No UV Radiation in Magnetic Powder and Penetrant Inspection

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Abstract. A new light source for the magnetic powder and penetrant testing inspection increases the contrast of material defects while avoiding UV exposure to NDT personnel. Newly developed LED illumination and filters stimulate the fluorescence, leading to better inspection results and better protection to the NDT personnel. The method and industrial implementations will be presented. Bluelight LEDs substitute UV bulbs in the visual inspection and in automated surface inspection systems.

1. Introduction
The magnetic particle and penetrant testing inspection are a non-destructive detection method. Cracks are indicated by using the magnetic powder or penetrate testing method. A high contrast between cracks and the undamaged surface of an object is inevitably necessary for a fault-free visual inspection.

2. Current situation with UV illumination
Traditional UV-mercury-illumination generates UV radiation. Comprehensive industrial safety measures have to be applied to ensure skin and eye protection. A fundamental problem with visually testing by UV-mercury-illumination is the use of shortwave light in the UV range. This generally results in the human eye being greatly stressed. In the case of direct contact with the shortwave radiation, the skin and other organs may also be damaged. If the intensity of the exiting UV light is increased in order to obtain a higher contrast, the risks will increase.

3. Introduction of a new illumination approach
Introducing the Autoflux®-Cracklight-System, Automation W + R GmbH offers a new approach in the field of surface inspection. Autoflux® Cracklight enables inspection without UV radiation. As a result, this system (patent pending) eliminates extensive work protection regulations and delivers improved inspection results, both factors contributing to reduced production costs. The system consists of a combination of newly developed LED illumination and filters. The inspector merely sees the flux medium resonance, but not the light that stimulates the fluorescence. The use of innovative LEDs and corresponding high-tech filters replace the use of UV-mercury-illumination. The new system convinces with low consumption of energy and higher life expectancy.
No UV radiation in magnetic-powder and penetrant inspection

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LED Technology is moving forward

- Mega-trends:
  - Efficiency of LEDs will further increase
  - Use of LED as universal light source i.e. automobile, traffic lights, medicine……
  - LED technology will substitute other light sources

[Evolution of Lighting Graph]
**Autoflux® cracklight: MT/PT inspection without UV-light**

- Improvement of inspection results
  - Powerful LEDs with highest luminous efficiency
  - Excellent contrast-to-background ratio due to our cracklight filter technology
- Improvement of work protection
  - Light contains no hazardous UV-radiation
  - Lower heat radiation creates a pleasant work environment / less weary
- Lower operating expenses for LEDs
  - Low consumption of energy and higher life expectancy
  - Higher IP-protection rating through dust- and splash water proof casing
- Simple handling for inspection personnel
  - Immediate full power in 0 seconds
  - Constant luminosity over full life span
  - Simple cleaning through high IP rating

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**Autoflux® Cracklight: Mobility without UV-radiation**

- High performance with large area coverage
  - Coverage of UV lighting mostly limited to a small area, thus limiting the inspection range
  - Excellent contrast-to-background ratio even outdoors in daylight inspection
  - Lightweight with small dimensions
- Lamp comes either with power or battery supply
- Good ergonomic handling due to a pistol handle
- Has high illumination level in comparison to other battery-powered UV lamps
- Higher IP-protection rating through dust- and splash water proof casing (IP 65)
Various UV safety requirements

- Extract from UV Safety guidelines for UV radiators
  - „Unprotected and prolonged exposure to any form of UV light, can result in skin injuries, cataracts and possibly cancer“
- Safety measures with UV radiation
  - Body covering, work clothing and gloves (impermeable to UV-Radiation)
  - Access only for trained personnel
- Labeling of the Emitter and the work environment with prohibitive- and warning signs
- EU-Directive 2006/25/EG „Artificial optical radiation“ in practice 2010
  - Determine the exposure of employees to optical radiation
  - Assess the risks and implement safety measures to eliminate risks of exposure

The Autoflux® Cracklight system (patents pending) offers unprecedented work safety without using UV-radiation

Economic efficiency

- Low consumption of energy due to a higher efficiency factor and less heat radiation
- Zero seconds power-on time, immediate start
- Lifespan of UV mercury lamps approximately 1.000h, thus requiring multiple lamp replacements. LED lifespan accounts typically to about 50.000h
  - Time for lamp replacement
  - Cost for replacement
- Fast and simple cleaning due to a high IP rating
- Investment for UV work protection unnecessary
Why become a distribution partner?

- Extend your product portfolio and offer a new NDT Technology
- An innovative product helps you to position your company as innovation leader
- Become one of the first suppliers offering a brand new product, without UV-radiation
- Possibility to address new target customers via different contact person
  - Company medical officer
  - Occupational health and safety officer
- We are interested to establish distribution partners e.g. in...