



Sika® CarboDur® DML

Ultra High Modulus CFRP Plates

Technical Data Sheet

DESCRIPTION

Sika CarboDur DML plates are high performance, corrosion resistant carbon fibre plates manufactured to individual project dimensional specifications. When used in conjunction with the appropriate **SikaDur®** structural epoxy adhesive, they form the **Sika CarboDur DML** strengthening system.

USES

To strengthen cast iron, steel and wrought iron structural elements on structures such as bridges, historic buildings, parking structures, marine structures, chimneys, silos, tunnels and tanks, pipelines etc for:

Loading increases

- * Increasing the load capacity of beams.
- * Increasing the load capacity of bridges to accommodate increase axle and impact loads.
- * Installation of heavy machinery in industrial buildings.
- * Vibrating structures.
- * Changes of building utilisation.
- * Blast resistance.
- * Seismic.

Damage to structural components

- * Vehicle impact.
- * Deterioration of construction materials.
- * Fire.

Serviceability improvements

- * Reduced deflection.
- * Stress reduction in steel reinforcement.
- * Reduces fatigue.

Change in structural system

- * Removal of walls or columns.

Design or construction defects

- * Insufficient section size.
- * Insufficient structural depth.

Technical Data (typical)

Colour:	Black
Base:	Carbon fibre reinforced with an epoxy matrix.
Fibre volumetric content:	>55%
Density:	1700 kg/m ³
Dimensions:	Manufactured individually on a project basis
Tensile strength (mean):	1110 N/mm ²
Tensile E-modulus (mean):	360,000 N/mm ²
Elongation at break:	0.3%

All above values are approximate

ADVANTAGES

- * Particularly suited to strengthening metallic structures.
- * Individually manufactured plates to required dimensions.
- * Excellent durability and resistance to corrosion.
- * Lightweight.
- * Tapered ends to minimise peel stresses.
- * Single adhesive substrate/plate bond line.
- * Minimum disruption to service environment.
- * Fast and economical application - no heavy handling and installation equipment.
- * Excellent fatigue performance.
- * Low aesthetic impact.

SURFACE PREPARATION

The metallic surface shall be grit blasted to ISO 8501-1 grade SA 2.5 using a hard angular grit, free of any contamination, to give a blast surface (peak to trough) amplitude between 50 and 100 microns. A maximum variation in level of plus or minus 3 mm over a distance of 300 mm in any direction should be achieved. Any inclusion or sharp arising must be ground out to give a radius of at least 10 mm.

Following grit blasting all dust shall be removed from the surface.

In the event that bonding of the carbon fibre is to take place more than 4 hours after exposure of the bare substrate. A corrosion protection primer of **Icosit® EG1** at a dry film thickness of 50-75 microns should be applied. This primer should be allowed to cure for a minimum of 12 hours at 15°C.

The bonding surface of the plate is protected with a disposable peel ply layer. The peel ply should be fully removed immediately before the bonding operation starts. The layer is easiest to remove as a continuous strip.

The metallic surfaces must be cleaned and degreased using **Sika® Thinner C** by lightly brushing with a stiff brush prior to the application of **Icosit EG1** and **SikaDur** structural epoxy adhesive.

APPLICATION

The metallic substrate to be bonded shall be given an application of **SikaDur** structural epoxy adhesive of minimum 2.0 mm thickness (dependent on substrate, alignment and surface preparation). Any low spots should be filled with additional adhesive.

The bonded surface of the carbon fibre plate shall be given an application of the **SikaDur** structural epoxy adhesive domed in the middle to a thickness of 5.0 mm feathering to 1.0 mm on the outer edges.

The contractor shall ensure that when placing the carbon fibre plate in position, full contact of the adhesive to the two surfaces being bonded is achieved. The adhesive should extrude along the sides throughout the whole length of the plate, to provide a final bond line of between 2-5 mm in thickness. This overflow adhesive should be filleted to an angle of approximately 45°.

Depending on the dimensions of the plate, temporary support may be required while the adhesive cures. (Typically 8-12 hours).

Handling Precautions

Sika products are generally harmless provided that certain precautions normally taken when handling chemicals are observed. The materials must not, for instance, be allowed to come in contact with foodstuffs or food utensils and measures should also be taken to prevent the uncured materials from coming in contact with the skin, since people with particularly sensitive skin may be affected. The use of protective clothing, goggles, barrier creams and rubber gloves is required. The skin should be thoroughly cleaned at the end of each working period either by washing with soap and warm water or by using a resin-removing cream - the use of powerful solvents is to be avoided. Disposable paper towels - not cloth towels - should be used to dry the skin. Adequate ventilation of the working area is recommended. In case of accidental eye or mouth contact, flush with water - consult a doctor immediately. Health and Safety information on Sika Products is available and we strongly advise that this is read prior to their use. Sika products are for professional use and should be stored in sealed containers away from the reach of children.

Important Note

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users should always refer to the most recent issue of the Technical Data Sheet for the product concerned, copies of which will be supplied on request.

Please consult our Technical Sales Department for further information

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IMPORTANT CONSIDERATIONS

- * A suitably qualified person must be involved in the design and detailed specification of the strengthening works.
- * The application is inherently structural and great care should be taken in choosing suitably experienced specialist contractors.
- * Refer to the appropriate **SikaDur** technical data sheets for information on the structural epoxy adhesive.
- * A full specification should be obtained from **Sika Limited**.
- * Site quality control must be assured by an independent testing authority.

Note: DETAILED ADVICE ON THE ABOVE SHOULD ALWAYS BE OBTAINED FROM **SIKA LIMITED**.

CLEANING

SikaDur structural epoxy adhesive may be removed from the **Sika CarboDur DML** plates whilst adhesive is still soft, using a spatula. Remaining residue should then be removed using **Sika Thinner C**.

PACKAGING

Plates are produced to satisfy specific project requirements with regard to width, thickness and length. Enquiry schedule available on request.

STORAGE AND SHELF LIFE

Unlimited if stored in dry conditions and without exposure to direct sunlight.

