT5 does not usually (though it can) replace the existing ballast. For ease of installation adapT5 is using the existing magnetic ballast in combination with its own electronic ballast.

Q.9: Can the AdapT5 adapter be used if there is already an electronic ballast installed in the fitting?

A.9 : Yes, AdapT5 can still give up to 25% saving compared to the T8 electronic ballast. The existing electronic ballast needs to be disconnected and an adapT5E unit has to be installed instead.

Q.10: It is known as a fact that electronic ballasts operate on a high frequency (40,000 Hz) and sometimes this creates problems with harmonics in computerized environment. How can the user be sure, that the adapT5 ballast will not interfere with other electronic equipment?

A. 10 : The adapT5 adapter has been tested and certified complying with European norms required such as EN 60598-2-1.89 and EN 60598-1.00.

Q.11: How does the AdapT5 adapter react to high voltage fluctuations?

A.11 : adapT5 has been designed taking voltage fluctuation into consideration. The electronic ballast can withstand fluctuation in the range of 160 -260 Volt.

AdapT5 FAQ's

Q.12: What is the average life time of the adapT5 adapter and the T5 tube?

A.12 : The life time of T5 tubes is around 20,000 hours and the life time of the built-in ballast is around 50,000 hours.

Q.13: What is the difference in light output over the life time between T5 and T8 fluorescent tubes?

A.13 : TheT5 tubes are designed to last for a longer period of around 20,000 hours. The depreciation of lumen output is only around 10% after 10,000 hrs. compared to 35-40% for standard T8 tubes. This reduces the service and maintenance costs and will give the user additional savings.

Q.14: What does better quality of light mean?

A.14 : The colour rendering index (CRI) of T5 tubes is 85. CRI translated in common language means that T5 tubes are 85% close to natural sun light.

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