EBC Technology

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DTS Systemoberflächen GmbH

Agenda

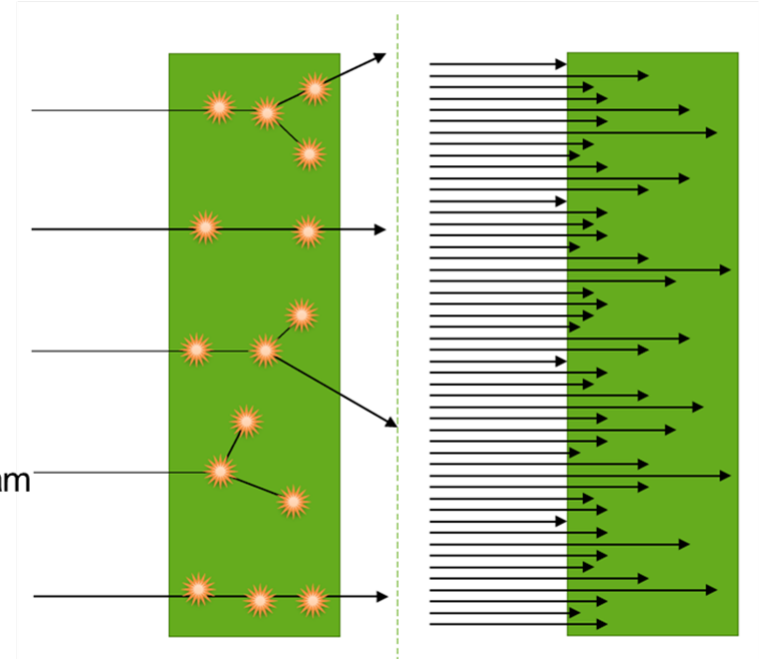
- UV curing
- EB curing
- EB vs. UV curing
- Machines
- Products
- Properties

EB vs. UV curing

Electronic beam curing with electrons

UV curing with photons

Cure energy deposit independent on optical density of the coating, but instead depending on the mass density
EB is a corpuskular beam which is color blind and

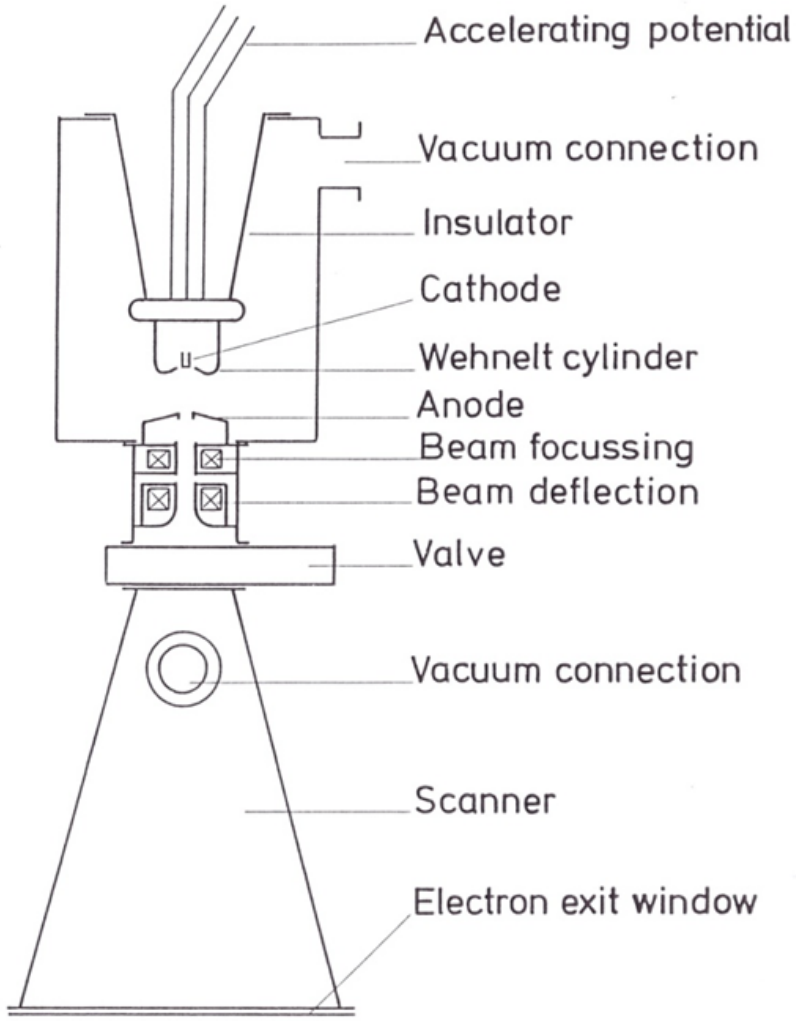


Cure energy deposit depends on optical density of the coating
Curing happens where the light hits the materia
(clear coats typically)

UV curing

- The UV radiation starts the polymerization process and interlinks the existing chain elements. Energy of photon determined by wavelength.
- But UV radiation is not enough. The coating needs photo initiators which have to be adjusted to the wavelength spectrum of the UV lamp system.
- Within a split second, the interlinked system is cured and dry and can immediately be processed in the next production step.
- UV curing is a low temperature process.

EB curing


Accelerating potential
Vacuum connection
Insulator
Cathode
Wehnelt cylinder
Anode
Beam focussing
Beam deflection
Valve
Vacuum connection
Scanner
Electron exit window

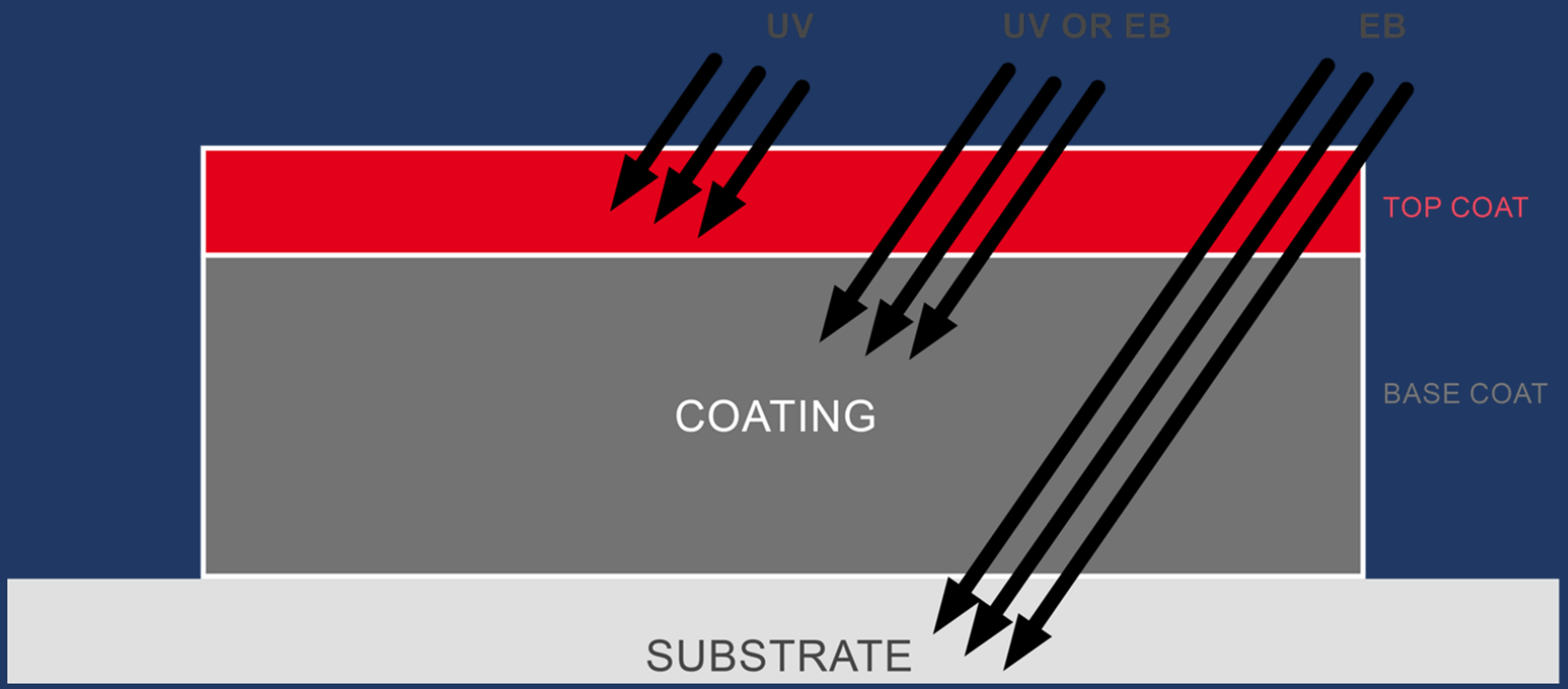
EB curing

- A cathode is powered and heated, starting to emit electrons. The electrons are then accelerated by a voltage between the cathode and the anode, giving the electrons lots of energy (mass and speed). They are first accelerated in vacuum, but are then, after passing through the electron-emitting window, which usually consists of a thin (10-15 micrometers) titanium foil; set free in the atmosphere of the irradiation chamber.

- When they hit the product they start to interact with the material, ionizing some atoms, creating new chemical bonds. Some of the electrons penetrate the material deeper before starting to interact. This fact can be used in a number of applications, including coatings. When the electrons are being slowed down by the material the atoms are excited and emit X-rays, which means that an Electron Accelerator must be shielded with lead.

- The product with the coating enters the irradiation chamber at one side and is fully cured within milliseconds. The products can be handled immediately after the treatment..

Comparison of EB and UV



Energy curing systems

Pros

- high curing speed – high productivity
- low/no VOC emission possible
- coated materials immediately available
- coating with high mechanical strength
- suitable for temperature sensitive substrates
- Space saving installations
- Low energy consumption

Cons

- sometime skin irritating monomers/oligomers
- shrinkage of coating during cure (depending on thickness of coating)
- cost of resin / cost of manufacturing
- very accurate inhibition needed to avoid oxygen inhibition

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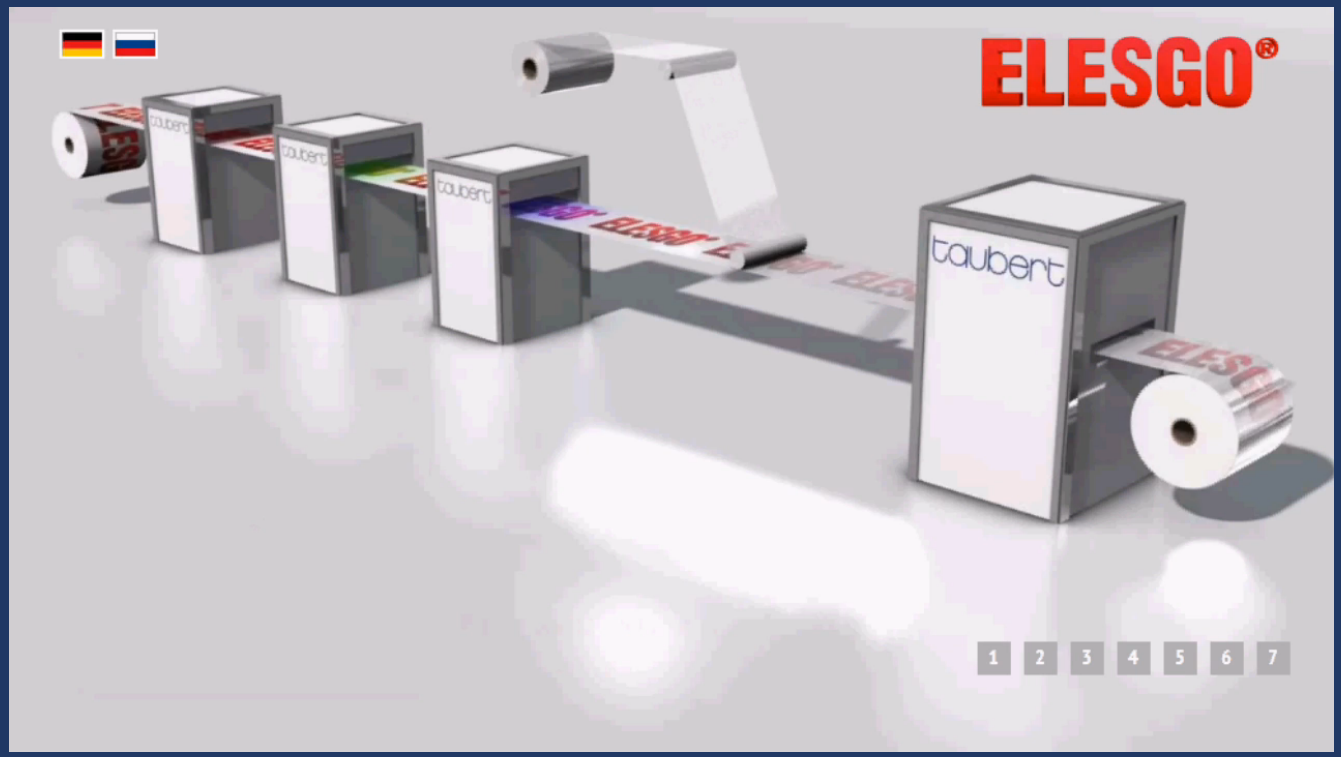
[redacted]

Process DTS



- Roll of paper
- Step 1 – paper gets impregnatet
- Step 2 – paper get lacquered with acrylic lacquer – Basic coat
- Step 3 – over the basic lacquer gets a topcoat
- Step 4 – the release film wich gives the structure comes on the wet lacquer
- Step 5 – the whole package goes through the beam and becomes dry and hard
- Rewinding the finished surface

Process DTS

- Paper with basic coat, topcoat and release film goes through the beam and gets dry and hard

Machines

Möckern

- MA 1
- MA 2
- MA 3
- MA 6

ELESGO®


Maschine
2


Maschine
1


taubert
RADIATION MONITOR
STRAHLUNGSMONITOR
CE
NOT-AUS

FAT in Davenport, May 2017

Assembly in Möckern, September 2017

Products

- Kitchen
- Indoor flooring
- Bathroom
- Window sills
- Doors and frames
- Profiles
- Facade claddings
- Outdoor flooring
- Laboratory tables
- Etc.


vinolo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Properties for ESH & product

- Fully crosslinked
- Closed surface
- Pigmented systems
- Thick coating to 300 µm
- High scratch resistance
- Low energy
- Environmentally friendly
- Solvent-free
- Long lifetime
- Maintenance easy
- No loss off performance
- No migration through the surface
- Sterile surface

TAUBERT

Thank you!