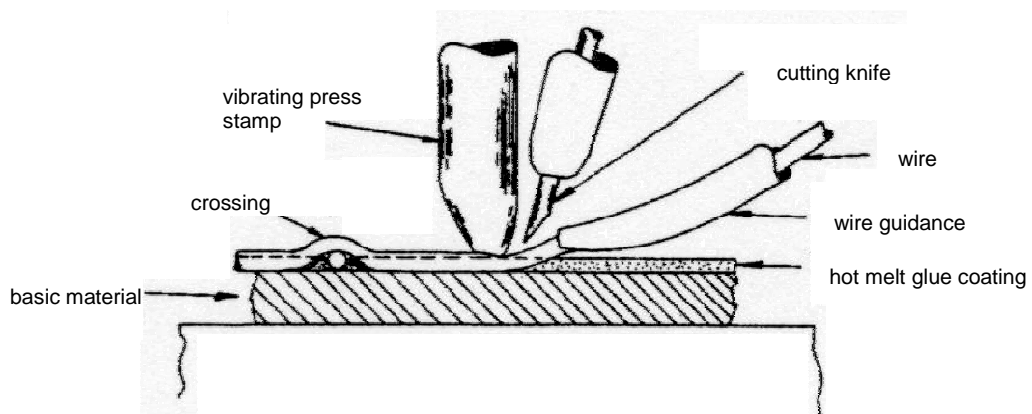


Ultrasonic-wire embedding, short introduction

Synonyms: Wire embedding, Wire scribing

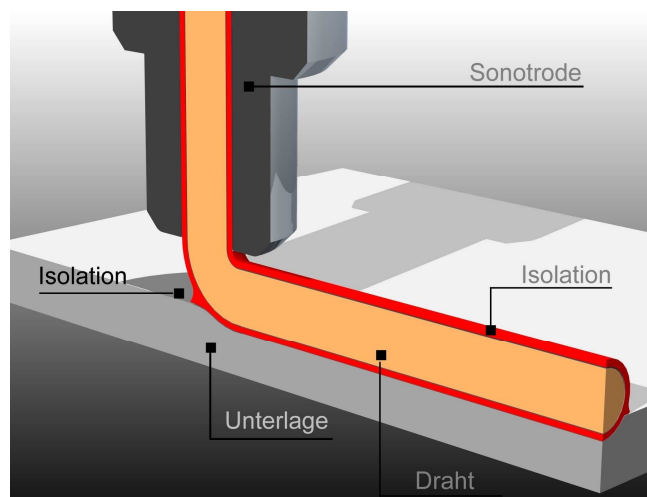
Already in 1982 in the "Handbuch der Leiterplattentechnik" described the forerunners of the today's US wire embedding for the first time.



Picture 1: Picture by courtesy of EUGEN G. LEUTZE Verlag, D-88348 Bad Saulgau
"Handbuch der Leiterplattentechnik", 1. Auflage 1982 (Translation by ruhlamat)

The today's technology of wire embedding can be described roughly as follows:

- A wire is led in a sonotrode oscillating at ultrasonic frequency.
- The wire is ideally covered with an insulator (Backlack) and comes out at the mouthpiece of the sonotrode.
- The sonotrode proceeds in any contour horizontal over the base (see below "Unterlage").
- During this movement the sonotrode oscillates with ultrasonic frequency vertical to the base (see below "Unterlage").
- Thereby the isolator is heated for a short period and connects the wire to the base (see below "Unterlage").

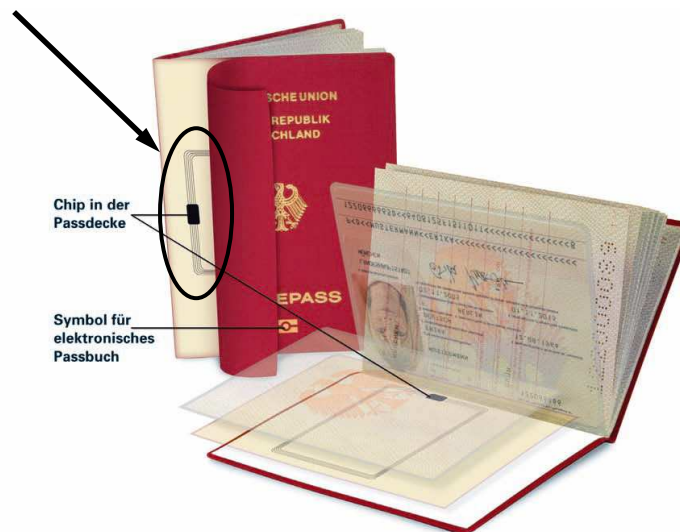


Alternatives:

- Also uncoated wires can be processed, if the base has a suitable coating.
- Instead of wires other flexible materials can be used.

Although the technology was already described a long time ago, it is almost unknown world-wide.

Industrial importance of the wire embedding came up for the first time with the production of electronic documents (identity cards, biometric passports).



Quelle: Bundesministerium des Inneren

In preparation are the introductions of car-screen-antennas for different purposes as well as heating of headlamps, which might be produced by the wire embedding technology.

The screenshot shows the Saint-Gobain Sekurit website. The header features the company logo and a navigation menu with items: Startseite, Unternehmen, Produkte, Karriere, Einkauf, and Kontakt. Below the menu, there are sub-navigation items: Übersicht, Einscheibensicherheitsglas, Verbundsicherheitsglas, Modulare Verglasung, and Produktionsprozesse. The main content area is titled 'Modulare Verglasung' and 'Integrierte Antennen'. The text describes the integration of antennas into car windows for communication purposes, mentioning the use of printed wire antennas (ESG/VSG) or metal coatings on glass (VSG).

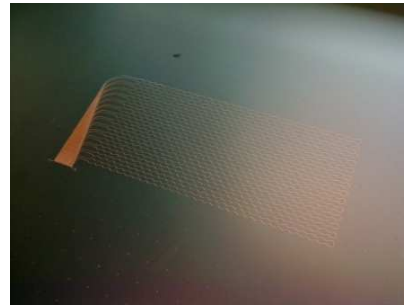
source: www.saint-gobain-sekurit.de

Applications:

PVB foil



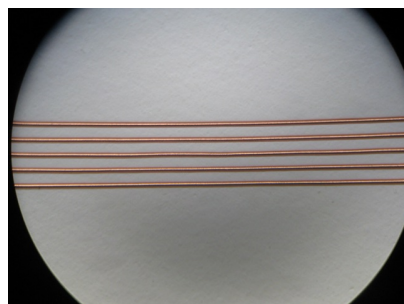
PC foil



Paper



Polymers paper, wire distance 0,4mm



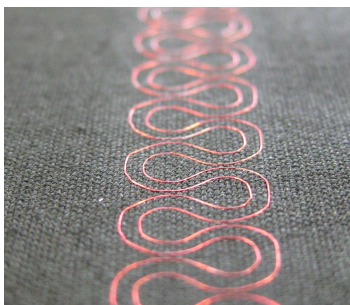
PU-foil



Microfiber cloth



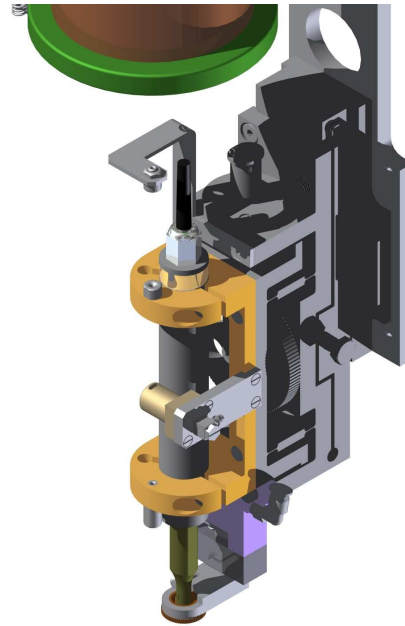
Textile



Since 1997 ruhlamat continuously improved the wire embedding technology.

Internationally 19 production plants work with ruhlamat-wire embedding technology so far inter alia in Japan, Germany, Singapore and the Iran. (State 01.03.2011)

The core technology for US wire embedding is in use in many development institutions for the development of innovative product applications and product validation.



ruhlamat is the world's leading company in development and building wire embedding equipment.

The following machine platforms are currently used:

2D application (see www.ruhlamat.de):

- WCE150, laboratory plant
- WCE600, 4 station rotary table solution
- WCE2000, high speed linear transfer solution
- Ultrasonic wire embedding machine FILUS
- WP22

3D application:

- robot applications