

Construction



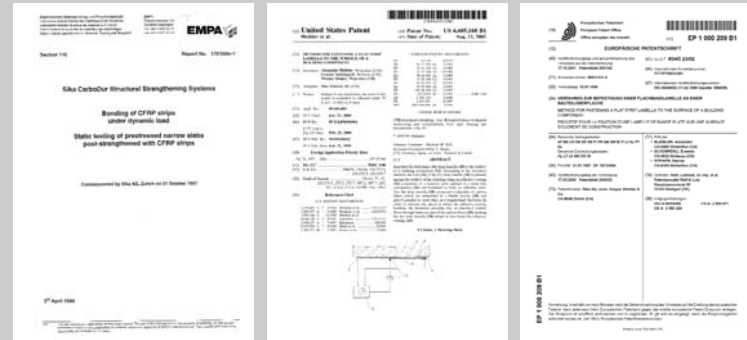
Sika[®] CarboHeater
for the Rapid Curing of
Sika[®] CarboDur[®] Plates



Sika® CarboHeater: Heating Device for Rapid Curing of Sika® CarboDur® Plates

Reasons for using Sika® CarboHeater

- **Fast curing** of structural adhesive: The **Sikadur®-30** and **Sikadur®-30 LP** (Long Pot Life) are epoxy based adhesives, which can be cured up to 50 times faster with the aid of the **CarboHeater**.
- **Application at low temperatures:** Structural strengthening can not be done with conventional epoxy adhesives at low surface temperatures (< 8 °C). With the **Sika® CarboHeater**, application is possible. Note: Other low temperature curing non epoxy adhesives are not recommended for use in structural strengthening due to a combination of their poor adhesion on CFRP and other substrates, their mechanical properties, their chemical and biological resistance plus their longterm durability.
- **Use at elevated service temperatures:** In hot climates asphalt or concrete exposed to direct sunlight can exceed the maximum allowable service temperature of standard epoxy adhesive. Using **Sikadur®-30 LP** in connection with the **Sika® CarboHeater**, a HDT (Heat Deflection Temperature) of up to + 90°C (max. service temp. approx. + 80°C) can be reached. With no other cold curing 2 component epoxy adhesive can such a high service temperatures be achieved.
- **Fire Resistance:** Because of the higher service temperature of the **Sika® CarboHeater** cured **Sikadur®** adhesive, reduced heat isolation is necessary for the equivalent **fire resistance**.
- **Application under dynamic load:** Rigid structures, subject to vibration (such as some concrete bridges) do not have to be closed during the curing period when using the **Sika® CarboHeater**. When strengthening more flexible structures with higher vibration potential (for example timber bridges), the structure has to be closed for a shorter time.
- **Increased performance:**
The mechanical properties of hot cured epoxy adhesives are up to 30 % higher than those cured at low temperatures (e.g. + 10°C)
- **EMPA certified performance**



Sika® CarboHeater Unit

- Weight: 40 kg
- Dimensions: 35x65x75cm
- Power supply: 16A 380V CEE
- Quality control with automatic temperature control and timer



Sika® CarboHeater Connection Set

- Copper profiles for every CarboDur plate width
- Metal brackets, contact screws, hardware, connection ruler for serial connection
- Temperature regulating wires
- Conductive silver paint



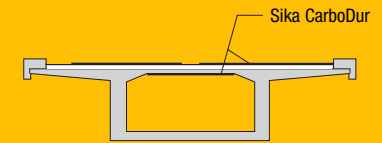
Connection Detail

- With conductive silver paint between copper profile and **Sika® CarboDur®** plate for optimum heat conduction

Sika® Strengthening Systems

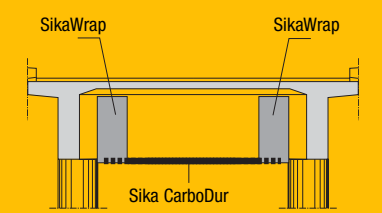
Flexural Strengthening with:

- **Sika® CarboDur®** CFRP plates
- **Sika® CarboHeater**, heating device for fast application
- **Sika® CarboStress®** prestressed CFRP plates
- **SikaWrap®** FRP fabric



Shear Strengthening with:

- **Sika® CarboShear®** L CFRP plates
- **SikaWrap®** FRP fabric



Seismic Retrofitting with:

- **SikaWrap®** FRP fabric



Typical Applications for the Sika CarboHeater:

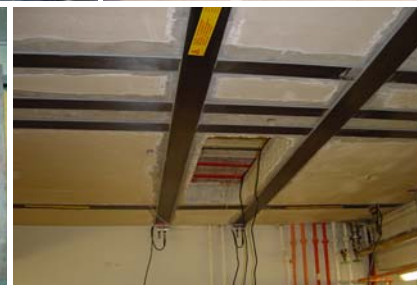
Low temperatures

- **External:** For application in cold conditions
- **For controlled curing** of the adhesive (no day - night temperature gradients), resulting in optimum performance



Fastest Installation

- **Shut downs:** Such as new machine installations, floor/door openings, entrances, stairs, wall replacement, etc.
- **Minimal disturbance in occupied areas:** In factories, tunnels, offices, stores, etc.



High service temperatures

- **In hot climates:** For sun exposed CFRP-plates
- **In hot environments:** Such as power stations, machine rooms, factories, etc.
- **For increased fire resistance:** With reduced necessity for heat insulation / protection



Installation under dynamic load

- **In Civil Engineering Structures:** Such as concrete, steel and timber bridges
- **For structures subject to vibration:** Such as in factories, machine rooms and car parks, etc.



Sika® CarboHeater

Technical Information

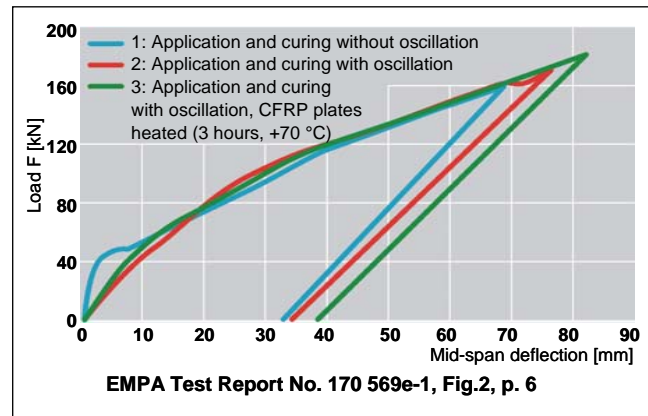
Dynamic loading test

Bonding of **Sika® CarboDur®** Plates to a Prestressed Concrete Slab and Curing of Adhesive under Dynamic Load

- Destructive test of specimens three hours after bonding of **Sika® CarboDur®** plates with **Sikadur®-30** adhesive.

Conclusion

- The ultimate loads are within the normal design range among specimens 1,2 and 3
- No adverse effect on ultimate load capacity during application and curing with specimen 3 - using **Sika® CarboHeater**



Curing times

Adhesive	Without Sika® CarboHeater		With Sika® CarboHeater		
	Curing temperature		Curing temperature		
	+10 °C	+25 °C	+60 °C	+70 °C	+80 °C
Sikadur®-30	7 days	3 days	4 hours	3 hours	2 hours
Sikadur®-30 LP	not possible	7 days	6 hours	4 hours	2 hours

Service temperature

(✓ = Application without CarboHeater)

Temperature	Sikadur®-30	Sikadur®-30 Long Pot Life
+30°C	✓	✓
+40°C	✓	✓
+50°C	✓	✓
+60°C	not possible	✓ (with CarboHeater)
+70°C	not possible	✓ (with CarboHeater)
+80°C	not possible	✓ (with CarboHeater, cured at 90°C)

Application limits

Minimum Air and Substrate Temperatures During Application of **Sika® CarboDur®** Plates:

Adhesive	Without Sika® CarboHeater	With Sika® CarboHeater
Sikadur®-30	+10°C	non frozen substrates *)
Sikadur®-30 LP (VP)	+25°C	non frozen substrates *)

*) At low temperatures (<10°C), the adhesives are more difficult to handle (high viscosity!). It is recommended that the adhesive is stored at 20°C for at least 24 hours before application.

Attainable Temperature

1-15 meters of every plate cross-section and type can achieve a **temperature difference** (between surface temperature and attainable temperature) of **minimum 60°C**. On **concrete surfaces**, this temperature is reached after approximately 30 minutes of heating.

(Note: Shorter plate lengths can reach a higher temperature and a higher difference.)

On **wooden surfaces**, approximately 25 metres can be heated up to a 60°C temperature difference.

Parallel connections are not recommended.

Serial connection of shorter lengths of plate to create a "large plate" and therefore increase the heating efficiency is possible. This must only be done with the same type and same cross-section of plates. Connection rulers are included in the Connection Set.

For full details please consult the relevant product data sheets and the installation manual.

Our most current General Sales Conditions shall apply. Please consult the Product Data Sheet prior to any use and processing.

Sika Services AG

Corporate Construction

CH-8048 Zürich

Switzerland

Phone +41 44 436 40 40

Fax +41 44 436 46 86

www.sika.com

