



**Flexible Substrates
and SCB-Technology**

Substrate Technology



As requirements are increasing, so are electronic systems becoming smaller and smaller and more complex. In its role as innovative forerunner Heraeus, the precious metals and technology company, has reacted to precisely this continuing trend towards miniaturization by developing smart new solutions.

Stamped Circuit Board (SCB) technology is especially designed for small circuits. It permits the structuring and laminating of metal-plastic combinations in a highly efficient mass production process for millions of parts. Heraeus has thus succeeded in setting a new, worldwide substrate standard in microelectronics.

Heraeus stamped flexible substrates have been used in electronics for many years. An area of application where Heraeus is highly competent is RFID technology. Thin coated metals with material thicknesses and structure sizes down to 60 μm are used as carriers for chips. Amongst other applications they are used in biometric passports. Heraeus has already given an impressive demonstration of its unique production expertise in this field with millions of identity cards worldwide.

SCB technology goes a step further and offers a large number of advantages compared with other substrate technologies. The further development is going from single layered metal substrates to multiple layered systems. Here structured metal layers can be combined with structured plastic layers. Similar to circuit boards, this layer structure can be composed of glass fiber reinforced epoxy and copper.

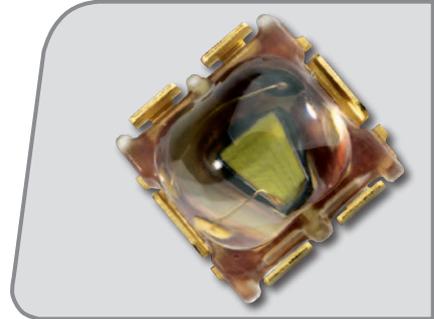
One important strength of Heraeus is the wide range of technologies, which enables to offer comprehensive solutions for the packaging industry. Next to the substrate technology, Heraeus supplies adhesives and bonding wires for the semiconductor industry. Thus, Heraeus can provide optimized combinations of those technologies according to the requirements of the customer.

Applications

SCBs for LEDs and CoB light engines

The Heraeus substrate technology is an approved alternative in the LED business. It is an innovative technology to achieve high requirements and low costs with reel to reel processes.

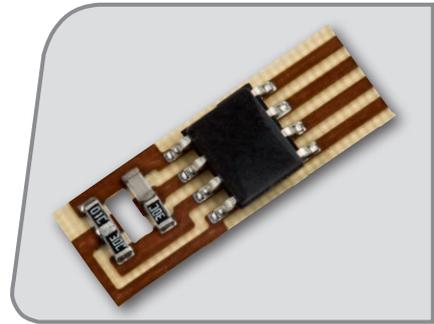
- Good thermal conductivity
- Optimized plated surfaces
- Various numbers of substrate colours
- Highest reflectivity possible



SCBs for Small Circuit Applications

The SCB technology is the perfect solution when you need small circuits with few electronic components. Suitable applications are e.g. Sensors or MEMS.

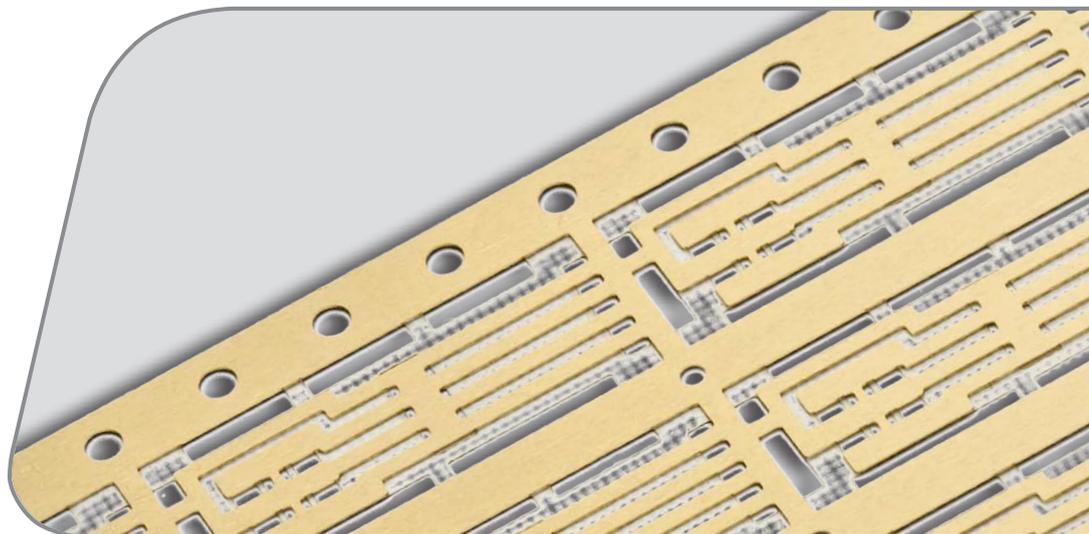
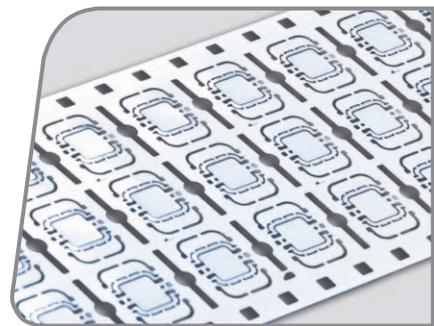
- Qualified for Pb-free soldering
- Highly efficient Reel to Reel production
- Electroplated layers for optimized wettability or wear resistance



RFID Substrates

Heraeus is a leading manufacturer of substrates for RFID applications and creates standards for the world market such as XOA2.

- Fine structures and small tolerances
- Extensive coining experience
- Flip-chip applications also available
- Highest process stability



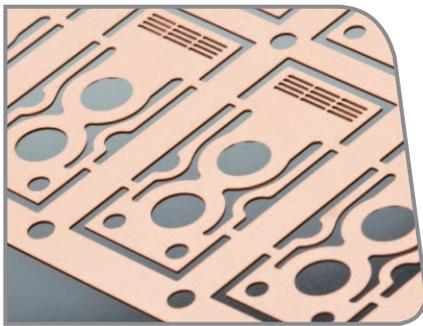
Additional Technologies



Micro Stamping

The geometry requirements for substrates are constantly rising. The Heraeus micro stamping concepts offer customer-oriented solutions for high technological demands, close to the limit of feasibility.

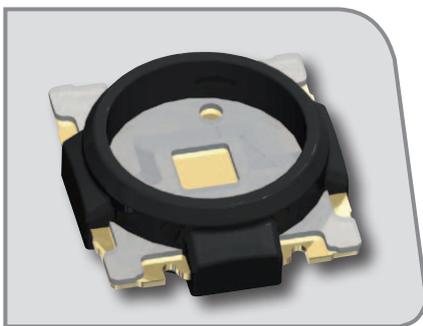
- Core competence high precision stamping
- Structures down to less than 60 μm
- Extensive materials know how



Etching Technology

Individual samples, preliminary series or even larger quantities can be produced with low tool costs using etching technology.

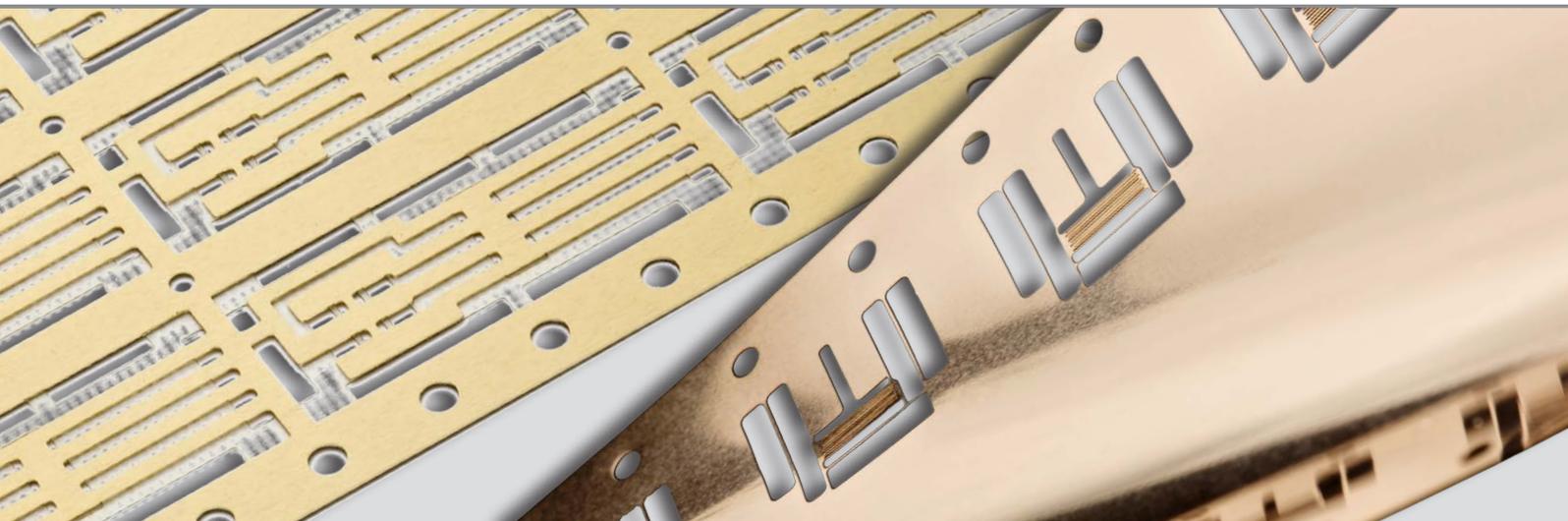
- Material thickness 0.03 – 0.80 mm
- High flexibility in geometry changes
- Suitable for prototyping



Micro Injection Moulding

Heraeus provides a wide range of innovative concepts in the field of micro injection moulding in combination with the SCB technology.

- Low parts weight
- Structures < 0.1 mm
- High vertical integration



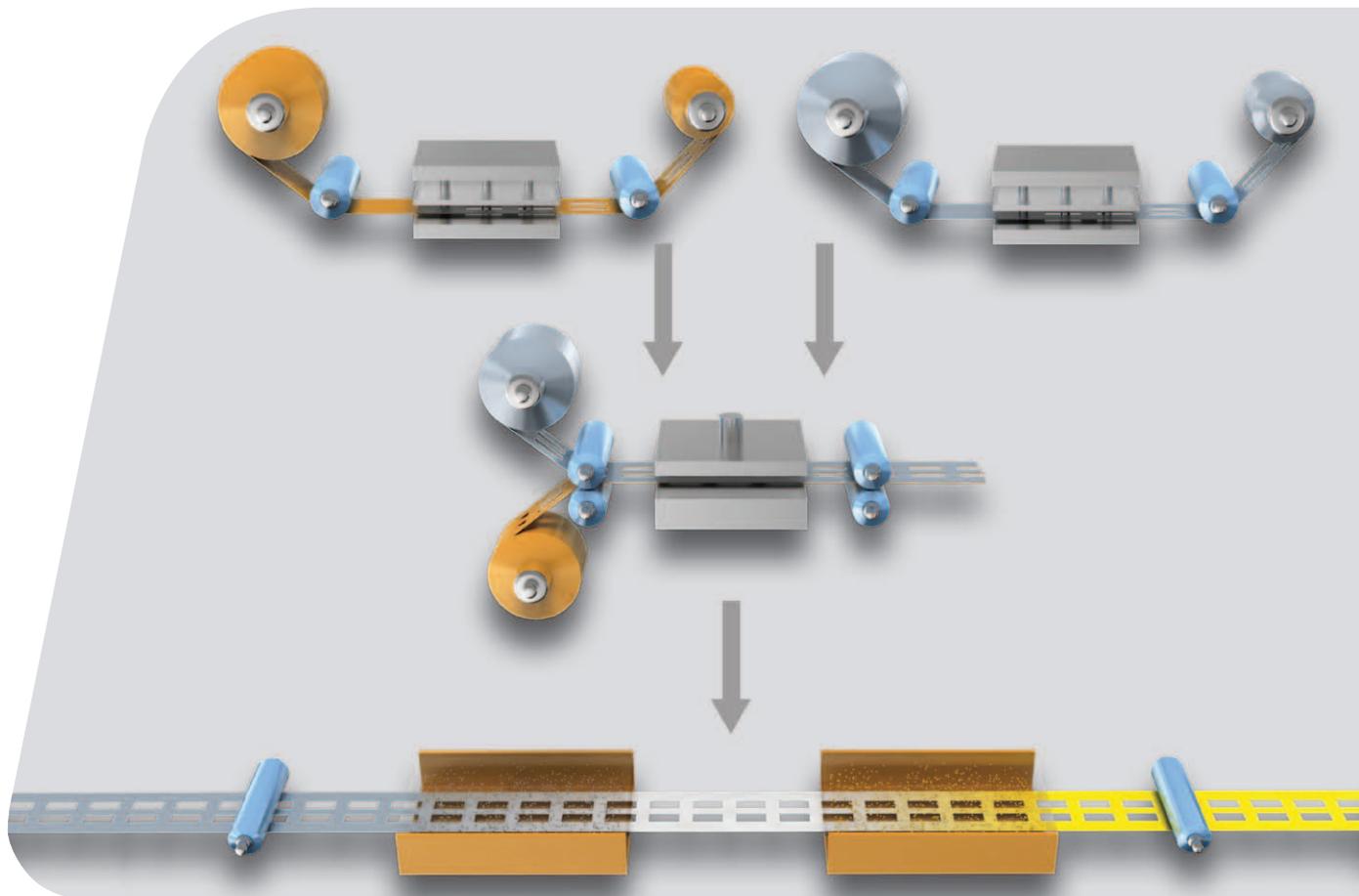
SCB Production Process

High precision and efficiency: this combination is what makes the Heraeus substrate technology and production process so successful. The innovative linking of familiar production processes leads to new design possibilities. In cooperation with Heraeus, the circuit design is developed on the basis of this technology mix, resulting in optimal usage for the customer's application.

The diagram shows a typical process sequence for the manufacture of SCBs. Four process steps lead to the best possible high volume product. The metal and the plastic tapes are processed initially on separate reels. Different structures can thus be achieved in the materials opening up completely new possibilities in the modeling of circuit design.

Subsequently, in the laminating process, an adhesive layer is activated on the plastic by heating and the two materials are joined very precisely. Depending on the application, a functional surface can be applied to the conductive layer. For this purpose Heraeus has many coating combinations which can be deposited on the substrate by electroplating.

All steps are operated highly efficiently in a reel to reel process. At Heraeus, processes of the highest precision are provided for the customer at optimized costs.



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