Heraeus

Noblelight

High Quality Photoionisation Detector Lamps (PID)

For Gas Detection and Gas Chromatography

PID Lamps
For a safer work environment

Demand for hazardous material (hazmat) monitoring is ever increasing, as we become more aware of the dangers of chemicals used in industrial processes and the need for personal and environmental protection. One set of materials – Volatile Organic Compounds (VOCs) – can be detected with very high sensitivity using Photoionisation Detection (PID), and the need for monitoring VOCs is driving demand for Heraeus' PID lamps.

Multi-Gas monitors are capable of detecting VOC's with a PID sensor. Picture courtesy of Crowcon Detection Instruments Ltd

Photoionisation is the term for the absorption of high energy photons by a molecule which results in ionisation of that molecule. The current created by ionisation is proportional to the concentration of the molecule, so this provides a simple method for quantitative analysis of a variety of compounds. The technique is non destructive so can be used in conjunction with other detectors for extending the analysis. PID lamps are available in both DC operated and RF operated versions. In general DC operation is the preferred option for fixed-installation instruments such as Gas Chromatographs, where continuous monitoring is required and high voltage power supplies can be supported. For hand-held detectors, RF versions provide the solution to demands for smaller size and low-power drive circuitry. Heraeus manufactures a wide range of PID lamps to standard design in both RF and DC versions. Customers can also benefit from our design expertise, as the Heraeus Technical Team can work with OEMs to design and build product to their specific dimensional and performance requirements.

Your advantages with Heraeus PID lamps

- DC or RF driven PID lamps for hand-held and fixed installations
- Customized lamp designs and dimensions to fit your specific application
- Different gas fills and window materials with photon energies from 8.4 – 11.8 eV for more selectivity in gas detection
- High purity window material for better transmission and higher intensity
- Proprietary getter technology and high purity gas fill for longer lamp life
- Reliable processes and highest quality lamps due to automated production

VOC Gas Detection

Photoionisation detector lamps (PID) are most commonly used in VOC detection, gas chromatography (GC), trace gas monitoring and sample ionisation for mass spectrometry. They are available with a variety of gas fills including argon, krypton and xenon gas.

VOC Gas Detection
Standard products and custom designs

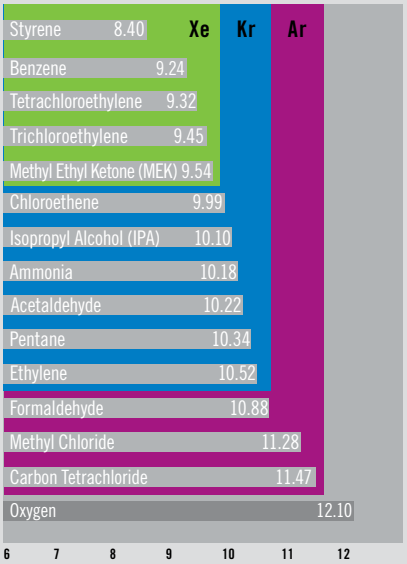
Recently PID monitoring is increasingly used often combined with other techniques, to provide safe monitoring of hazardous materials for emergency response teams, industrial maintenance, public safety and military protection.

Applications

- VOC gas detection
- Gas Chromatography (GC)
- Mass Spectrometry (MS)
- Field monitoring of air and soil
- Emergency first response
- Jar headspace screening
- Leak detection
- Personnel safety in confined spaces

Heraeus has extensively tested and selected materials to establish a quality standard in PID manufacture. Heraeus' proprietary manufacturing processes ensure state-of-art performance and consistency over the lifetime of the lamps. A unique sealing technique enables the use of thinner MgF2 windows, providing improved transmission and life. High purity of the gas spectrum is achieved throughout the life of the lamp by the use of an internal getter in the RF version. A programme of Continuous Improvement Processes ensures that performance and capacity are increased, thereby maintaining Heraeus' position as the leader in this market.

Detectable substances with PID



PID lamp spectra – energy table in eV

Gas	Energy/ eV	λ/nm	Window material
Xenon	9.6/8.4	129/147	MgF_2
Krypton	10.0	124	$MgF_2 + CaF_2$
Krypton	10.6/10.0	117/124	MgF_2
Argon	11.8/11.6	105/107	LiF

Product range RF PID lamps

Lamp Type	PXR 096 ③	PKR 100-6-14 ①	PKR 100 ③	PKR 106-6-14 ①	PKR 106-6 ①	PKR 106 ③	PAR 118 ③
Photon Energy (eV)	9.6	10.0	10.0	10.6	10.6	10.6	11.8
Gas Fill	Xenon	Krypton	Krypton	Krypton	Krypton	Krypton	Argon
Diameter (mm)	12.7	6	12.7	6	6	12.7	12.7
Length (mm)	53	14	53	14	30	53	53
Operating current (mA)	150	26	150	26	26	150	150
Typical RF power input (W)	0.5	< 0.5	0.5	< 0.5	< 0.5	0.5	< 0.5
Ignition time (s)	0.1	0.1 - 1.0	0.1	0.1 - 1.0	0.1 - 1.0	0.1	0.1

PID RF excited

① AUTO manual 6 × 14
② AUTO manual 6 × 30
③ manual 12 × 53

Product range DC PID lamps

Lamp Type	PXS 096 ④	PKS 106 ④	PAS 118 ④
Photon Energy (eV)	9.6	10.6	11.8
Gas Fill	Xenon	Krypton	Argon
Diameter (mm)	19.6	19.6	19.6
Length (mm)	53.5	53.5	53.5
Ignition voltage (V)	1,500	1,500	1,500
Operating current (mA)	< 2	< 2	< 0.1
Typical operating current (mA)	0.5	0.5	< 0.1
Ignition time (s)	< 2	< 2	< 2

PID DC excited

④ 19.6 × 53.5

Customers profit from the new automated production of PID lamps

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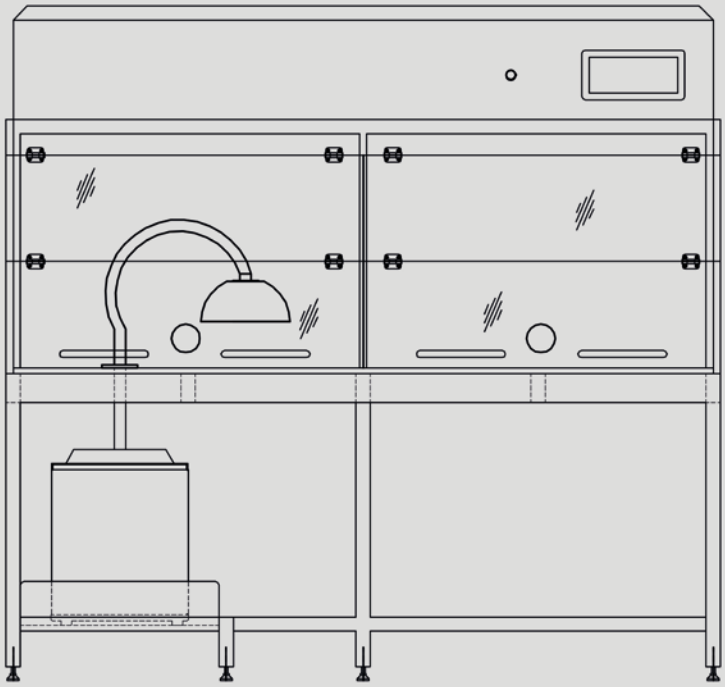
Heraeus Noblelight is the first PID manufacturer to embark on automated production of PID lamps to introduce more reliable processes for highest quality lamps.

AUTO-PID is a new milestone in the production of PID lamps. Large parts of the complex PID manufacturing process, which up to now were done manually, can now be done fully automated on the new system.

Clear advantages for our customers: Process control on the automated system is much improved enabling production of lamps with much more consistent quality. Better control over lamp dimensions and shape can be achieved, which are important to customers when fitting lamps to their sensors.

Furthermore it is possible to influence the process systematically. The intensity of the lamps for example can be influenced by varying the process parameters and can now be adjusted to meet customers' specific requirements.

The intensity of a batch of lamps has always shown a certain distribution. With automated production the intensity of any batch can be limited to a specific region of this distribution.



Europe, Middle East, Africa, Rest of World*
Heraeus Noblelight GmbH
Heraeusstraße 12-14
63450 Hanau, Germany
Phone +49 (6181) 35 3177
hng-analyticallamps@heraeus.com
www.heraeus-noblelight.com/opticalanalysis

America*
Heraeus Noblelight America LLC
910 Clopper Road
Gaithersburg, MD 20878, USA
Phone +1 (301) 527 2660
info.hna@heraeus.com
www.heraeus-noblelight.com/opticalanalysis

Asia-Pacific, Oceania*
Heraeus Noblelight (Shenyang) Ltd.
Shanghai Branch
2F, No. 399 Guangzhong Road,
Minhang District
201108 Shanghai, PR China
Phone +86 (400) 080 2255
info.hns@heraeus.com
www.heraeus-noblelight.cn

***For local contacts please also visit our website:**
https://www.heraeus.com/en/hng/contact_heraeus_noblelight/customer_contacts_1/regional_contacts.html