2014/10/16

RECTIFYING EFFECT

Following the OSM/LUM Decision Sheet N° 0932A/2019, the rectifying effect has to be carried out on all MH and HPS lamps with the exceptions listed in TABLE 1.
TABLE 1 should be used as a guide to help the Laboratories to perform the abnormal condition tests, according to Annex C of EN 60598-1 and EN 62035.

TABLE 1

Exceptions			
Type	**Manufacturer**	**Type of lamp**	**Note**
MH	PHILIPS	HPI 250 PLUS T E40 HPI 250 PLUS BU E40 HPI 250 PLUS BUS E40 HPI 250 PLUS BUP E40 HPI 250 PLUS BUSP E40 HPI 400 PLUS T E40 HPI 400 PLUS BU E40 HPI 400 PLUS BUS E40 HPI 400 PLUS BUP E40 HPI 400 PLUS BUSP E40 HPI/MHN 1000-2000W E40	See Philips declaration
MH	SYLVANIA	HSI-THX 250W E40 HSI-HX 250W/CI E40 HSI-HX 250W/CO E40 HSI-THX 400W E40 HSI-HX 400W/CI E40 HSI-HX 250W/CO E40	See Sylvania declaration
MH	OSRAM	HQI E 250W/N/SI HQI T 250W/N/SI HQI E 400W/N/SI HQI T 400W/N/SI	See Osram declaration
MH	VENTURE LIGHTING-EUROPE LTD	50 – 70 – 100 – 125 – 150 – 200 250 – 350 – 400 – 450 W	See Venture Lighting declaration
MH	GE LIGHTING	ARCSTREAM SE > 150W KOLOARC SPORTLIGHT (inc. CSI/CID) MULTI-VAPOR	See GE Lighting declaration

Exceptions			
Type	**Manufacturer**	**Type of lamp**	**Note**
MH	Philips	MSR 125W 12000W MSD 200W – 1200W	See IEC 61549 data sheet 61549-IEC720
MH	Osram	HMI ; HMP ; HMD ; HTI ; HSR and HSD	See IEC 61549 data sheet 61549-IEC720
MH	SLI	BA ; BS ; BF and BT 125W – 12000W	See IEC 61549 data sheet 61549-IEC720
HPS	PHILIPS	White SON 35-50-100W PG12 (SDW-T)	See Philips declaration. Furthermore this kind of lamps are not in the scope of EN 62035, due to the different pressure
HPS	ALL	1000W	See IEC 62035 Amend. 1
HPS	ALL	110-210-220-350W	See IEC 62035 Amend. 1

Annex N° 1

11/10 '01 10:42 FAX 02087818929 BUSINESS SERVICE 002

PHILIPS

Philips Lighting

The Philips Centre, 420-430 London Road, Croydon, Surrey CR9 3QR
Tel: 020 8665 6655
Fax: 020 8684 0136

Meet the new standard

The luminaire construction Standard – BS EN 60598, has recently been altered with amendment A14. This will effect luminaires using HID lamps.

As from 1st September 2002, it will be necessary to protect all luminaires produced from any possible conditions at the end of lamp life.

Where the lamp manufacturer states that a particular lamp type could cause a problem, i.e. the risk of rectification at the end of lamp life, protection of the luminaire should be provided. This would normally (although not exclusively) mean the use of a thermally switched ballast.

In order to assist in the clarification of which lamp types are specified as requiring protection of the luminaire e.g. usage of a thermally protected ballast. Philips have compiled the following information.

	Protection Req'd
Metal Halide	
35 - 150W CDM (T, TD, R, TP, TC*)	yes
70 - 250W MHN/W-TD	yes
250 - 400W HPI PLUS (T, BU(S)(P))	no
1kW - 2kW HPI MHN	no
High Pressure Mercury	
50 - 700W HPL (standard and Comfort)	no
White SON	
35 - 100W SDW (T and TG*)	no
High Pressure Sodium	
50 - 1kW SON (T, E, I, Comfort)	yes
220 & 350W SON-H	no
Low Pressure Sodium	
18 - 180W SOX (Plus and E)	no

* 70W CDM-TC and 50 - 100W SDW-TG are only suitable for full electronic operation.

Ian Graves 17/09/01

Annex N°2

European Product Marketing Lamps

Noorderlaan 105c
B-2030 Antwerpen
Belgium
Tel. +32 (0)3-610 44 85
Fax +32 (0)3-610 44 58
E-mail : nicole.loysch@sylvania-lighting.com

The writer Sylvania, Industriepark 13, Soldatenplein Z2, 3300 Tienen – Belgium declares to – – – – – – that following lamp types designed to be operated on mercury control gear with soft ingitor :

Code 20394 : HSI – THX 250W
Code 20357 : HSI – HX 250W/Cl
Code 20355 : HSI – HX 250W/Co
Code 20546 : HSI – THX 400W
Code 20353 : HSI – HX 400W/Cl
Code 20350 : HSI – HX 400W/Co

And the lamp types designed to be compatible with mercury control gear having an internal ignitor :

Code 20356 : HSI – HX 250W/Co/I
Code 20351 : HSI – HX 400W/Co/I

Are not restricted to be used on thermal protected ballasts. The lamps are designed as such that they do not require a thermal protected ballast.

Issued in Antwerp,

January 24, 2001

Name with signature

Nicole Loysch
Product Marketing Manager HID lamps

Annex N°3

Amend subclauses F.5 and F.6 as follows:

F.5 Protection against UV radiation

Some types of metal halide lamps emit a high level of UV radiation (greater than 6 mW/klm for a non-reflector lamp or 6 mW/(m^2· klx) for a reflector lamp). In instances where the lamp manufacturer provides a cautionary notice or symbol (see H.1), requiring the use of a protective shield on the luminaire, as well as a UV cautionary notice or symbol (see H.2), a protective shield with adequate UV absorption according to IEC 60598-1 Annex P should be used. (For lamps standardised in IEC 61167 the maximum specific effective radiant UV power is specified on the lamp datasheet. For non-standardised lamps the maximum value should be obtained from the lamp manufacturer).

Some types of metal halide lamps emit a low level of UV radiation (greater than 2 mW/klm but less than 6 mW/klm for a non-reflector lamp, or greater than 2 mW/(m^2· klx) but less than 6 mW/(m^2· klx) for a reflector lamp). In instances where the lamp manufacturer provides a cautionary notice or symbol (see H.1), requiring the use of a protective shield on the luminaire, but does not provide a UV cautionary notice or symbol, the requirements of IEC 60598-1 Annex P do not apply to the protective shield. In this case any glass will reduce the UV radiation to a sufficiently low level.

F.6 Possible condition at end of lamp life

a) For most high-pressure sodium lamps there is a risk that a number of lamps may exhibit a rectifying effect at the end of lamp life. This can lead to overloading of the lamp control gear (ballast, transformer and/or starting device). Adequate protective measures should be taken to ensure that safety is maintained under this condition.

   The following lamp types are not liable to rectification:

   – high pressure sodium lamps with nominal wattage 1 000W;
   – high pressure sodium lamps which are designed as a replacement for high-pressure mercury lamps;
   – other high pressure sodium lamps for which the manufacturer states that the lamp is not liable to rectification.

b) For some types of metal halide lamps there is a risk that a number of lamps may exhibit a rectifying effect at the end of lamp life. This can lead to overloading of the lamp control gear (ballast, transformer and/or starting device). In instances where the lamp manufacturer warns against the possibility of rectification adequate protective measures should be taken to ensure that safety is maintained under this condition.

   The following lamp types are liable to rectification:

   – metal halide lamps identified on the lamp data sheet in IEC 61167 as being liable to end of life rectification;
   – other metal halide lamps for which the lamp manufacturer states that the lamp is liable to end of life rectification.

Annex N°4 – Page 1

OSRAM

Alla ca.
Sig. E. Parma
OSM/LUM Secretary

ST/ Milano 18.11.02

Subject: **Obligation of thermal protection of circuits of luminaires equipped with Metal Halide Lamps or with High Pressure Sodium Lamps**

OSRAM lamps are built meeting all requirements of standards in forceand in particular complying EN 60662 as far as High Pressure Sodium Lamps is concerned and EN 61167 as far as Metal Halide Lamps is concerned.

All High Pressure Sodium Lamps up to 600 W need a thermal protection.

All Metal Halide Lamps (up to 150W) as well as HQI...-250W/D and HQI...-400 W/D need a thermal protection.

HQI...-250W/N/SI and HQI...-400W/N/SI can be used with Control Gears without thermal protection.
Please find enclosed the Technical Information HID4-02, where specifications and characteristics are shown.

Best regards

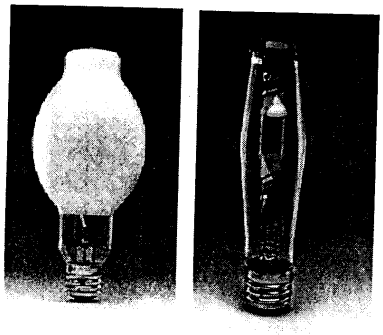
R. Barbieri J. Diano

Annex N°4 – Page 2

Product Information Bulletin

POWERSTAR HQI®

General Purpose Metal Halide Lamps



- 250 and 400W available
- Well-balanced white light, available in 4K correlated color temperature (CCT)
- Multiple choices allow design flexibility
- Universal operating position
- Durable mount structure and lamp construction
- Available in clear and coated
- Good Color Rendering Index
- Lamps operate on high pressure sodium or Mercury vapor control gear

POWERSTAR HQI lamps are an economical choice for a high efficacy, long life, white light source.

OSRAM POWERSTAR HQI lamps are offered in 250 and 400 W products. This family of lamps allows for design flexibility with multiple light source solutions to choose from. Lamps with universal operating position allow for a wider range of applications. In addition POWERSTAR HQI lamps have significantly higher efficacy than mercury vapor or incandescent and better CRI than mercury vapor and high pressure sodium.

Product Availability

Wattage	Bulb Shapes
250	ET18, BT28
400	ET18, BT37

Application Information

Applications

- Indoor and Outdoor
- Industrial and Commercial
- Shopping Malls
- Greenhouses
- Warehouses
- Retail Facilities
- Area Lighting
- Street Lighting

Fixtures

- Lamps are rated for use in enclosed fixtures.
- Thermal protection is not required for lamps listed in this bulletin. (Reference IEC 62035)
- Contact your local fixture agent for available fixtures.

Ballast Information

Contact your OSRAM representative for a list of compatible operating systems.

Application Notes

All lamps are designed for universal burning positions

HID4-02

OSRAM

Annex N°4 – Page 3

Sample Specification
Lamp(s) shall be (a) POWERSTAR HQI lamp(s) and shall be rated for 10,000 or 8,000 hours average rated life and may be operated in any position.

Ordering and Specification Information

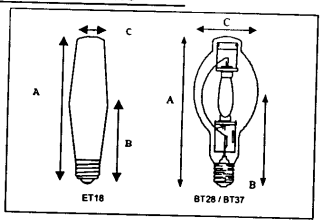
Item Number	Ordering Abbreviation	Bulb	Base	Avg. Rated Life (hrs.)	Initial Lumens	CCT	CRI	Case Qty.
OPERATED ON HQL / MERCURY VAPOR CONTROL GEAR								
64624	HQI-E250W//N/SI,E40/COATED [2]	BT28	E40 Mogul	10,000	21,500	3800K	65	6
64626	HQI-T250W//N/SI,E40/CLEAR [3]	ET18	E40 Mogul	10,000	20,000	4400K	65	10
64343	HQI-E400W//N/SI,E40/COATED [3]	BT37	E40 Mogul	10,000	40,000	3700K	65	6
64377	HQI-T400W//N/SI,E40/CLEAR [3]	ET18	E40 Mogul	10,000	35,000	4100K	65	10
OPERATED ON NAV / HIGH PRESSURE SODIUM CONTROL GEAR								
64624	HQI-E250W//N/SI,E40/COATED [2]	Approval Pending						
64626	HQI-T250W//N/SI,E40/CLEAR [3]	ET18	E40 Mogul	10,000	23,000	4100K		
64343	HQI-E400W//N/SI,E40/COATED [3]	BT37	E40 Mogul	10,000	46,200	3600K		
64377	HQI-T400W//N/SI,E40/CLEAR [3]	ET18	E40 Mogul	10,000	41,800	4000K		

1. Lamps must be operated in enclosed fixtures.
2. Approval for this lamp to be used on NAV / high pressure sodium control gear is pending.
3. Lamps may be operated on HQL / Mercury vapor or NAV / high pressure sodium control gear. (HQL control gear must have a SI-type ignitor)
4. All HQI-T lamp performance values are for horizontal operating positions. Average rated life and initial and mean lumen values will be higher when operated vertically. All HQI-E lamp performance values are for vertical operating positions. Average rated life and initial and mean lumen values will be lower when operated horizontally.

Ordering Guide

HQI	T	250W	/	N	/	SI	/	E40	/	COATED
POWERSTAR HQI Lamp	Bulb Type: T=Tubular E=Ellipsoidal	Wattage: 250 or 400W		Color: N=Natural White		Ballast Type		Base: European E40 Mogul Base		Bulb Finish: Clear or Coated

Dimensions



	(A) MOL	(B) LCL	(C) Bulb Diameter
ET18	248 mm	160 mm	57.2 mm
BT28	216 mm	N/A	88.9 mm
BT37	297 mm	N/A	117.5 mm

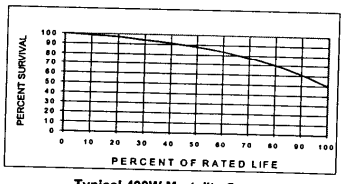
OSRAM GmbH

International Sales Customer Service Center:
18725 N. Union Street
Westfield, IN 46074

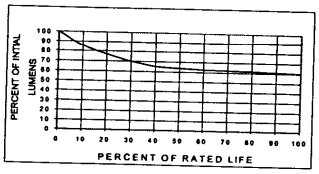
Phone: 1-800-255-5042
Fax: 1-800-255-5043

Technical Information

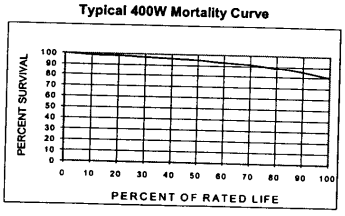
Typical 250W Mortality Curve



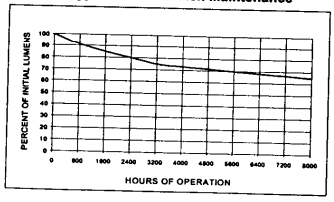
Typical 250W Lumen Maintenance



Typical 400W Mortality Curve



Typical 400W Lumen Maintenance



OSRAM

Annex N°5 – Page 1

VENTURE LIGHTING EUROPE LTD
An Advanced Lighting Technologies Company

Changes to EN 60598 – 1:2000 Luminaire Standard

As from 1st September 2002 all Luminaires manufactured will require protection from any possible end of lamp life conditions, with the following exceptions.

- HPS lamps with rated wattage of 1000W and above
- HPS/MH lamps identified by IEC 62035 as not being liable to end of life rectification
- Other HPS/MH lamps for which the lamp maker has identified no end of life rectification risk.
- HPS lamps designed as direct replacements for Mercury lamps.

Venture Lighting Metal Halide lamps do not require thermally protected ballasts (see our information sheet .....)

However, due diligence for the luminaire manufacturer is recommended to ensure that any replacement lamp used in the future maintains the integrity of the approval. To this point a range of self-adhesive labels suitable for mounting on the fixture is available from Venture Lighting.

Please also consider existing installations where non-thermal cut-out ballasts have been installed. If any of your customers have concerns with Metal Halide installations please make them aware of Venture Lighting Metal Halide lamps – non-rectification. Further copies of our information sheet are available on request.

Venture Lighting Ballasts

- MBF/MH ballasts will continue to be offered as non-thermal and thermally protected.
- HPS/MH ballasts up to and including 400W will be offered as non-thermal and thermally protected.

Annex N°5 – Page 2

VENTURE LIGHTING EUROPE LTD
An Advanced Lighting Technologies Company

Venture Lighting Metal Halide lamps
Lamp rectification and ballast thermal protection

RECOMMENDATION: THERMALLY PROTECTED BALLASTS ARE NOT REQUIRED WHEN INSTALLING VENTURE LIGHTING METAL HALIDE LAMPS - DUE TO NO RISK FROM RECTIFICATION

1. ARC TUBE CHEMISTRY
2. OUTER BULB CONSTRUCTION

Rectification explained
For some discharge lamps, rectification can occur when the lamp fails at the end of its useful life. Rectification leads to higher current and increased power dissipation in ballasts. If the level of rectification is severe, and the time extended, ballasts can over-heat and fail. For this reason lamp manufacturers often recommend thermal protection for particular lamp types.

The occurrence of rectification or very low resistance at end of lamp life, is dependent on the properties of the lamp materials and construction details.
What follows are some examples and the rationale for not recommending thermal protection for ballasts that operate Venture Lighting Metal Halide lamps.

ARC TUBE CHEMISTRY
An important potential source of rectification is wear out of the electrodes. When electrodes wear asymmetrically, one will be a better cathode than the other, however wear does not impair the anode function. The result is rectification. This can range from a small DC component superimposed on the AC waveform to, in the extreme case, conduction in only one direction. In the first case we see visual flicker and in the second, dead ballasts. The lamp dose chemistry, its interactions with the arc tube wall material, and to some extent the type of ballast and ignitor all influence this. Some dose chemicals lead to asymmetric wear and therefore the lamp manufacturer normally recommends thermal protection for the ballast due to the possibility of rectification. Venture Lighting uses a sodium scandium based dose that typically leads to symmetrical wear and therefore no rectification issues.

OUTER BULB CONSTRUCTION
Another important potential source of rectification is within the outer bulb and depends on the fill gas (if any) and the details of the parts that mechanically support the arc tube, make electrical connections, and the stem that hermetically seals the electrical in-leads.
There are 3 different construction methods:

1. Evacuated outer bulbs provide many mechanisms for rectification and or effective short circuits. For example when an arc tube fails and the fill gas and dose constituents leak into the outer bulb, the ballast will usually initiate and maintain an arc in these materials between support components within the outer bulb. If the arc is between different materials, rectification is likely. If the current is high, considerable damage occurs within the outer bulb. In most cases arc gap grows until the ballast can either no longer sustain the arc, or the bulb is damaged and air enters the lamp. It is much harder to sustain an arc in air at one atmosphere than in the arc fill gas and dose materials and arcing usually stops. Sometimes the arcing damage ends in an electrical short across the lamp terminals.

2. With vacuum outer bulbs, sometimes and usually are the operative words. With the voltage available from most HID ballast's and practical limits on spacing between the electrical leads within the outer bulb, arcing is a virtual certainty as air or arc tube fill gas enters the outer bulb. (An exception is some low wattage lamps that have a very small arc tube volume and a relatively large outer bulb.) The resulting pressure from an arc tube failure is too low for an arc and a glow discharge starts. This glow also does great damage to internal structure of the lamp albeit over a period of days or weeks. Eventually some lamps arc over.

Vacuum outer bulbs are used for *high pressure sodium* lamps and to date all *ceramic metal halide* lamps.

3. Gas filled outer bulbs prevent arcing by the pressure being increased. High pressure mercury lamps are gas filled as are all Venture lighting metal halide lamps. Venture Lighting use a nitrogen gas fill at a sufficient pressure to prevent arcing within the outer bulb during normal operation. A leak results in a pressure increase rather than an arc within the outer bulb.

To a much lesser extent other construction details such as base materials, wire terminations, lead wire size, etc. offer potential for rectification or shorting of the lamp terminals . Venture Lighting design all these potential hazard areas out of the products.

RECOMMENDATION: THERMALLY PROTECTED BALLASTS ARE NOT REQUIRED WHEN INSTALLING VENTURE LIGHTING METAL HALIDE LAMPS – DUE TO NO RISK FROM RECTIFICATION

Venture Lighting International, 32000 Aurora Road, Solon, Ohio 33419. USA +44 (0)1332 875444

Annex N°5 – Page 3

LAMPS DESCRIPTION

HIE 50W/U/4K
HIE 50W/C/U/4K
HIE 70W/U/4K
HIE 70W/C/U/4K
HIE 70W/U/3K
HIE 70W/C/U/3K
HIPE 70W/U/4K
HIPE 70W/C/U/4K
HIPE 70W/U/UVS/3K
HIPE 70W/C/U/UVS/3K
HIPE 70W/C/V/UVS/27K
HIE 100W/U/4K
HIE 100W/C/U/4K
HIE 100W/U/3K
HIE 100W/C/U/3K
HIPE 100W/U/4K
HIPE 100W/C/U/4K
HIPE 100W/U/UVS/3K
HIPE 100W/C/U/UVS/3K
HIPE 100W/C/V/UVS/27K
HIE 125W/U/4K
HIE 125W/C/U/4K
HIE 150W/U/4K
HIE 150W/C/U/4K
HIE 150W/C/U/3K
HIPE 150W/U/4K
HIPE 150W/C/U/4K
HIPE 150W/U/UVS/3K
HIPE 150W/C/U/UVS/3K
HIPE 150W/C/V/UVS/27K
HIE 200W/U/PS/4K
HIE 200W/C/U/PS/4K
HIPE 200W/V/UVS/PS/4K
HIPE 200W/C/V/PS/4K
HIE 250W/HBU/PS/4K
HIE 250W/C/HBU/PS/4K
HIPE 250W/BU/PS/4K
HIPE 250W/C/BU/PS/4K
HIE 350W/V/PS/4K
HIE 350W/C/V/PS/4K
HIE 350W/H75/PS/4K
HIPE 350W/V/UVS/PS/4K
HIPE 350W/C/V/UVS/PS/4K
HIE 400W/HBU/PS/4K
HIE 400W/C/HBU/PS/4K
HIPE 400W/BU/PS/4K
HIPE 400W/C/BU/PS/4K
HIE 450W/BU/PS/4K
HIE 450W/C/BU/PS/4K
HIPE 450W/BU/UVS/PS/4K
HIPE 450W/C/BU/UVS/PS/4K

Annex N°6

g GE Lighting Europe

High Intensity Discharge Lamps (HID)

HID Luminaire overload protection according to EN 60598

GE Lamp Type and Family Name		Control gear/Luminaire protection required	Notes Applicable
Metal Halide			
CMH ≤150W		YES	1, 2 & 4
CMH >150W		YES	1 & 2
Arcstream G12 & DE		YES	1 & 2
Arcstream SE >150W		NO	2
KolorArc		NO	2
Sportlight (inc. CSI /CID)		NO	2
Multi-Vapor		NO	2
High Pressure Mercury			
Standard + Deluxe		NO	-
High Pressure Sodium			
Standard		YES	2 & 3
High Output		YES	2 & 3
Low Pressure Sodium			
SOX + SOX-Plus + SOX-E		NO	-

Notes:

1 Refer to IEC 61167 individual lamp data sheet requirements

2 Refer to IEC 62035 clause F.6 relating to lamp end-of-life rectification and maintaining safety (this superceeds the information in IEC60662 clause 9.4 and IEC61167 clause 1.8)

3 New luminaires are required to incorporate circuit component overload protection according to EN 60598-1:2000 + A11:2000 from 1st September 2002. Overload protection is not required for 1000W lamps

4 Risk for 70W and 150W Elliptical/Tubular (E27/E40) is under consideration

u.c. Under consideration

HID Product Manager