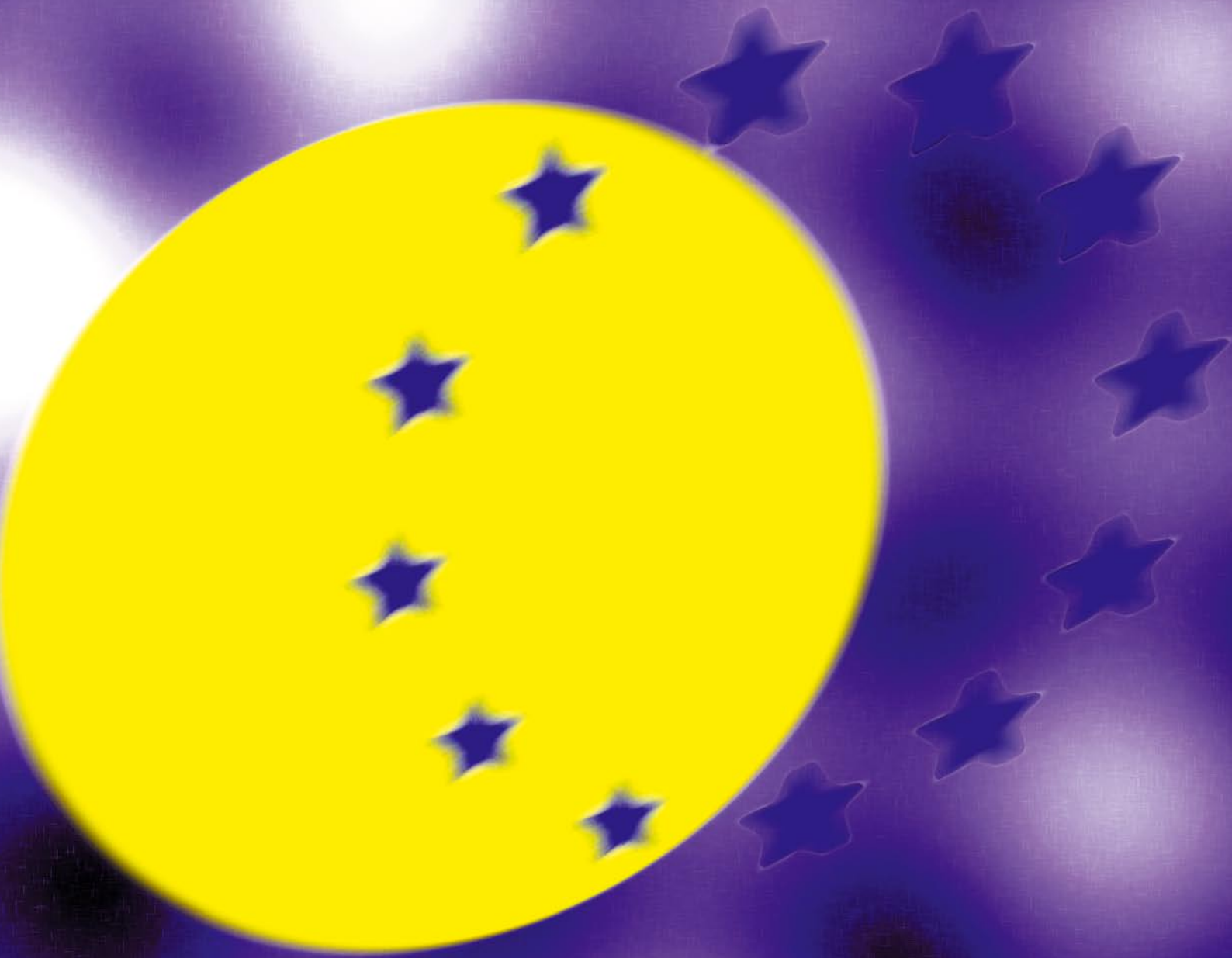
CELMA

Federation of National Manufacturers Associations for Luminaires and Electrotechnical Components for Luminaires in the European Union



GUIDE

for the application of Directive 2000/55/EC on energy efficiency requirements for ballasts for fluorescent lighting

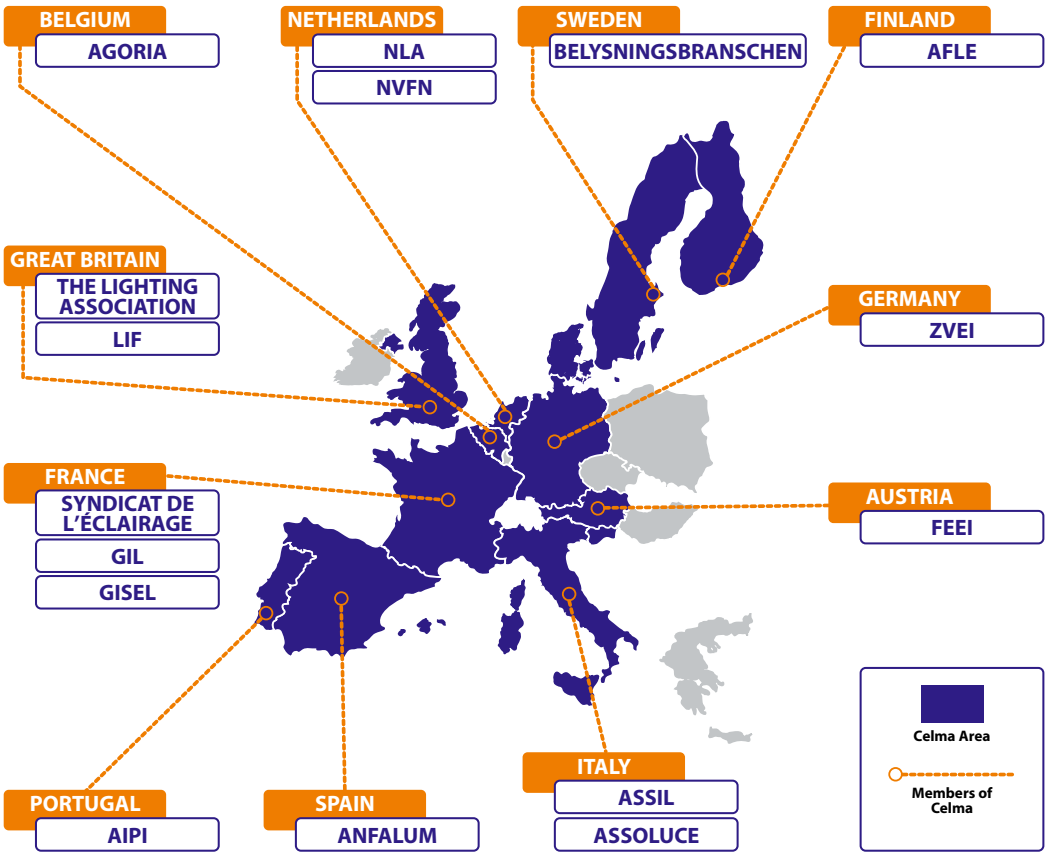
ISSUE 3.1
JULY 2007

PREFACE

This guide is an update from the guide written in 2002 just before the first phase of the banning of D-type ballasts. At the end of this year (21 November 2005) the second phase will come into force. This guide will provide the information, as it is understood by the Active Components Working Group of CELMA.
The 21st of November 2005 is the implementation deadline for the second and last phase of the directive for the efficiency of ballasts for fluorescent lamps. For this important date, the CELMA active components working group has issued this 3rd edition of the "CELMA brochure". The ballast manufacturers are advised to change over to EEI B ballasts to prevent large quantities of C ballasts, intended for sale in EU countries, accumulating in theirs stocks.
In addition that new lamp types have been incorporated in the tables of the annexes.

WHAT IS CELMA?

CELMA is a Federation established for an unlimited period, representing 16 National Manufacturers Associations for Luminaires and Electrotechnical Components for Luminaires in the European Union. CELMA members' Associations are representing more than 90% of the market in the Luminaires and Electrotechnical Components for Luminaires industries in 11 European countries. These producers, which include many small and medium-sized companies, directly employ some 100,000 people and generate 8 billion Euros annually. CELMA acts as a Body of contact, co-ordination, representation and assistance for the European and National Associations, Federations and Organisations in the EU manufacturing of luminaires and electrotechnical components for the Luminaires Industry.



The ballasts manufacturers are represented in

CELMA ACTIVE COMPONENTS *WORKING GROUP*

Who is CELMA ACTIVE COMPONENTS Working Group?

CELMA ACTIVE COMPONENTS is a working group within CELMA Federation composed of National Associations in which manufacturers of components are members.

Which components are covered?

Ballasts, transformers, ignitors, capacitors, etc....

MEMBERS OF CELMA ACTIVE COMPONENTS WORKING GROUP	FINLAND	SPAIN	ITALY	AUSTRIA	NETHERLANDS	GREAT BRITAIN	FRANCE	GERMANY
	AFLE	ANFALUM	ASSIL	FEEI	NLA NVFN	LIGHTING INDUSTRY FEDERATION	SYNDICAT DE ECLAIRAGE	ZVEI
						THE LIGHTING ASSOCIATION		

SCOPE and OBJECTIVES of CELMA

CELMA studies any matters of common interest, with particular emphasis on their scientific, educational, legal and institutional aspects and provides sectorial policies such as contact, co-ordination, representation and assistance for European and national associations, federations and organisations in the EU involved in the manufacture of luminaires and electrotechnical components for the Luminaires Industry.

With this outlook, CELMA shall particularly endeavour to address the following items:

- To express the desires and needs appropriate to the membership.
- To maintain stable relations with the public authorities and, specifically with the institutions of the European Union, particularly with a view to keeping the Members fully informed of developments that may be of interest to them, and with a view to conveying the Members' needs and aspirations to those authorities.
- To solicit the adoption and compliance with common standards aimed at ensuring that uniform technical standards are respected with specific reference to matters relating to the production, testing, installation, safety, reliability, energy efficiency, environmental aspects and performance of lighting products.
- Within the limits of the EU and national competition laws to encourage fair business practices between luminaires, components and light-sources manufacturers as well as between manufacturers and their customers or suppliers and, where possible, the adoption of a Members' Common Code of Conduct.
- Within the limits of the EU and national competition laws to adopt and support any initiatives aimed at enhancing the image of the Associations, the Members and their products, which may be to their benefit.
- To combat any situation that places the Members of CELMA in a position hampering fair trade and competition.
- To combat the counterfeiting or the unauthorised copying of Members' products.
- To initiate instruments aimed at providing information, assistance and consultancy services for the Members' benefit.

DIRECTIVE 2000/55/EC

The governments that participated in the climate conferences of Rio, Kyoto, The Hague and Bonn aim to reduce emissions of carbon dioxide (CO_2) as one of the so-called greenhouse gases. CO_2 is a waste product created by fossil fuels during the production of electrical power. Lighting is estimated to account for around 15% of the electricity consumed in the industrialised world. To harness the maximum energy saving potential of artificial lighting systems without compromising on the quality of lighting, the industry has constantly developed new products and systems that consume less energy. For many applications fluorescent lamps give the highest efficiency and are aimed to replace incandescent lamps wherever possible. Fluorescent lamps are operated by ballasts.

The target of directive 2000/55/EC is to improve the efficiency of the systems by limiting the ballast losses. For this purpose, CELMA developed a classification system that takes both parts of the system into account, the lamp and the ballast. Ballasts are given an energy efficiency index (EEI) classification.

To allow the market to follow the requirements in a sensible way, ballasts with high losses are being phased out in 2 steps. The first phase took place on 21st May 2002 when EEI D ballasts were phased out. According to article 2 of the directive, on 21st of November 2005 only ballasts with EEI B2 or better are allowed to be placed on the European market.

WHO ARE THE BENEFICIARIES ?

BALLAST MANUFACTURERS
Through the application of the scheme they will be able to control their production to the market demand.

LUMINAIRE MANUFACTURERS
Will have the possibility to choose the right ballast for the application.

LIGHTING DESIGNERS AND WHOEVER IS RESPONSIBLE FOR THE LIGHTING PROJECT
Will be able to choose the ballast starting from objective evaluations and not from personal considerations.

IMPLEMENTATION BY THE BALLASTS MANUFACTURERS

The European Ballasts manufacturers, represented in CELMA, have adopted the scheme of classification of ballasts defined by CELMA since 1999. As a consequence all ballasts falling under the scope of the 2000/55/EC Directive are marked with the pertinent EEI printed in the label or stated in the manufactures' literature. The scheme of classification is based on a voltage of 230V (Harmonised voltage) and a frequency of 50Hz.
The following deviations are managed as hereunder specified:
Voltage supply : 240V
Voltage supply : 220V
Voltage supply : 110V, 120V
Frequency : 60Hz
Series compensation.

VOLTAGE SUPPLY: 240V

Products for the markets with 240V will be supplied with a rated voltage of 240V but with a classification value measured at 230V as the harmonised voltage. The 15 member countries of the EU have all signed up to comply with the requirements of the Voltage Harmonization policy which centres its nominal voltage of supply at 230V. The measurement standard EN 50294 reflects this as a logical consequence.

VOLTAGE SUPPLY: 220V

Products for the markets with 220V will be supplied with a rated voltage of 220V but with a classification value measured at 230V as the harmonised voltage. The 15 member countries of the EU have all signed up to comply with the requirements of the Voltage Harmonization policy which centres its nominal voltage of supply at 230V. The measurement standard EN50294 reflects this as a logical consequence.

VOLTAGE SUPPLY : 110V, 120V

These voltages are not in use in the EU market and are out of the Voltage Harmonization policy. The measurement method Standard EN 50294, based on 230V harmonized voltage, excludes therefore the ballasts with these special voltage supplies. As a consequence the ballasts for these special voltages are displaying the "CE" marking only as a conformity to the Low Voltage Directive (LVD) and Electro Magnetic Compatibility Directive (EMC) and this will be clearly put in evidence in the corresponding Declaration of Conformity.

FREQUENCY: 60Hz

The frequency commonly adopted in EU market is 50Hz. The measurement method Standard EN 50294, based on 230V harmonized voltage, excludes therefore the ballasts with special frequencies. As a consequence the ballasts for application at 60Hz are displaying the "CE" marking only as a conformity to the Low Voltage Directive (LVD) and Electro Magnetic Compatibility Directive (EMC) and this will be clearly put in evidence in the corresponding Declaration of Conformity.

SERIES COMPENSATION

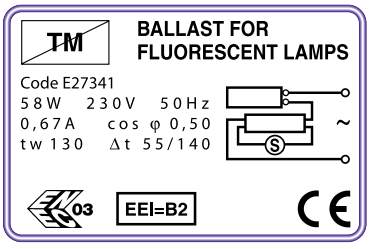
In some countries, the power factor correction for magnetic ballasts is traditionally made by a capacitor in series with the ballast. Due to its characteristics and the tolerances, this circuit causes a higher lamp current and therefore higher ballast losses. The system wattage of inductive ballasts in series with a power factor correction capacitor therefore may not meet the limits according to the Energy Efficiency Index (EEI) marked on the ballast. Power factor correction capacitors in parallel to the supply voltage do not have any impact on the ballast losses, consequently they appear the only way to satisfy the maximum values required. For installations, where a parallel compensation is not possible, please contact your ballast supplier for detailed information and solutions.

THE LABEL

The EEI is refered to the CELMA classification scheme.

The label on the product will indicate the class defined through the Energy Efficency Index (EEI). Marking of the EEI class is not mandatory.

Example of the typical markings of the ballast showing Energy Efficiency Index



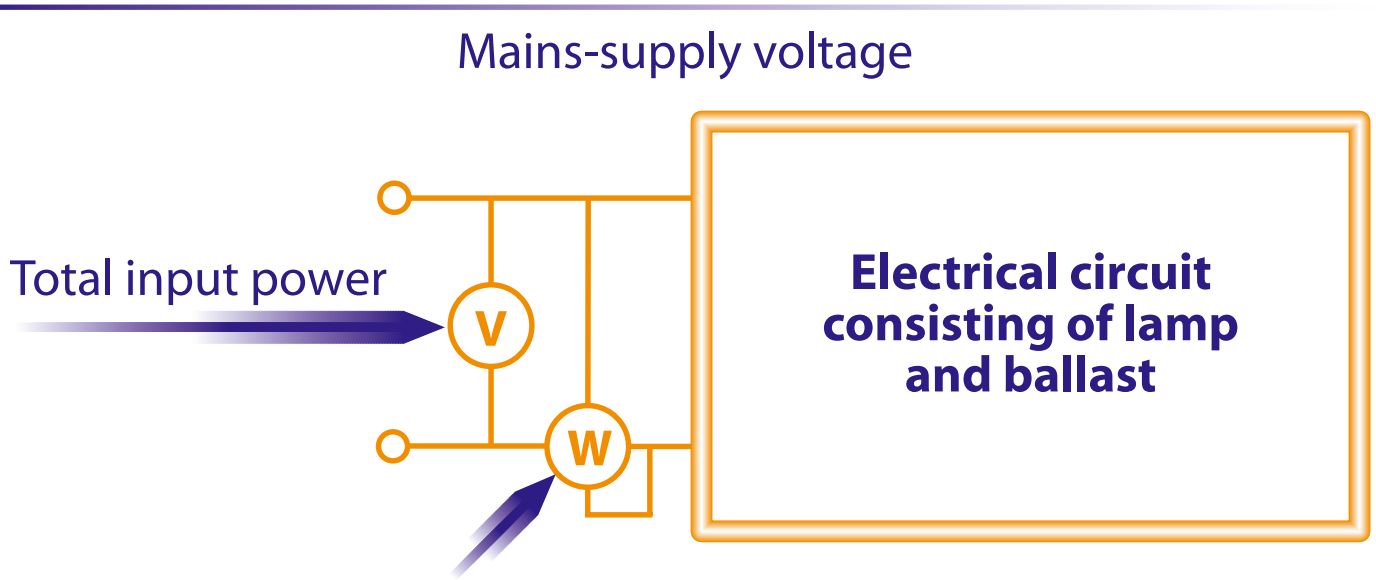
HOW IS IT DEFINED ?

The corrected total input power of the lamp-ballast circuit is defined as the "Energy Efficiency Index" (EEI) of the ballast-lamp combination. The grading consists of different classes defined by a limiting value.

There are seven classes of efficiency. The classes have no direct correlation to a specific technology; every class is defined by a limiting value of total input power related to the corresponding ballast lumen factor.

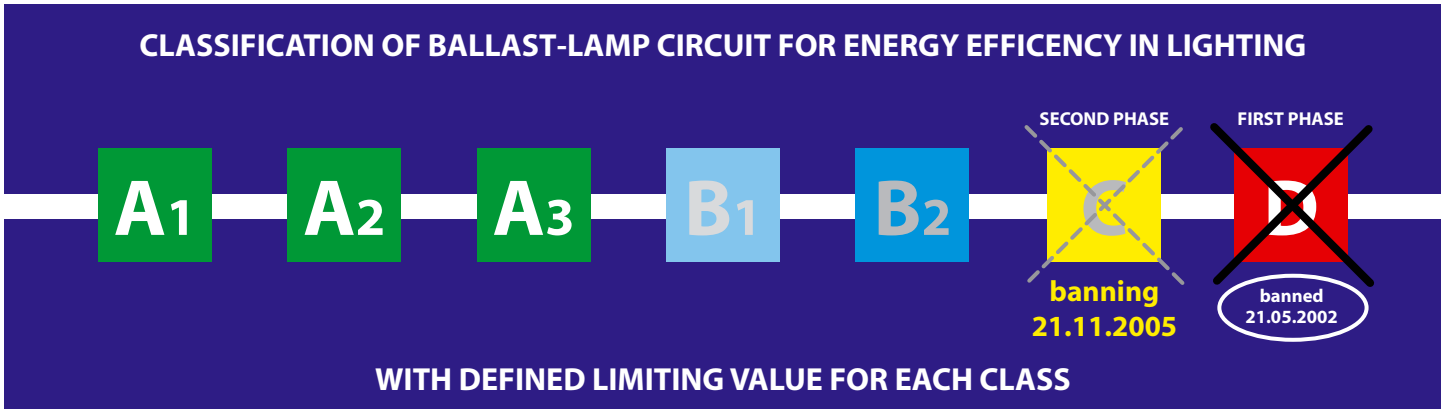
The classes are A1, A2, A3, B1, B2, C and D.

Every class is defined by a limiting value of total input power when referenced with a BLF 1.00 for high frequency operated ballasts and 0.95 for magnetic ballasts. The Energy Efficiency Index (EEI) is compared to the corresponding table to obtain the relevant energy class of the ballast-lamp combination.



The application of the scheme refers only to the consumption of electrical energy, in Watts, by the lamp-ballast circuit measured at an ambient temperature of 25 °C.
The scheme should not be used to classify the energy efficiency of the luminaire where additional aspects may need to be considered such as luminous intensity, light distribution, glare, etc. ...

THE PRESENT AND THE FUTURE



THE BALLASTS OF THE FUTURE

During the preparation of the Directive there was an expectation to have greater than 55% market share of CELMA class A by the end of 2005.
It is clear that this target will not be met. The main reason for not meeting this target is the economic state during the beginning of the 21st century. The members of CELMA see that the economy will start to grow again. With this growth the consumer is also willing to invest in the environment again, e.g. A-type ballasts for fluorescent systems.
The advantages of this type of ballasts are:
1. Lower system power, mainly due to the 10% efficacy gain of the lamp, when it is operated at high frequencies. This lower energy usage makes the use of electronic ballast more environmental friendly. Life cycle assessments (LCA) shows that the energy use is responsible for more than 98% of the environmental impact. This means that in general, for LCA, electronic ballasts are 10-20% better for the environment compared with magnetic ballasts, B-type. In some cases this better performance will occur after only a few thousand hours (this includes making and disposal of ballasts).
2. Longer lamp life due to the optimal starting conditions and the optimal setting of the electrodes during burning
3. No flicker and stroboscopic effects.
4. No end of life effect. Electronic ballasts have protection built-in so that in case of end of life of a lamp, the ballast will de-energize. With switch start magnetic ballasts the system attempts to ignite the lamp until the contact of the starter switch sticks together; then continuously a current will flow through the electrodes until they break: an arc may occur between the end of the electrodes, which eventually can lead to overheating of the lamp ends.
CELMA is also aware that the robustness of electronic ballast is not as good as of magnetic ballasts. This is mainly due to the large number of components used in electronic ballast which all have a certain failure chance. Ballast manufactures always give figures under worst-case conditions; this means that, in practice, the ballast lives much longer. It is the opinion of CELMA that the advantages of electronic ballasts outweigh the disadvantages. Therefore the AC-working group of CELMA will actively promote electronic, with a target of a 20% annual growth. It is expected by the members of CELMA that 70÷75% of the new installed fluorescent lamps in 2010 will be operated by electronic ballasts.

NEW EUROPEAN GUIDELINES

The European Standard EN 50294 fixes the measuring methods for the total input power of the ballast-lamp system. Using this European Standard as a basis, CELMA (the European Federation of the National Associations of the manufacturers of luminaires, control gears and lampholders) has fixed both energy classes and limit values for the ballast-lamp combination of the most common fluorescent lamps.

Energy Efficiency Index (EEI)
The "Energy Efficiency Index" system contains 7 classes: A1, A2, A3, B1, B2, C and D. The guideline is valid for mains-operated ballasts for fluorescent lamps.

The EEI system comprises the following lamp types:
- Tubular fluorescent lamps T8
- Compact fluorescent lamps TC-L
- Compact fluorescent lamps TC-D
- Compact fluorescent lamps TC-T
- Compact fluorescent lamps TC-DD
- Compact fluorescent lamps TC-F

LIGHTING POINT INDEX
Operated on a conventional ballasts, most lamp wattages need one ballast per lamp. The main exemption is the 18W T8 lamp where 2 lamps can be operated at a 36 W ballast. Based on a different technology, electronic ballasts are designed to operate several lamps at the same time which allows the use of one ballast only for any luminaire, independent on the number of lamps.
Based on market behaviour (single, twin and multilamp luminaires) as an European average, the following lighting point index is valid:

LIGHTING POINT INDEX FOR MAGNETIC BALLASTS	**1.1**
LIGHTING POINT INDEX FOR ELECTRONIC BALLASTS	**1.7**

Phase-out dates according to European Directive 2000/55/EC

Step 1	21.05.2002	class D	discontinued
Step 2	21.11.2005	class C	to be discontinued

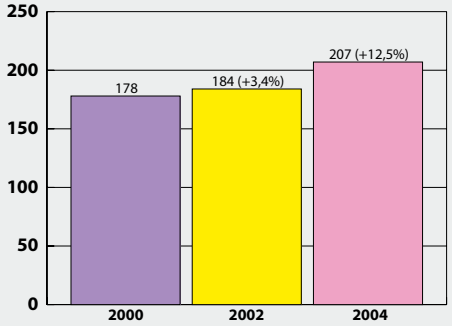
The wide range of high performance magnetic and electronic ballasts offered by leading European ballasts manufacturers enables immediate upgrading from conventional magnetic products to high performance versions, i.e. B2, B1, A3 and A2. In addition to these products the market also offers complete ranges of high performance controllable electronic ballasts, i.e. A1 class, featuring additional advantages like lighting management systems. The market also offers solely purchase-cost oriented electronic ballasts, which require a correct knowledge of the application in order to guarantee the performances expected by the end user.
Ballast directive does not cover lamp wattages smaller than 15W operated at line frequency and smaller than 13.5W operated at high frequency. For information, CELMA have included the small wattage lamps into EEI classification (see also Annex II).

EUROPEAN BALLASTS MARKET

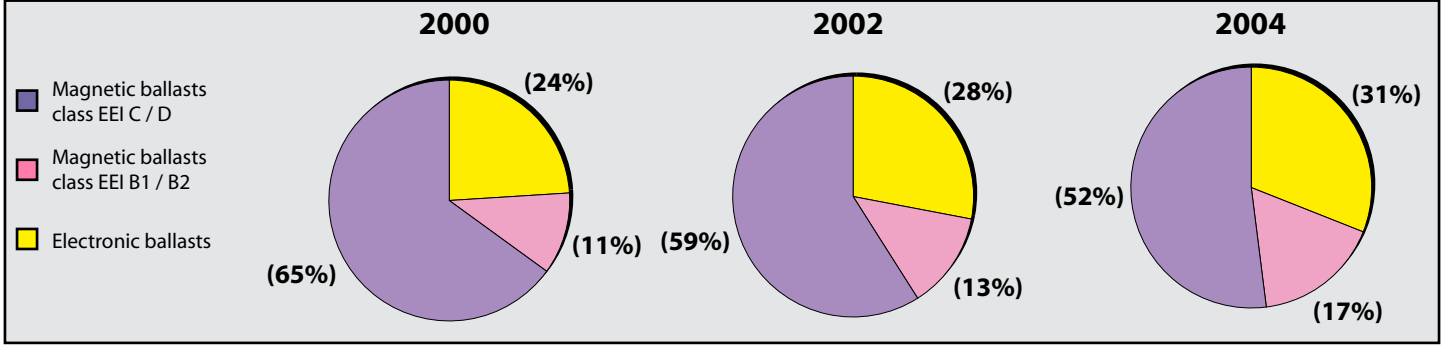
NUMBER OF NEW INSTALLED LAMPS DRIVEN BY				
	CLASS	2000	2002	2004
Magnetic ballasts	EEI C / EEI D	115.500.000	109.000.000	106.000.000
Magnetic ballasts	EEI B1 / EEI B2	20.000.000	24.000.000	36.000.000
Electronic ballasts	EEI A1 / EEI A2 / EEI A3	42.500.000	51.000.000	65.000.000
Total number of new installed lamps		**178.000.000**	**184.000.000**	**207.000.000**

The market is grown in total during the last five years at 16,3%

Number of lamps in millions

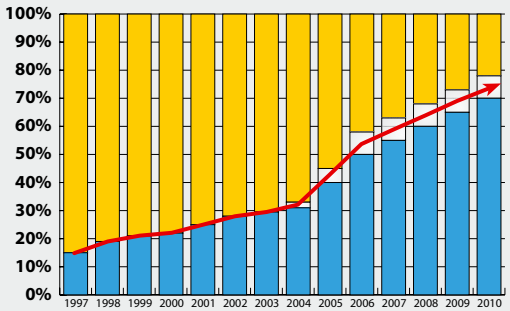


The market share of electronic ballasts is grown from 24% to 31% by a growing market at 16,3%



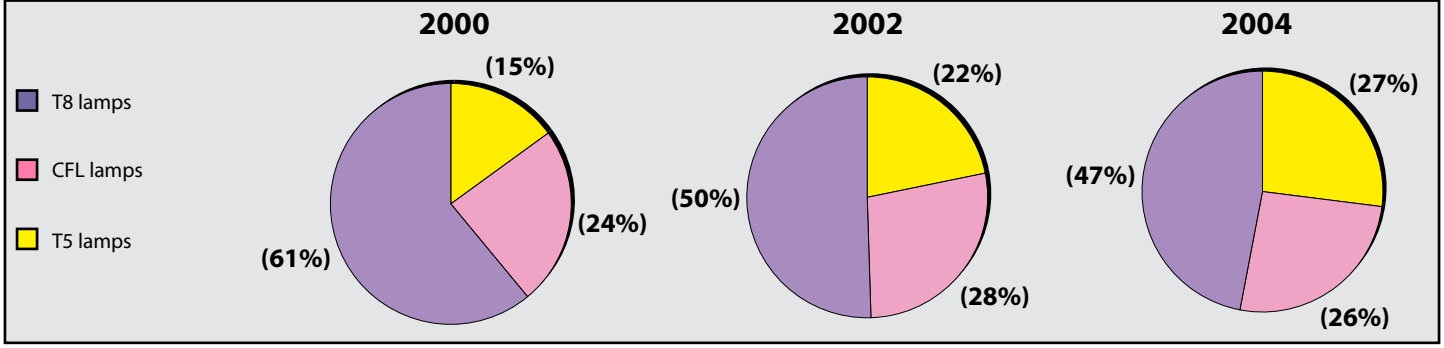
Market share (1997 to 2004) and expected market share (2005 to 2010) of the ballasts sales development in Europe based on operated lamps.

ORANGE = magnetic ballasts
BLUE = electronic ballasts
GREY = tolerance band



This trend is much better than the experience occurred in the USA

Market share of ballasts for the different lamp type. Ballasts for T5 lamps are growing fast at the expense of T8. CFL lamps are quite stable.



NEW ENLARGED EU

The ballast directive was prepared for a EU consisting of fifteen member states. In May 2004 the European Union was enlarged by ten new countries. The new member states were obliged to implement the ballast directive in their national legislation immediately after joining, without transition periods. The effect of energy saving achieved by the directive is thus considerably larger than achieved in the old fifteen member states. Additional savings come from the fact that currently the penetration of low loss class A and B ballasts is significantly lower in the new member states.

CE MARKING

CE

Conformity with directive 2000/55/EC is confirmed by the application of the CE mark. CE marking must be affixed visibly, legibly and indelibly to ballasts. The ballast manufacturer will only print the CE mark on ballasts that fulfil also the requirements of this directive. This means only ballasts placed on the market before the 21st of November 2005, or ballast EEI B2 or better will have the CE marking after the deadline.

INTERPRETATION OF "PLACING ON THE MARKET"

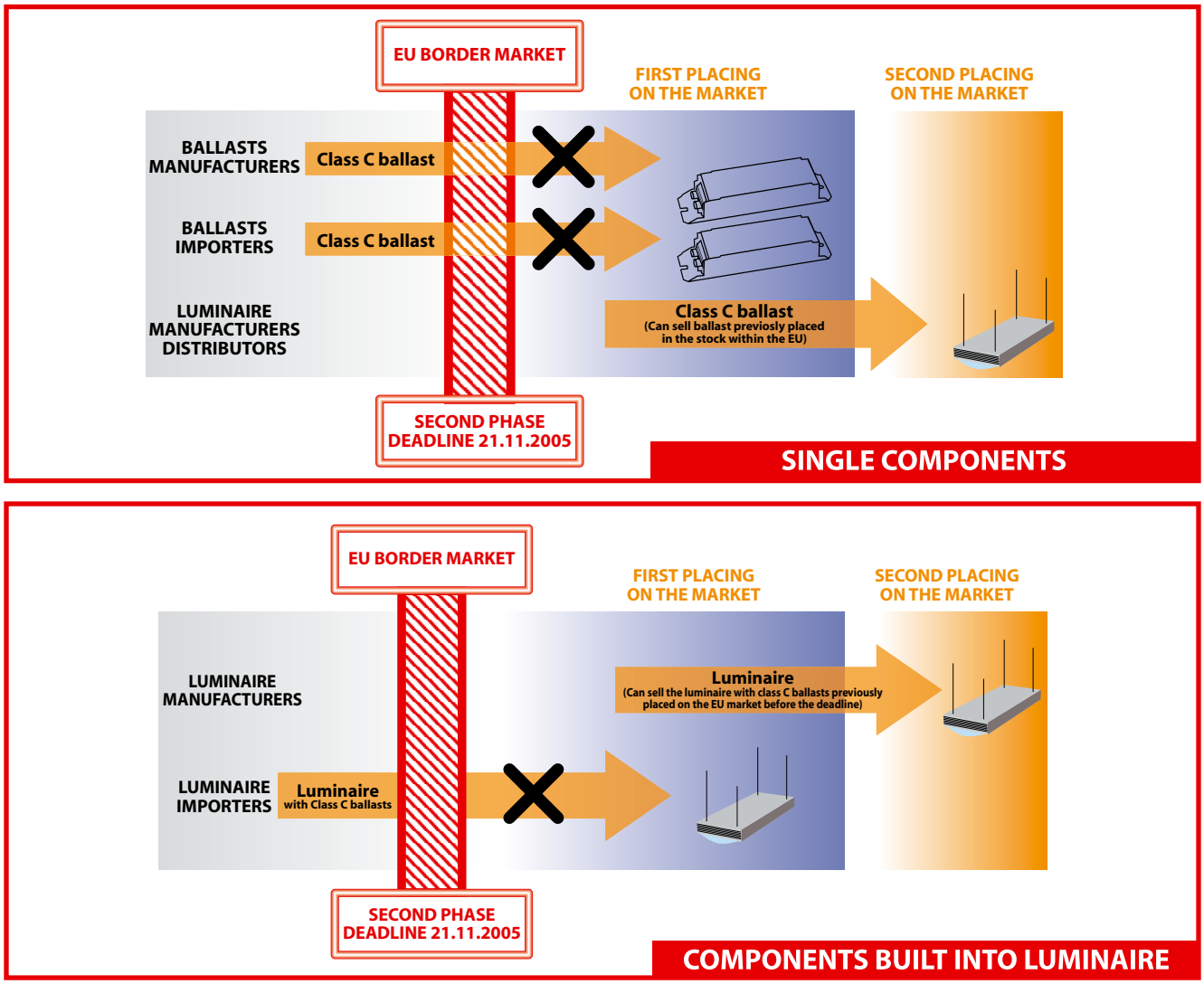
The European Commission's Guide to the implementation of Directives based on the New Approach and the Global Approach (ISBN 92-828-7500-8), published on 07/2000 and applicable to all Directives, included Ballasts Directive 2000/55/EC, explains under item 2.3.1 "Placing on the market" as the initial action of making a product available for the first time on the Community market with a view to distribution or use in the community. Therefore, according to the Directive, a product can only be initially placed on the market once.

Placing on the market is the initial action of making a product available in the European community with the intention that it will also be distributed or used in the European community. Ballasts are normally placed on the market when the producer sells them to a trading company or to a luminaire manufacturer.

The directive is also valid for ballasts that are first placed on the market together with the luminaire: this typically occurs with luminaires imported into the EU that contain ballasts produced within Europe.

The following possibilities exist:

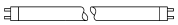
Ways of ballasts sales	Players involved	Actions
Single component	Ballasts manufacturers	Must respect the deadline established
Single component	Ballasts importers	Must respect the deadline established
Single component	Luminaire manufacturers Distributors	Can sell ballasts previously placed in stock within the EU
Component built into the luminaire	Luminaire manufacturers inside EU	Can sell the luminaire with class C or D ballasts unlimited if they were placed on the EU market before the dead line
Component built into the luminaire	Luminaire importers	Can only import the luminaires with compliant ballasts

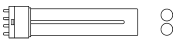


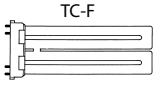
ACTIONS FOR BALLASTS AND LUMINAIRES MANUFACTURER

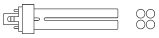
If EEI C ballasts are first placed on the market before 21st November 2005, they can still, be used in luminaires sold in the European market after 21st November 2005.
Ballast manufacturers will clear their stocks of CE marked EEI C ballasts by the 20th of November 2005.
Therefore CELMA advises to "immediately" change over to EEI B or A ballasts for any low volume products; for higher volume types (e.g. 36 and 58W) the change should be done as soon as possible. From the beginning of September, ballasts manufacturers will assume no new orders of C-class ballasts intended for EU market. Orders are expected only for non-CE marked ballasts intended for export outside the European Union. The responsibility for ensuring that non-CE marked class C ballasts are exported, lies with the purchaser of the ballasts.

Annex I - Ballast-lamp circuit falling within EU Directive 2000/55/EC

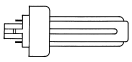
Lamp type	Ilcos code	Lamp power		CLASS							
		50Hz	HF	A1	A2	A3	B1	B2	C	D	
T 	FD-15-E-G13-26/450	15W	13.5W	9W	16W	18W	21W	23W	25W	> 25W	EU 2000/55/EC Category.1
	FD-18-E-G13-26/600	18W	16W	10,5W	19W	21W	24W	26W	28W	> 28W	
	FD-30-E-G13-26/900	30W	24W	16,5W	31W	33W	36W	38W	40W	> 40W	
	FD-36-E-G13-26/1200	36W	32W	19W	36W	38W	41W	43W	45W	> 45W	
	FD-38-E-G13-26/1047	38W	32W	20W	38W	40W	43W	45W	47W	> 47W	
	FD-58-E-G13-26/1500	58W	50W	29,5W	55W	59W	64W	67W	70W	> 70W	
	FD-70-E-G13-26/1800	70W	60W	36W	68W	72W	77W	80W	83W	> 83W	

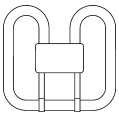
Lamp type	Ilcos code	Lamp power		CLASS							
		50Hz	HF	A1	A2	A3	B1	B2	C	D	
TC-L 	FSD-18-E-2G11	18W	16W	10,5W	19W	21W	24W	26W	28W	> 28W	EU 2000/55/EC Category.2
	FSD-24-E-2G11	24W	22W	13,5W	25W	27W	30W	32W	34W	> 34W	
	FSD-36-E-2G11	36W	32W	19W	36W	38W	41W	43W	45W	> 45W	

Lamp type	Ilcos code	Lamp power		CLASS							
		50Hz	HF	A1	A2	A3	B1	B2	C	D	
TC-F 	FSS-18-E-2G10	18W	16W	10,5W	19W	21W	24W	26W	28W	> 28W	EU 2000/55/EC Category.3
	FSS-24-E-2G10	24W	22W	13,5W	25W	27W	30W	32W	34W	> 34W	
	FSS-36-E-2G10	36W	32W	19W	36W	38W	41W	43W	45W	> 45W	

Lamp type	Ilcos code	Lamp power		CLASS							
		50Hz	HF	A1	A2	A3	B1	B2	C	D	
TC-D TC-DE 	FSQ-10-E-G24q=1 FSQ-10-I-G24d=1	10W	9,5W	6,5W	11W	13W	14W	16W	18W	> 18W	EU 2000/55/EC Category.4
	FSQ-13-E-G24q=1 FSQ-13-I-G24d=1	13W	12,5W	8W	14W	16W	17W	19W	21W	> 21W	
	FSQ-18-E-G24q=2 FSQ-18-I-G24d=2	18W	16,5W	10,5W	19W	21W	24W	26W	28W	> 28W	
	FSQ-26-E-G24q=3 FSQ-26-I-G24d=3	26W	24W	14,5W	27W	29W	32W	34W	36W	> 36W	

Annex I - Ballast-lamp circuit falling within EU Directive 2000/55/EC

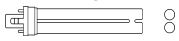
Lamp type	Ilcos code	Lamp power		CLASS							
		50Hz	HF	A1	A2	A3	B1	B2	C	D	
TC-T TC-TE 	FSM-13-I-GX24d=1 FSM-13-E-GX24q=1	13W	12,5W	8W	14W	16W	17W	19W	21W	> 21W	EU 2000/55/EC Category.5
	FSM-18-I-GX24d=2 FSM-18-E-GX24q=2	18W	16,5W	10,5W	19W	21W	24W	26W	28W	> 28W	
	FSM-26-I-GX24d=3 FSM-26-E-GX24q=3	26W	24W	14,5W	27W	29W	32W	34W	36W	> 36W	

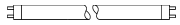
Lamp type	Ilcos code	Lamp power		CLASS							
		50Hz	HF	A1	A2	A3	B1	B2	C	D	
TC-DD TC-DDE 	FSS-10-E-GR10q FSS-10-L/P/H-GR10q	10W	9W	6,5W	11W	13W	14W	16W	18W	> 18W	EU 2000/55/EC Category.6
	FSS-16-I -GR8 FSS-16-E-GR10q FSS-16-L/P/H-GR10q	16W	14W	8,5W	17W	19W	21W	23W	25W	> 25W	
	FSS-21-E-GR10q FSS-21-L/P/H-GR10q	21W	19W	12W	22W	24W	27W	29W	31W	> 31W	
	FSS-28-I-GR8 FSS-28-E-GR10q FSS-28-L/P/L-GR10q	28W	25W	15,5W	29W	31W	34W	36W	38W	> 38W	
	FSS-38-E-GR10q FSS-38-L/P/L-GR10q	38W	34W	20W	38W	40W	43W	45W	47W	> 47W	

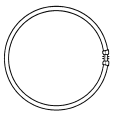
UK MARKET - 240V

Products for markets with 240V mains supply will be supplied with a rated voltage of 240V but with a classification value measured at 230V as harmonised voltage. The 15 member countries of the EU have all signed up to comply with the requirements of the Voltage Harmonization policy which centres its nominal voltage of supply at 230V. The measurement standard EN50294 reflects this as a logical consequence.

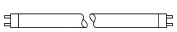
Annex II - Ballast-lamp circuit not mentioned in Annex I of the EU Directive 2000/55/EC

Lamp type	Ilcos code	Lamp power		CLASS						
		50Hz	HF	A1	A2	A3	B1	B2	C	D
TC 	FSD-5-I-G23 FSD-5-E-2G7	5W	4,5W	4W	7W	8W	10W	12W	14W	> 14W
	FSD-7-I-G23 FSD-7-E-2G7	7W	6,5W	5W	9W	10W	12W	14W	16W	> 16W
	FSD-9-I-G23 FSD-9-E-2G7	9W	8W	6W	11W	12W	14W	16W	18W	> 18W
	FSD-11-I-G23 FSD-11-E-2G7	11W	11W	7,5W	14W	15W	16W	18W	20W	> 20W

Lamp type	Ilcos code	Lamp power		CLASS						
		50Hz	HF	A1	A2	A3	B1	B2	C	D
T 	FD-4-E-G5-16/150	4W	3,4W	3,5W	6W	7W	9W	11W	13W	> 13W
	FD-6-E-G5-16/225	6W	5,1W	4W	8W	9W	11W	13W	15W	> 15W
	FD-8-E-G5-16/300	8W	6,7W	5W	11W	12W	13W	15W	17W	> 17W
	FD-13-E-G5-16/525	13W	11,8W	8W	15W	16W	17W	19W	21W	> 21W

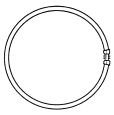
Lamp type	Ilcos code	Lamp power		CLASS						
		50Hz	HF	A1	A2	A3	B1	B2	C	D
T9-C 	FC-22-E-G10q-29	22W	19W	12W	22W	24W	28W	30W	32W	32W
	FC-32-E-G10q-29	32W	30W	18,5W	35W	37W	38W	40W	42W	42W
	FC-40-E-G10q-29	40W	32W	19,5W	37W	39W	46W	48W	50W	50W

Annex III - New ballast-lamp circuit not mentioned in Annex I of the EU Directive 2000/55/EC - Lamps operated only in High Frequency

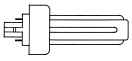
Lamp type	Ilcos code	Lamp power	CLASS						
		HF	A1	A2	A3	B1	B2	C	D
T5-E 	FDH-14-G5-L/P-16/550	14W	9,5W	17W	19W				
	FDH-21-G5-L/P-16/850	21W	13W	24W	26W				
	FDH-24-G5-L/P-16/550	24W	14W	26W	28W				
	FDH-28-G5-L/P-16/1150	28W	17W	32W	34W				
	FDH-35-G5-L/P-16/1450	35W	21W	39W	42W				
	FDH-39-G5-L/P-16/850	39W	23W	43W	46W				
	FDH-49-G5-L/P-16/1450	49W	29W	55W	58W				
	FDH-54-G5-L/P-16/1150	54W	31,5W	60W	63W				
	FDH-80-G5-L/P-16/1150	80W	47,5W	88W	92W				
	FDH-95-GX5-L/P-16/1150	95W	56.5W	105W	113W				
	FDH-120-GX5-L/P-16-1450	120W	71W	133W	142W				

Added JULY 2007

Annex III - New ballast-lamp circuit not mentioned in Annex I of the EU Directive 2000/55/EC - Lamps operated only in High Frequency

Lamp type	Ilcos code	Lamp power HF	CLASS						
			A1	A2	A3	B1	B2	C	D
T5-C 	FCH-22-L/P-2GX13-16	22W	14W	26W	28W				
	FCH-40-L/P-2GX13-16	40W	24W	45W	48W				
	FCH-55-L/P-2GX13-16	55W	32,5W	61W	65W				
	FCH-60-L/P-2GX13-16	60W	35W	66W	70W				

Lamp type	Ilcos code	Lamp power HF	CLASS						
			A1	A2	A3	B1	B2	C	D
TC-LE 	FSDH-40-L/P-2G11	40W	24W	45W	48W				
	FSDH-55-L/P-2G11	55W	32,5W	61W	65W				
	FSDH-80-L/P-2G11	80W	47,5W	88W	92W				

Lamp type	Ilcos code	Lamp power HF	CLASS						
			A1	A2	A3	B1	B2	C	D
TC-TE 	FSMH-32-L/P-2GX24q=3	32W	19,5W	36W	39W				
	FSMH-42-L/P-2GX24q=4	42W	25W	47W	50W				
	FSM6H-57-L/P-2GX24q=5 FSM8H-57-L/P-2GX24q=5	57W	33,5W	63W	67W				
	FSM6H-70-L/P-2GX24q=6 FSM8H-70-L/P-2GX24q=6	70W	41W	77W	82W				
	FSM6H-60-L/P-2G8=1	63W	37,5W	70W	75W				
	FSM6H-85-L/P-2G8=1	87W	51,5W	96W	103W				
	FSM6H-120-L/P-2G8=1 FSM8H-120-L/P-2G8=1	122W	72W	135W	144W				

Lamp type	Ilcos code	Lamp power HF	CLASS						
			A1	A2	A3	B1	B2	C	D
TC-DD 	FSSH-55-L/P-GR10q	55W	32,5W	61W	65W				

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CELMA **ACTIVE COMPONENTS** *Working Group*

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