



Infrared and UV Technology for Automotive Interiors

NobleLight®


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Automotive Interiors benefit from IR and UV



IR and UV Technology optimize automotive interior part production

The interior of a car should be comfortable and user-friendly. An astonishing number of manufacturing steps for dashboards, handles, switches, seats, carpets and consoles benefit from infrared heat and UV curing technology.

Infrared heat improves many process steps such as deburring, forming, laminating, and drying or activating adhesives and coatings. Precisely matched infrared systems improve quality and save energy.

UV light curing of inks and coatings on interior components such as switches, handles and trim pieces improves durability and aesthetics.

Many steps in the production and finishing of automotive interior parts are time-consuming and energy intensive. And in the end, the car owner demands good quality at a reasonable price. Modern UV and infrared technology optimizes industrial manufacturing processes:

- Reducing Energy Costs
- Increasing Production Rate
- Improving Quality
- Ensuring Sustainability

Heat exactly where it is needed – Deburring and Shaping

Infrared emitters help automate deburring processes. Contour-matched emitters melt burrs in seconds, reliably and repeatably.

Infrared Heating improves quality while deburring

Heat on demand, exactly where it is needed.

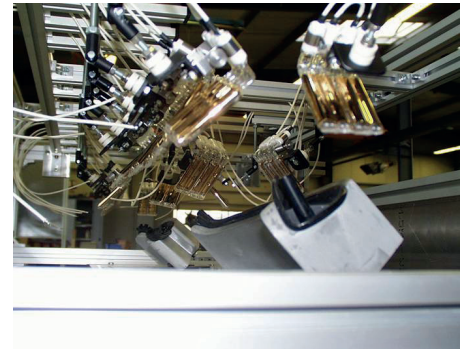
- Contact free heating
- Uniform and reliable heating
- Reduces reject rates
- Short wave emitters
- Quartz glass heaters formed to exactly match part contours
- Thermoplastics melt within seconds



Infrared Emitters for efficient deburring of glove compartments and door handles

Short wave infrared emitters automate deburring process.

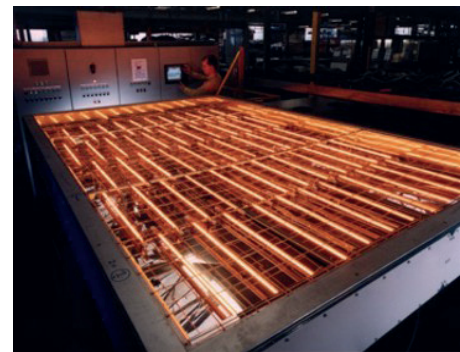
- Analysis of different deburring techniques showed IR heat is superior – efficient and consistent automated process
- Low energy use
- IR system uses small short-wave emitters
- Easy to arrange along three-dimensional product edges
- Very controllable
- Deburring takes place within five seconds



Infrared System improves the quality of carpet blank moulding

A system with carbon infrared emitters improves the quality of in-vehicle fitted carpets.

- Heating blanks prior to placement in molding machines ensures optimum efficiency
- Improved quality
- Saved energy
- Infrared heating system with carbon emitters
- Sixty 2kW carbon emitters with 15 individually controllable zones



Infrared helps fit carpets in classic cars

A medium wave infrared emitter helps create tailor-made carpets for refurbished classic cars.

- Softening and moulding blanks
- Infrared emitters shut off automatically when part reaches required temperature
- Fast response medium wave infrared emitters organized into 3 x 34kW modules
- Pyrometer control optimizes the process



Drying and Curing – Infrared and UV optimize the result



Infrared and Ultraviolet make cars shine

The applications of infrared and UV technologies for surface treatment on automobiles are diverse. For example coatings on plastic parts can be cured with UV then post-dried with infrared. The combination of both technologies offers a lot of potential for efficient and reliable drying processes.

Many vehicle components receive a protective coating or finish. The combination of infrared heat with UV curing of coatings is particularly innovative. On the one hand, this can improve the energy efficiency of the coating curing process, and on the other hand, the UV coating often cross-links better as a result of preheating.

Excelitas offers application-optimized UV lamps and curing systems as well as infrared heat solutions for efficient coating curing. Application examples show when a combination of UV and IR makes sense.

When does a combination of Infrared heat and UV curing technology make sense?

Heat improves the mobility of the molecules. Using IR prior to UV curing improves adhesion and scratch resistance and enables lowering the photoinitiator concentration which can lower costing costs. Infrared heat is also used to drive out the solvents of high-gloss UV coatings before curing. Similarly, infrared heat efficiently drives off the water in UV water-based coatings prior to UV curing. A combination of IR and UV is therefore useful when outstanding quality and production rates are required.



Infrared heat activates adhesives on decorative trims

Medium wave infrared emitters perfectly activate the adhesive for plastic decorative trims on door panels.

- Medium wave Carbon heater, matching to product
- Fast response times allow precise control
- Contact free and efficient heating
- Infrared system with Carbon Infrared emitters, two cassettes with 8kW each
- Pyrometer measures surface temperatures to ensure a consistent bonding process

Drying and Curing - Infrared and UV optimize the result



Quality enhancement through Infrared for UV

Plastic parts are coated to improve scratch resistance and give them a mirror-like finish. It prevents fingerprints from spoiling the high-gloss appearance. Such UV coatings crosslink better at higher temperatures. That's why plastic parts for fascia panels or gearshift levers are first preheated with infrared radiation. If the UV coating levels out a little due to the heat and is then crosslinked with UV radiation, this improves the surface quality.

Infrared emitter for many materials

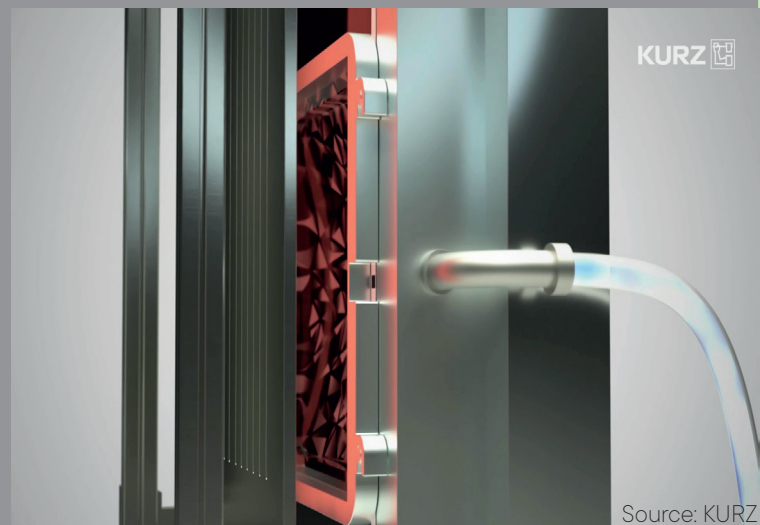
Infrared heat penetrates into the material at various depths, depending on the paint system, and dries the paint film from the inside out. This prevents the formation of a skin or bubbles on the surface and accelerates drying of the coating. Unlike hot air, infrared drying minimizes dust and dirt particles becoming entrapped in the coating.

Innovative Coating: IMD/In-mold decoration

Decorative automotive moldings and switches with a metal or high-gloss look are made from injection-molded plastic and coated on the outside. This is often done using the IMD process, the so-called in-mold decoration or film back injection.

In the IMD process, a carrier product with decorative coating is placed inside the injection mold. As the mold fills with plastic, the coating or paint adheres to the surface of the plastic molded part. When the mold is opened, the coating detaches from the carrier and remains on the plastic part. The coated part can now be removed.

The entire process benefits from IR and UV technology. The coated carrier product is easier to process if it is preheated by infrared radiation and thus becomes moldable. After injection molding, UV curing the coated part significantly improves scratch resistance.



Laminating and Relaxing Materials

Infrared Heat ensures crease-free surfaces

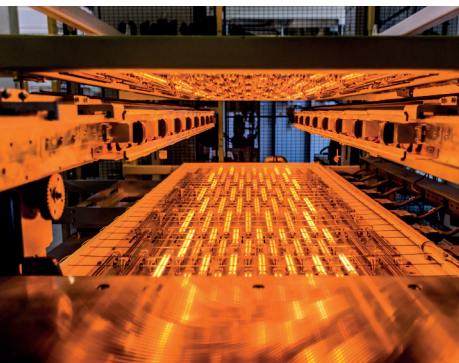
Infrared emitters ensure smooth car seat covers and perfectly fitted carpets. It pays to think about infrared when it comes to car interior trim.



Infrared heating system speeds up adhesive curing on vacuum presses

Medium wave infrared emitters ensure perfect and constant adhesive bonding even at high operational temperatures.

- Activation of adhesive for wrapping molded parts with leather, fabric or pvc
- Fast response, medium wave infrared emitters with integral gold reflector and ruby anti-glare coating
- Module consisting of two zones, one with 5kW emitters (102cm heated length) and one with 7,35kW emitters (150cm heated length)
- PID-controlled
- Fast response within seconds



Infrared emitters optimize vacuum laminating

Medium wave infrared emitters are used for heating TPO and PVC foils prior to lamination onto plastic carrier parts.

- Plastic carrier parts are laminated with TPO or PVC foil
- Infrared emitters replaced fused silica emitters
- Shortened cycle times by 5 seconds
- No standby preheating required saving both space and energy
- Fast response medium wave infrared emitters
- Emitter control unit adjusts wavelengths to exact requirements of the material



Infrared heat helps Bentley make the high quality headliners

Two purpose-designed infrared heating systems are helping ensure a perfect fit and increase longevity of the headliner interior leather trim on 4-door and 2-door models.

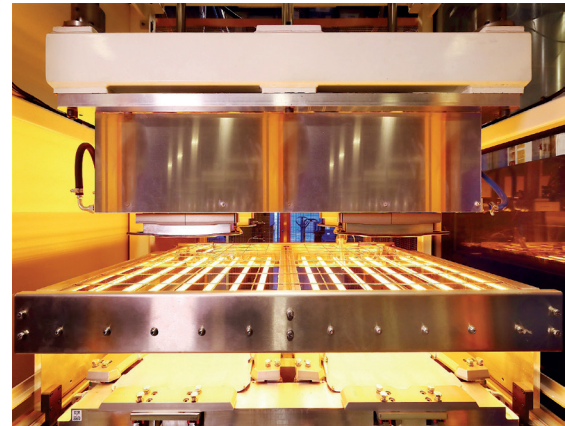
- Infrared emitters activate adhesives to bond carrier fabric and leather surfaces of headliners in a vacuum press for exact alignment
- Adhesive activation temperature of 65°C
- One system has 15, 5kW fast response medium wave emitters for the 4-door model production line
- Second system has two 54kW emitters for the 2-door model production line
- Heating time of around 3 minutes
- PID control

Laminating and Relaxing Materials

IR System reduces both energy and cycle times for automotive interior trim supplier

An infrared system reduces energy costs and shortens cycle-times in production of soft-trimmed automotive interior products.

- Twelve fast response medium wave infrared emitters
- Reduced energy consumption by 73%
- Quicker ramp-up time



Infrared heat for crease removal in vehicle interiors

Short wave infrared emitters gently remove creases from fabrics for car interior parts without damaging the fabric.

- Contact free heat
- Eight fast response short wave heaters, 6kW each
- Controls for five different heating profiles



Test, adapt and find the optimal solution

All UV and IR systems can be used individually or in combination to adapt the curing and drying solution to the process requirements.

Practical tests in the inhouse application center help determine the process parameters more precisely.

Application experts advise how the targeted use of UV and IR radiation can optimize curing and drying processes and save energy - for high quality, scratch-resistant and durable surfaces.



About Excelitas Technologies

Excelitas is a leading provider of advanced, life-enriching technologies that make a difference, serving global market leaders in the life sciences, advanced industrial, next-generation semiconductor, aerospace and defense end markets. Headquartered in Pittsburgh, PA, USA, Excelitas is an essential partner in the design, development and manufacture of photonic technologies, offering leading-edge innovation in sensing, detection, imaging, optics, and specialty illumination for customers worldwide. Excelitas is at the forefront of addressing many of the relevant megatrends impacting the world today, including precision medicine, industrial automation, artificial intelligence, connected devices (IoT) and military modernization.

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