

## The Future of Fixturing Systems C/C – An Alternative to Steel

# C/C – The Better Material Wins

## The problem of traditional applications of steel

In modern heat treating processes such as hardening, annealing, or brazing, state-of-the-art installations typically use protective gases and/or vacuum furnaces.

Sadly, the fixturing for these modern processes is often made of old-fashioned steel.

These traditional materials show some distinct disadvantages in their performance at ever increasing temperatures:

- Creep distortion
- Limited heat resistance

After only a few furnace cycles the carriers often show permanent distortion or dimensional changes, due to their lack of creep resistance.

Such distortion hurts productivity and economic efficiency in the long run:

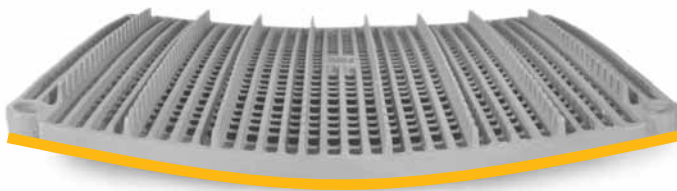
- Distorted steel fixtures need to be repaired by hand at a high cost
- Automated loading and unloading systems cannot tolerate the changes in the fixture size or position

When using modern carbon fibre reinforced carbon (C/C) materials, you can avoid such problems.

## The advantages of C/C over steel

C/C's characteristics make it ideal for use as a fixture at high temperatures:

- C/C materials have higher strength at high temperatures than heat resistant steel
- C/C materials show no deformation even under extreme thermal shock conditions
- C/C materials have a lower density and a considerably lower weight than steel
- Compared to steel, C/C materials typically have a higher life expectancy in high temperature applications



*Problem: Old-fashioned steel fixtures normally sag and become deformed after several furnace cycles, and must be scrapped*



*Solution: C/C grids, designed to hold the same parts, show no deformation, even after several years*

# C/C – Successful in Practical Applications

## Five good reasons for changing to C/C fixtures

Here you see an actual example of a C/C carrier used in a high-temperature application. The following advantages could also benefit you and add to your bottom line:

### A 100% load increase

i. e. double the previous load through a more compact design (see on the left)

### Automation is possible

due to a lack of sagging and distortion, even after hundreds of cycles

### Shorter Cycle Times

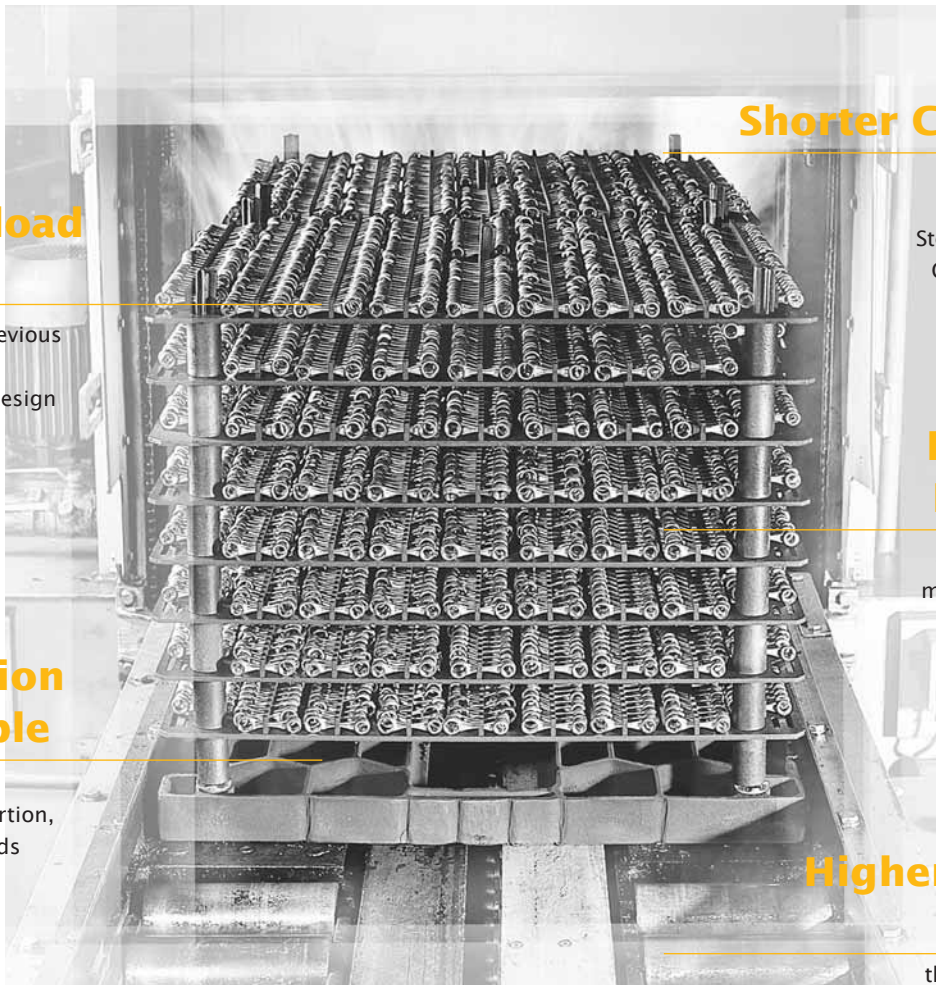
through substantially reduced thermal mass  
Steel grid: 30 kg (66 lbs.)  
C/C grid: 2 kg (4.4 lbs.)

### Longer Life Expectancy

due to no distortion or material fatigue, even in extreme thermal shock conditions

### Higher Economic Efficiency

through reduced waste, fewer distorted parts, and reduced energy costs



# C/C – Innovative and Economical

Two methods of production have proven successful for the manufacture of C/C grids: Interlocking (machined) grids and water-jet cut grids.

## Interlocking Grids Made of C/C

They allow for a flexible design, grid stiffness can be adjusted precisely via web height. Interlocking grids are especially suited for very high weight loads.

## Water-Jet Cut Grids Made of C/C

They are ideally suited for individual requirements, at low to medium weight loads. Water-jet cutting technique allows for exact, full-fashioned shaping.

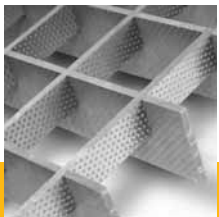
## New: UniGrids™

Integrally manufactured grids are a new way of producing C/C grids.

Unlike interlocking or water-jet cut grids, integrally manufactured grids have a continuous fibre structure which is manufactured on squeeze moulding machines with no joints.

Their closed frame structure allows for simple and uncomplicated handling with high stiffness and material strength.

*New: Integrally manufactured grid, multi-layer tiers in a building block design*



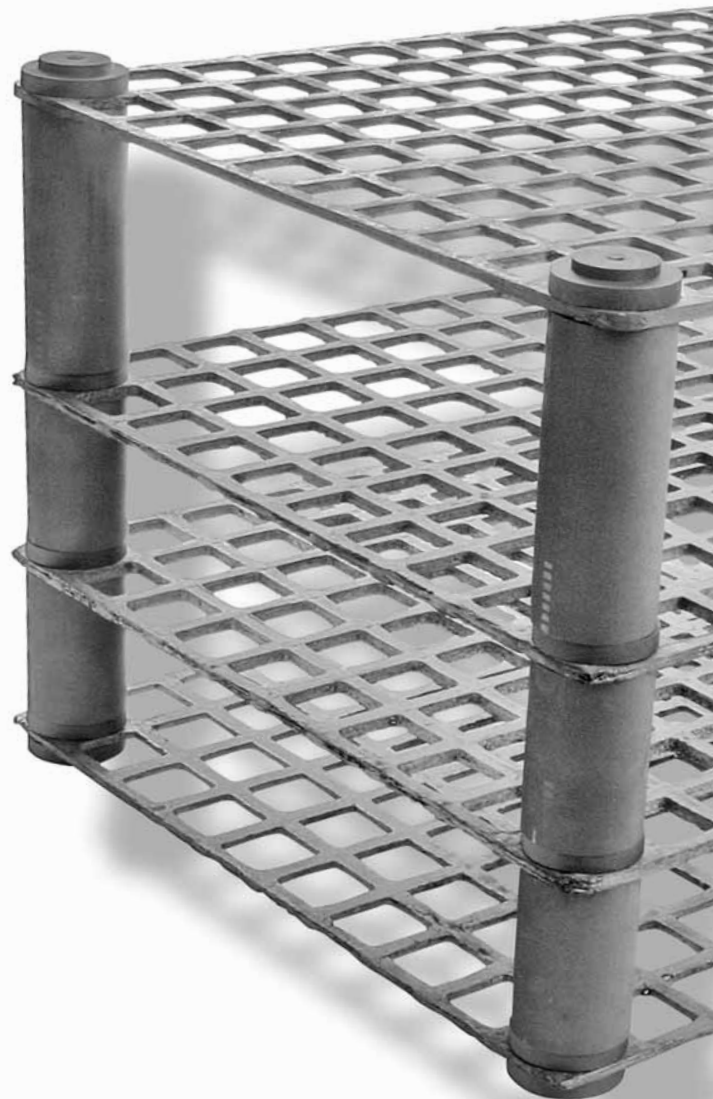
*Interlocking grid for high strain and big loads*



*Water-jet cut grid, ideal for individual requirements*



*Integrally manufactured grid, the new economical solution*



# C/C – A Safe Solution

## **We offer you our support and guidance:**

In today's competitive business environment, it is important to consider every possible means of cutting cost and increasing efficiency. One means of doing so is to consider the use of C/C fixturing.

Changing from steel to C/C fixtures normally requires the following elements to be in place:

- the economic advantages of C/C are understood
- the increases in efficiency can be clearly demonstrated
- personnel involved in the transition understand the benefits and support the improvement
- full vendor support during the change-over process is available

For all of these issues, we can offer our assistance at any time.

## **Optimum Solution with C/C**

We will be happy to review your process parameters to determine the best fit for C/C fixtures in your facility.

These discussions can then lead to a determination of which design (interlocking, water-jet cut or integral) will be the most advantageous for your company's applications.

We are happy to offer you our support from concept to completion for any C/C fixturing systems or components.

For a free analysis of how C/C products might fit into your specific processes and applications, please contact us. We will be happy to discuss this unique solution with you.

*C/C Fixture (in a vacuum application) for brazing stainless steel heat exchangers for automobile suppliers*



## **Expertise – Immediate-Information**

We're happy to share information with you about any of our C/C grids:

- Interlocking grids
- Water-jet cut grids
- Integrally manufactured grids

Please contact:

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## **Fast Order Delivery**

At Schunk Kohlenstofftechnik we can offer you any C/C spare parts for furnace construction. Most of our standard products will be shipped within 24 hours.

Please ask for your copy of our brochure "Hot Service for Cold Furnaces" – detailing information about profiles, sheets and fasteners made of C/C!

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