Exemption Request Form

Date of submission: 15 December 2014

1. Name and contact details

1) Name and contact details of applicant:

Company:	VskE	Tel.:	+49 (0)931 46583148
Name:	Klemens Ehrlitzer	E-Mail:	info@vske.de
Function:	Managing Director	Address:	D-97204 Höchberg Luzer Straße 6

2) Name and contact details of responsible person for this application (if different from above):

Company:	_____	Tel.:	_____
Name:	_____	E-Mail:	_____
Function:	_____	Address:	_____

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2. Reason for application:

Please indicate where relevant:

- ☐ Request for new exemption in:
- ☐ Request for amendment of existing exemption in
- ☒ Request for extension of existing exemption in
- ☐ Request for deletion of existing exemption in:
- ☐ Provision of information referring to an existing specific exemption in:
  - ☒ Annex III ☐ Annex IV

No. of exemption in Annex III or IV where applicable: 4f

Proposed or existing wording: mercury in ultraviolet discharge lamps for special purposes

Duration where applicable: 21 July 2016

- ☐ Other: _____

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3. Summary of the exemption request / ~~revocation request~~

The request focuses on UV lamps which are defined as “high intensity discharge lamps” (HID) according to commission regulation EC No. 245/2009 (ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps), Article 2, Section 9. Several companies which are developing, manufacturing and selling UV irradiation devices equipped with such UV HID lamps are members in the association VskE (Verband der Hersteller selbstklebender Etiketten und Schmalbahnconverter e.V.; www.vske.de). The UV HID lamps are used in narrow web production processes (including but not limited to printing of labels and most types of packaging for consumer goods, food, etc., producing of tags and other specialty products) to cure inks, varnishes, adhesives, release silicone, technical coatings etc. All these applications are viable for the whole label industry worldwide. In Germany, Austria and Switzerland many narrow web converters are members of the association VskE. At the end of year 2014 a total of 106 narrow web converters are organized within VskE. The number of narrow web converters using UV HID lamps throughout Europe are estimated at more than 3000 companies with ca. 80.000 employees and a market volume of more than € 10 billion (according to the international association FINAT; www.finat.com).

According to directive 2011/65/EU (restriction of the use of certain hazardous substances in electrical and electronic equipment) UV HID lamps belong to the category “lighting equipment”, Annex I, Section 5. According to Annex III of this directive they are to be exempted from Article 4, Section 1, since they fall under Annex III, Section 4(f): “mercury in other discharge lamps for special purposes not specifically mentioned in this Annex”.

UV HID lamps as used in the above mentioned markets are essential components for UV irradiation systems. Besides the use in the narrow web industry they also enable industrial/technical processes like UV polymerization for applications in several other industries, e.g. woodworking industry (flooring and furniture coating), fibre optics, scratch resistant coatings for the automotive industry as well as displays and housings, disinfection of water, air and surfaces etc.

For nearly all these applications there is at present no substitute available that could replace the state of the art versatility of UV HID lamps based on mercury vapour arc discharge. These types of UV HID lamps cannot be built with comparable performance, life-time, versatility and cost effectiveness without the essential ingredient of mercury. Especially because UV HID lamps supply UV light in the whole spectral range of UVC through UVA. The UV reactive chemistry is adapted to this output. The fact that UV HID lamps are indispensable in the foreseeable future is the main reason for the extension of the requested exemption.

4. Technical description of the exemption request / ~~revocation request~~

(A) Description of the concerned application:

1. To which EEE is the exemption request/information relevant?

   Name of applications or products:
   UV HID lamps installed in UV curing equipment

a. List of relevant categories: (mark more than one where applicable)

☐ 1	☐ 7
☐ 2	☐ 8
☐ 3	☐ 9
☐ 4	☐ 10
☒ 5	☐ 11
☐ 6	

b. Please specify if application is in use in other categories to which the exemption request does not refer: not known

c. Please specify for equipment of category 8 and 9:
   The requested exemption will be applied in
   ☐ monitoring and control instruments in industry
   ☐ in-vitro diagnostics
   ☐ other medical devices or other monitoring and control instruments than those in industry

2. Which of the six substances is in use in the application/product?
   (Indicate more than one where applicable)
   ☐ Pb ☐ Cd ☒ Hg ☐ Cr-VI ☐ PBB ☐ PBDE

3. Function of the substance: essential ingredient; product does not work without this constituent; specific UV emission is an intrinsic physical property of the mercury atom

4. Content of substance in homogeneous material (%weight): 100% (pure mercury, enclosed in hermetically sealed quartz tubes)

5. Amount of substance entering the EU market annually through application for which the exemption is requested: 75 kg
   Please supply information and calculations to support stated figure.
   According to Yole Report 2012 (page 40) the estimated market of mercury based lamps for UV curing applications is 440.000 pieces worldwide. The

amount of mercury used in UV HID lamps is depending on arc length and power rating of the lamp. Under assumption of an average mercury content of 500 mg per lamp the global usage of mercury for UV curing purposes is approximately 220 kg worldwide.
The international association RadTech estimates market shares in the worldwide UV curing market on basis of the production of chemical raw materials. According to them the share of the European market is roughly 30% of the global market. As a consequence the estimated amount of mercury annually entering the EU market is as mentioned approx. 75 kg (for UV curing applications).

Name of material/component: Mercury (Hg)

6. Environmental Assessment: _____
   LCA: ☐ Yes
   ☒ No

(B) In which material and/or component is the RoHS-regulated substance used, for which you request the exemption or its revocation? What is the function of this material or component?

Mercury is the essential ingredient of the UV HID lamp assembly (hermetically sealed quartz tube). The lamp is the emission source for the UV radiation. Relevant for the above mentioned applications is the spectrum between 200 and 380 nm (see Annex I).

(C) What are the particular characteristics and functions of the RoHS-regulated substance that require its use in this material or component?

Mercury provides the necessary vapour pressure for the arc discharge and delivers the needed spectral output required by UV reactive chemistry. UV curing is triggered by so called photo initiators (PI). These PI react to the UV emission created by mercury, especially in UVC and UVB (see Annex II). UV activated PI enable the crosslinking of the chemical compounds.

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5. Information on Possible preparation for reuse or recycling of waste from EEE and on provisions for appropriate treatment of waste

1) Please indicate if a closed loop system for EEE waste of application exists and provide information of its characteristics (method of collection to ensure closed loop, method of treatment, etc.)

Users of UV HID lamps are informed to either return the lamps to the seller or hand them over to certified recycling organizations. Since the majority of the lamp

users are ISO 14001 certified they are obliged to fulfill the environmental waste management requirements. The recycling organizations receiving the returned lamps declare the legal conformity of the recycling process (see example of certificate in Annex III). According to www.lamprecycle.org the recycling rate of returned mercury is 99,98%.

2) Please indicate where relevant:

☒ Article is collected and sent without dismantling for recycling
☐ Article is collected and completely refurbished for reuse
☐ Article is collected and dismantled:
  ☐ The following parts are refurbished for use as spare parts: _____
  ☐ The following parts are subsequently recycled:

☐ Article cannot be recycled and is therefore:
  ☐ Sent for energy return
  ☐ Landfilled

3) Please provide information concerning the amount (weight) of RoHS substance present in EEE waste accumulates per annum:

☐ In articles which are refurbished _____
☒ In articles which are recycled maximum see 4.(A)5.
☐ In articles which are sent for energy return _____
☐ In articles which are landfilled _____

6. Analysis of possible alternative substances

(A) Please provide information if possible alternative applications or alternatives for use of RoHS substances in application exist. Please elaborate analysis on a life-cycle basis, including where available information about independent research, peer-review studies development activities undertaken

Currently there is no alternative material for mercury available.

In technical terms there is a development undergoing to enable curing via LED technology.

(B) Please provide information and data to establish reliability of possible substitutes of application and of RoHS materials in application

Due to the monochromatic output of LED technology in the range of UVA and visible light (see Annex IV) the alternative is limited to special applications (such

as adhesive curing or pre-curing of inkjet inks). In addition the availability of appropriate LED photo initiators (PI) is reduced to a small number.

Most PI react in UVB and UVC range. These features are needed e.g. to fulfil the requirements of European legislation in concern of food packaging and therefore low migration. UVC light will also help to form high scratch and solvent resistant surfaces.

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7. Proposed actions to develop possible substitutes

(A) Please provide information if actions have been taken to develop further possible alternatives for the application or alternatives for RoHS substances in the application.

Development on LED technology is an ongoing process. Limitations are described under 6(B).

(B) Please elaborate what stages are necessary for establishment of possible substitute and respective timeframe needed for completion of such stages.

1. Continued development of semiconductor manufacturers to meet equivalent power levels/spectral output (5 years and ongoing). Short wavelength LEDs should be commercially available and output must be substantially increased (factor 100 or more).
2. Further development of LED curable substances such as PI, binders, additives etc. (10 years and more)

8. Justification according to Article 5(1)(a):

(A) Links to REACH: (substance + substitute)

1) Do any of the following provisions apply to the application described under (A) and (C)?

- ☐ Authorisation
  - ☐ SVHC
  - ☐ Candidate list
  - ☐ Proposal inclusion Annex XIV
  - ☐ Annex XIV
- ☐ Restriction
  - ☐ Annex XVII
  - ☐ Registry of intentions
- ☐ Registration

2) Provide REACH-relevant information received through the supply chain.
Name of document:

(B) Elimination/substitution:

1. Can the substance named under 4.(A)1 be eliminated?
   ☐ Yes. Consequences? _____
   ☒ No.
   Justification: see 4.(B) and 6.(A).

2. Can the substance named under 4.(A)1 be substituted?
   ☐ Yes.
      ☐ Design changes:
      ☐ Other materials:
      ☐ Other substance:
   ☒ No.
   Justification: see 4.(B) and 6.(A).

3. Give details on the reliability of substitutes (technical data + information):

   not available

4. Describe environmental assessment of substance from 4.(A)1 and possible substitutes with regard to
   1) Environmental impacts:
      See material safety data sheet for mercury under
      http://www.epa.gov/mercury/eco.htm
   2) Health impacts:
      See material safety data sheet for mercury under
      http://www.epa.gov/mercury/effects.htm
   3) Consumer safety impacts:
      None, if products are used according to specifications.

⇨ Do impacts of substitution outweigh benefits thereof?

There is no chemical substitution for mercury available.

Please provide third-party verified assessment on this:

(C) Availability of substitutes:

a) Describe supply sources for substitutes:
There is no chemical substitution for mercury available.
There are various producers of LED arrays which assemble UV curing arrays based on LED chips, e.g. GEW, Heraues Noblelight, Hönle AG, Integration Technology, IST METZ GmbH etc. (listings are without claim of completeness; see also Annex V). But nevertheless in most applications LED technology cannot replace mercury vapour lamps.

b) Have you encountered problems with the availability? Describe:

LED chips with reasonable optical outputs at wavelengths down to 365 nm are available. But for most of the applications also radiation at lower wavelength is needed (more precisely: the broad UV spectrum of a medium pressure mercury vapour lamp is needed). At lower wavelengths there are no LED chips with good optical yields and reasonable prices available.

c) Do you consider the price of the substitute to be a problem for the availability?
☒ Yes ☐ No

d) What conditions need to be fulfilled to ensure the availability?

see 7(B)

(D) Socio-economic impact of substitution:

⇨ What kind of economic effects do you consider related to substitution?

☒ Increase in direct production costs (More expensive formulations)

☒ Increase in fixed costs (Investment costs for LED curing units)

☒ Increase in overhead (Implementation and development of the process)

☒ Possible social impacts within the EU (Possible shut-down of print plants)

☒ Possible social impacts external to the EU (Displacement of European production sites)

☐ Other:

⇨ Provide sufficient evidence (third-party verified) to support your statement:

9. Other relevant information

Please provide additional relevant information to further establish the necessity of your request:

UV HID lamps based on mercury vapour arc discharge are undoubtedly the workhorse of current UV polymerization and UV disinfection.

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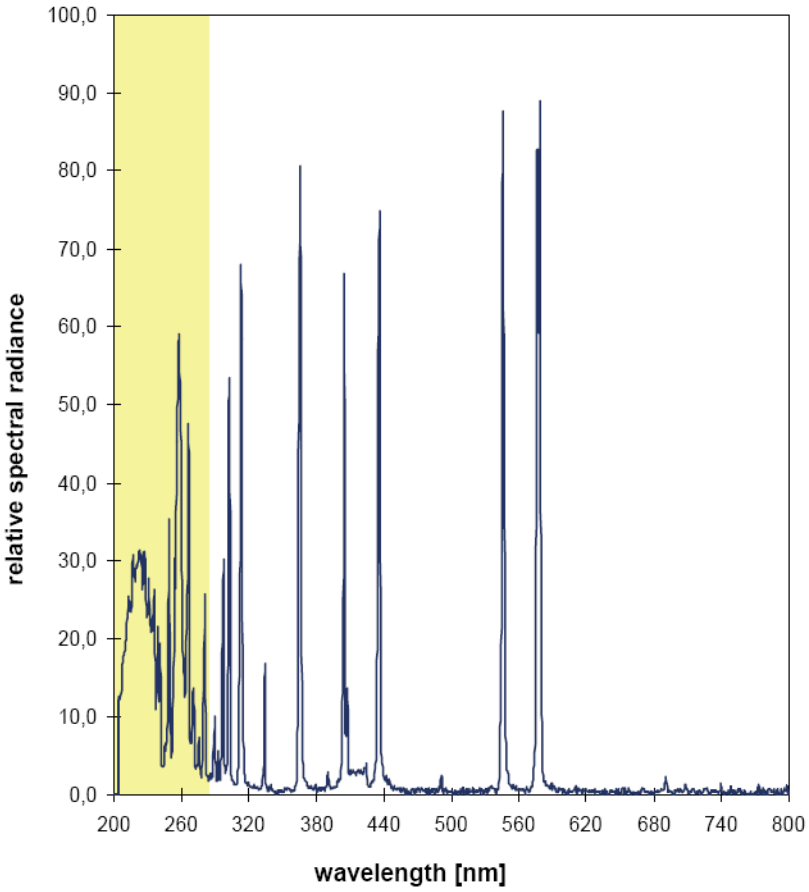
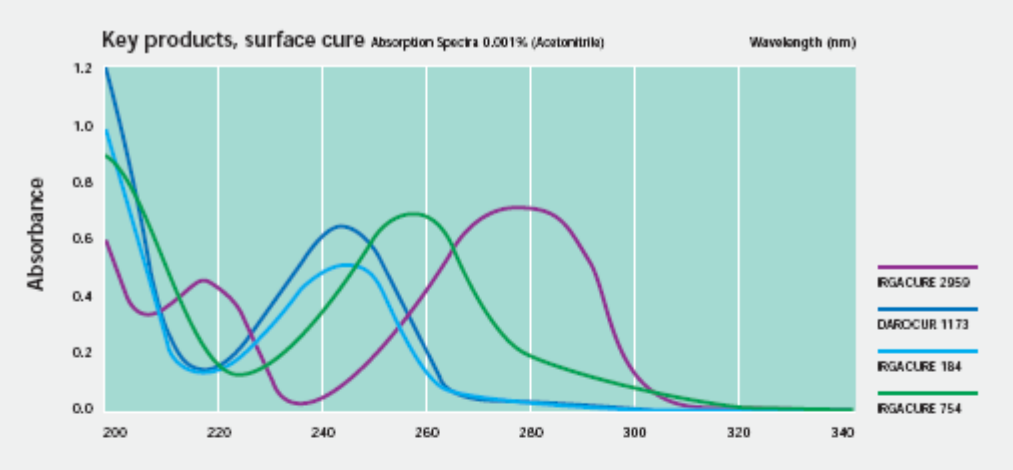
10. Information that should be regarded as proprietary

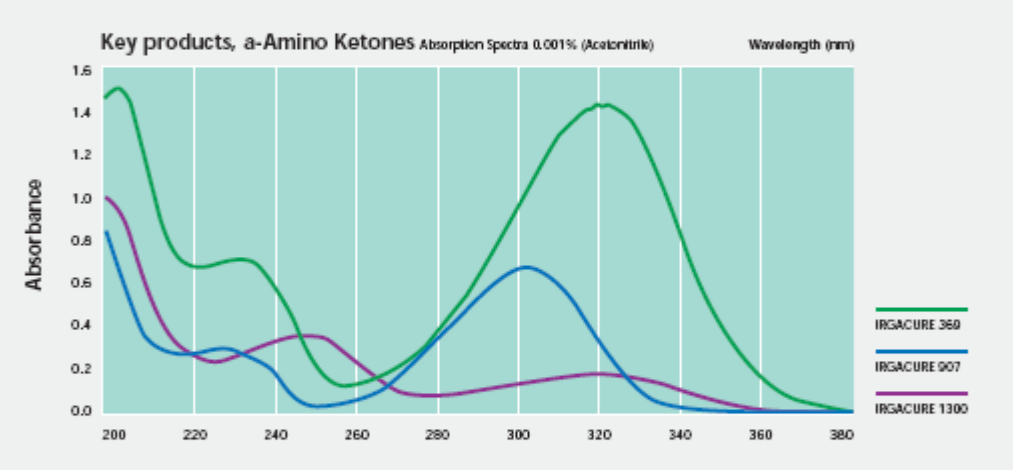
Please state clearly whether any of the above information should be regarded to as proprietary information. If so, please provide verifiable justification:

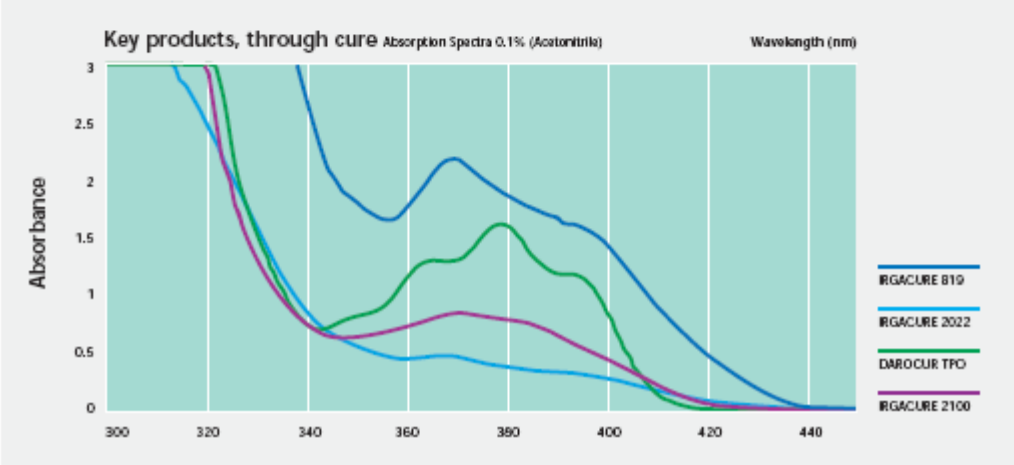
ANNEX I: MERCURY SPECTRUM



ANNEX II: ABSORBANCE OF PHOTOINITIATORS







ANNEX III: EXAMPLE OF RECYCLING CERTIFICATE

Form HWCN01v111

The Hazardous Waste Regulations 2005: Consignment Note

WHITE - CUSTOMER; PINK - CONSIGNEE; YELLOW - CARRIERS

ENVIRONMENTAL

PART A Notification details

1 Consignment note code: [illegible]

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):
GEW (EC) Limited, Crompton Way, Crawley, West Sussex, RH10 9QR, 01737 824500, purchasing@gewuv.com, 01737 823822

3 Premises code (where applicable): N / A

4 The waste will be taken to (name, address and postcode):
J&G Environmental Ltd, Unit 6, Holland Way, Blandford, Dorset, DT11 7TA

5 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):
AS A2

PART B Description of the waste — If continuation sheet used, tick here

1 The process giving rise to the waste(s) was: Manufacturing

2 SIC for the process giving rise to the waste: 22.22/

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
Lamps/Tubes	200121	50	MERCURY SALT 0.1%		Solid	H6	[illegible]
Lamp Bulbs	200121	100	MERCURY SALT 0.1%		Solid	H6	[illegible]

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
200121					
200121					

PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here.)

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are: [illegible]

1 Carrier name: [signature]

On behalf of (name, address, postcode, telephone, e-mail, facsimile):
J&G Environmental Ltd, Unit 6, Holland Way, Blandford, Dorset, DT11 7TA

2 Carrier registration no./reason for exemption:
CB/JP3415DC

3 Vehicle registration no. (or mode of transport, if not road):
PO14 FMM

Signature [signature]

Date 23/10/2014 Time 1030

PART D Consignor's certificate

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):
As A2

Signature [signature]

Date 23/10/2014 Time 1030

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
200121			
200121			

1 I received this waste at the address given in A4 on: Date Time

2 Vehicle registration no. (or mode of transport if not road):
PO14 FMM

3 Where waste is rejected please provide details:

I certify that waste permit/exempt waste operation number:
RP3931SE
authorises the management of the waste described in B at the address given in A4.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Name:

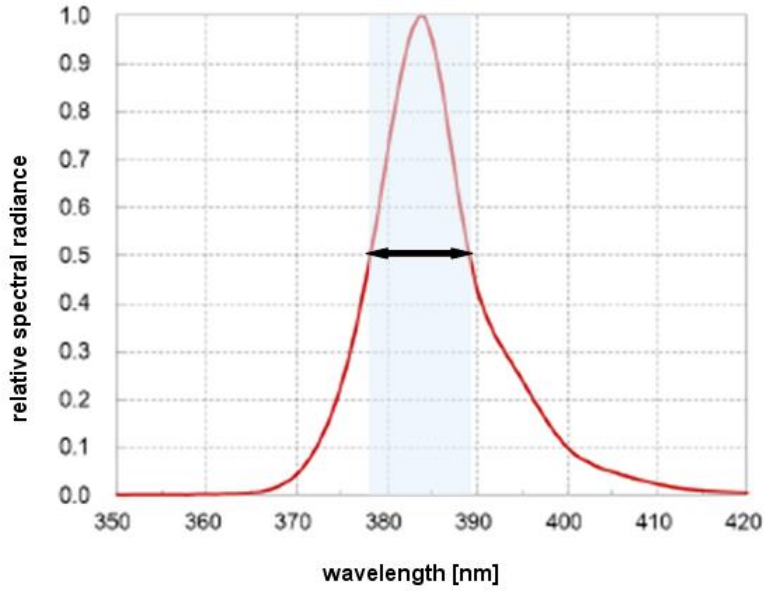
On behalf of (name, address, postcode, telephone, e-mail, facsimile):
J&G Environmental Ltd, Unit 6, Holland Way, Blandford, Dorset, DT11 7TA

Signature [signature]

Date Time

Snows Business Forms Limited 0845 63 44 123 Re-Order Ref TBA Rev. 09/11

ANNEX IV: TYPICAL LED SPECTRUM



ANNEX V

To fill out this request form for extension of the exemption VskE was supported by the below listed companies. VskE is submitting the commonly elaborated request in place of these companies which all are direct or indirect members of the association.

- Dr. Hönle AG
  Lochhamer Schlag 1
  D-82166 Gräfelfing
  Tel.: +49 (0) 89 856 08 - 0
  Fax: +49 (0) 89 856 08 – 148

- GEW (EC) Ltd**.**
  Crompton Way,
  CRAWLEY, RH10 9QR, Great Britain
  Tel.: +44 (0) 1737 824500
  Fax +44 (0) 1737 823822

- IST METZ GmbH
  Lauterstr. 18
  D-72622 Nürtingen
  Tel.: +49 (0) 7022 6002-0
  Fax: +49 (0) 7022 6002-53

- PrintConcept UV-Systeme GmbH (member of Hönle Group)
  Philipp-Jakob-Manz-Str. 18
  D-72664 Kohlberg
  Tel.: +49 (0) 7025 91277-0
  Fax: +49 (0) 7025 -91277-660

- Uviterno AG
  Musterplatzstr. 3
  CH-9442 Berneck
  Tel.: +41 (0) 71 747 4151
  Fax: +41 (0) 71 747 4161