Cork Tech TalkNews

Manufacturers of Waterbase, UV+EB Curable Coatings, Varnishes and Adhesives

10/03

SHOULDN'T YOU BE LOOKING AT UV/EB ENERGY CURING?

Want more reasons and information? All you have to do, is take a look at Radtech International NA's web site, http://www.radtech.org to appreciate the full scope of UV/EB energy curing growth, activity and applications.

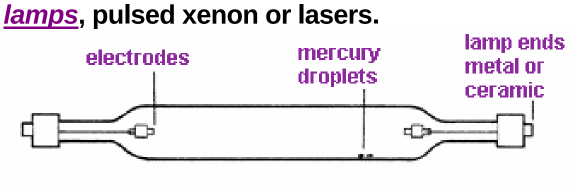
Under *"Focus on Industry",* you'll find a listing of major industry areas of applications.

- **Graphic arts**
- **Powder coatings**
- **Adhesives**
- **Automotive**
- **Wood**
- **Plastics**
- **Emerging/other applications**

Further, under each of these major areas you'll find a listing of resource articles expanding on the technology and applications.

For those of you that are new to UV/EB technology we should review the *"What it is", "What it does"*, "*How it does it"* and *"What advantages are there*" factors.

UV/EB technology refers to the use of ultraviolet (UV), or electron beam (EB) to cure or polymerize a mixture of 100% solid monomers and oligomers usually onto a substrate. Both processes involve the curing (rather instantly) of liquid mixtures into solids. UV/EB materials may be formulated into inks, coatings, varnishes, adhesives or other products. The process is called energy curing or radiation curing, (radcure) because UV and EB are known as radiant energy sources. The energy used for UV or visible light cure is sourced from *medium pressure mercury lamps*, pulsed xenon or lasers.



Formulated products cured with these energy sources are usually clear or translucent although thin ink opaque films are also commonly cured. EB electron beam generators produce a stream of electrons with high enough energy to cure thick, pigmented coatings as well as thinner films of pigmented inks and adhesives. UV provided protons of light are absorbed, mainly at a curing materials surface, while electrons have the power to penetrate through materials.

UV curing systems consist of three key components, *irradiator (reflector)/lamps*, control module and power supply. UV light is sourced from medium pressure mercury arc quartz tubular lamps that are energized by microwave or tube end electrodes. Lamp out-put is stated in watts per inch of lamp length, and consists of approximate-ly 30% UV light, 50% bright visible light and 20% heat producing infra-red. The lamp is housed in an irradiator that may be water or air-cooled. Additional I-R filtering panels may be used to limit heat reaching a substrate.

An EB processor works by applying high voltage to heat tungsten filaments inside a vacuum chamber in order to generate a cloud of electrons. Electrons are drawn from the formed cloud and are accelerated to high speeds. A foil window allows them to pass to a curing zone where they can impact a product to be cured. The EB process can be precisely controlled by a computer controlled system to produce the desired level of cure defined by dose and penetration depth of the accelerated electrons. EB curing is a virtually instantaneous, room temperature, and safe process.

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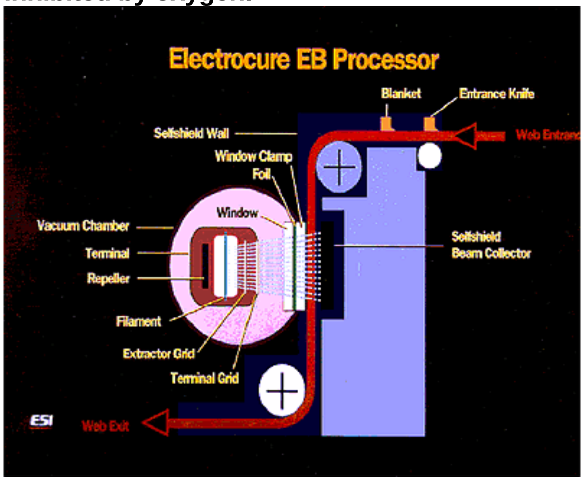
Typically products are cured in an inert nitrogen environment, because cure is inhibited by oxygen.



UV & EB curable formulated products commonly include the following major raw material ingredients:

- Monomers: Mono or multifunctional 100% solid diluents are used to lower the viscosity of a formulated product to a working range. They contain single unsaturated reactive, or multiple reactive sites, that let them react or become part of the cured material instead of volatilizing off.
- Oligomers: These represent 100% solid materials that are medium low molecular weight polymers that are mainly based on the acrylation. The acrylation yields unsaturated sites on the ends of the oligomers allowing linking.
- Photoinitiators: These materials basically absorb light and are used in UV formulations to produce radicals (actions). Free radicals are responsible for the cross-linking between the unsaturated sites of monomers, oligomers and polymers during curing.
- Additives: These are the other performance enhancing ingredients that are used in formulating and include stabilizers, pigments, dyes, defoamers, adhesion promoters, flattening agents, wetting agents and slip aids.

OK, why should you be considering the use of UV/EB technology in your business, whatever it is? ***Just look at the advantages!***

- Improved productivity due to 100% solids, solvent free formulations and short cure exposure time.
- A process that provides total control of cure temperature allowing use on temperature sensitive substrates.
- Solvent-free chemistry, user and environmentally friendly.

What is it that convinces users to buy into UV/ EB technology? Survey results indicate that the most important motivating factors are:

1. Increased Speed (productivity)
2. Improved Properties
3. Environmental Compliance
4. Enabling Technology
5. Cost Effectiveness
6. Reduced Space
7. Less Waste
8. Lower Energy requirements

If these factors are not enough there is also the clear record of an advancing technology demonstrating:

- Lower chemistry costs
- User acceptance
- Improved range of formulations
- Improved photoinitiators (UV)
- Better equipment with lower costs

The North American UV/EB energy curing formulated product market last surveyed in 2001 was estimated to be approximately 77,000 metric tons with near term growth expected to be in the 8% per year range.

ISN'T UV or EB CURING FOR YOU?

LOOK TO CORK!

Whatever your UV-EB product requirements-
Whatever your processes-

LOOK TO CORK!

For Corkote aqueous, and Corkure UV and EB coatings, varnishes and adhesives

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Reference: Radtech Intl, www.radtech.org