

# SILICON

*Your partner for all refractory anchoring solutions*



## **CEMENT Refractory Anchoring Solutions**

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**Full Service Solutions Provider:  
Engineering - Production - Installation**

# Patents

## **SpeedBolt®**

The following patent rights have been granted for the SILICON SpeedBolt® system:

- NL2006790
- EP2525006
- US8,844,239

## **SpeedCell® 2G + SpeedCell® 3G**

The following patent rights have been granted for the SILICON SpeedCells® system:

The Netherlands: 1036914

Europe: 2425192

United States of America: 9,127,890

Brasil: PI1016125-2

*We are always working on  
new and better solutions. That  
is how we continue to evolve.*

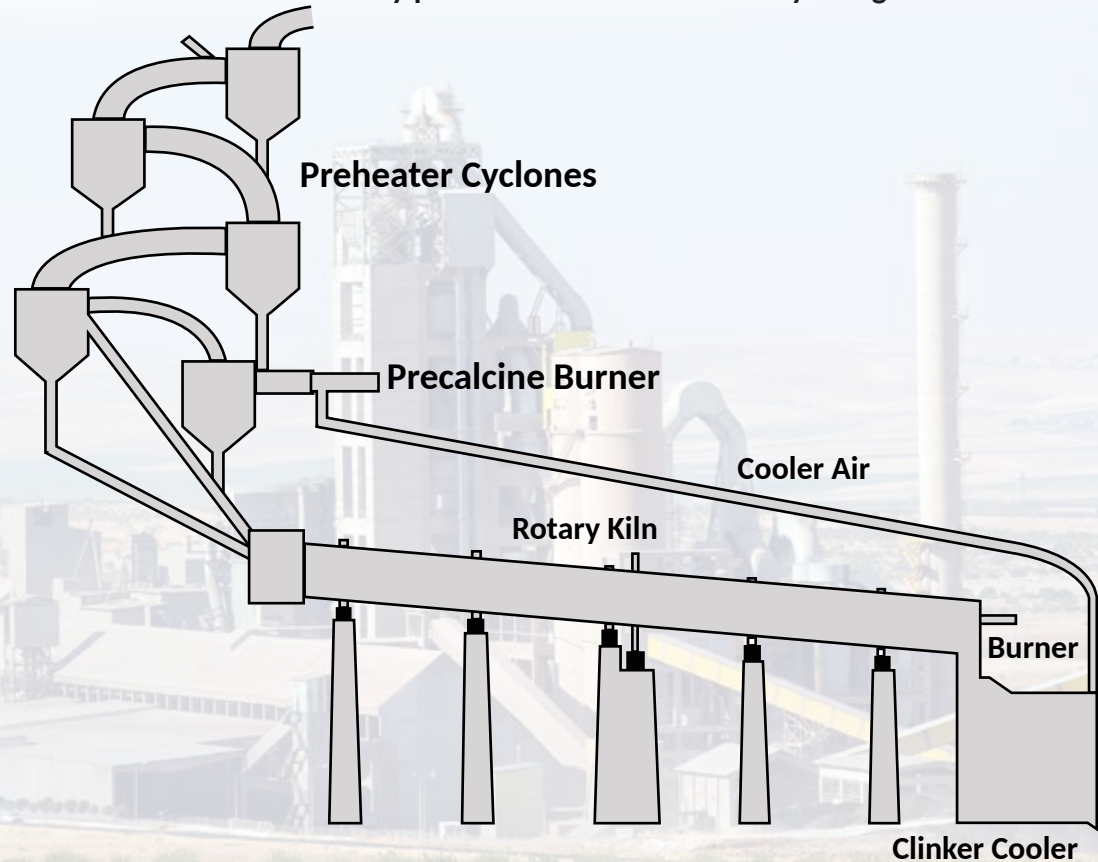
# Fields of Application

SILICON is a Full Service Solutions Provider:

1. Engineering – SILICON provides custom and proprietary products and solutions, as well as personalized advice on types of anchoring, suitable alloys and optimal internal layout patterns.
2. Production – SILICON has a state-of-the-art Refractory Anchoring and Rapid Arc Welding production facility.
3. Installation – SILICON has a dedicated crew that supervises and/or installs Refractory Anchoring Systems with our own Rapid Arc Welding technology worldwide.

We have products for the rotary kilns, upper and lower cyclones, coolers, burner pipes, pre-heaters, air ducts and calciners, because we know each process part has its own unique problems.

There is a solution for every problem. An anchor for every lining.



# THROUGHOUT THE PLANT

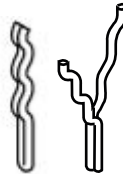
**Problem: The use of different fuels, corrosion and chemical reactions eat away the unit's steel shell**

**Our Solution: Custom-made corrective measures based on over 40 years of metallurgical expertise**

Drawing on our extensive experience in metallurgy, we excel at identifying the perfect alloy for each unique application. In an industry that's constantly evolving, we specialize in crafting tailor-made anchoring systems that precisely match specific process needs. Additionally, we offer expert consultancy services and thorough failure investigations to ensure your peace of mind.

**Problem: Low quality welds - poor hand welding (mostly tackwelding)**

Detachment of anchors and/or refractory concrete.



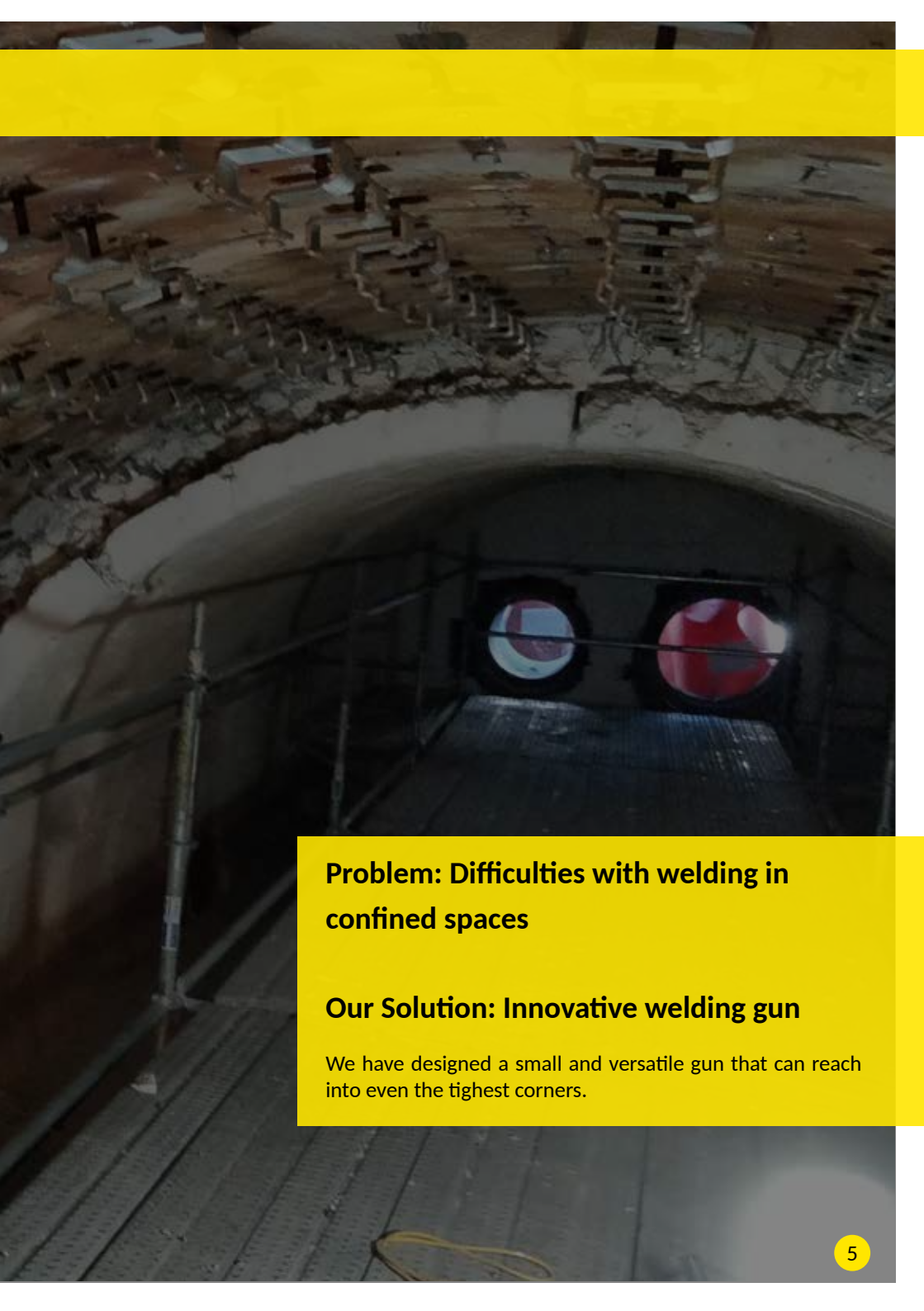
**Our Solution: CTP Anchors**

- Piercing a hole through the concrete and studwelding a CTP, which we open afterwards to support the concrete.
- Using our computer-controlled Rapid Arc Welding (RAW) technology to achieve the best possible result.



RAW technology can also be used when welding claws





**Problem: Difficulties with welding in confined spaces**

**Our Solution: Innovative welding gun**

We have designed a small and versatile gun that can reach into even the tightest corners.

# ROTARY KILNS

**Problem: Rigidly fixed anchors break and initiate corrosion**

## **Our Solution: SpeedBolt®**

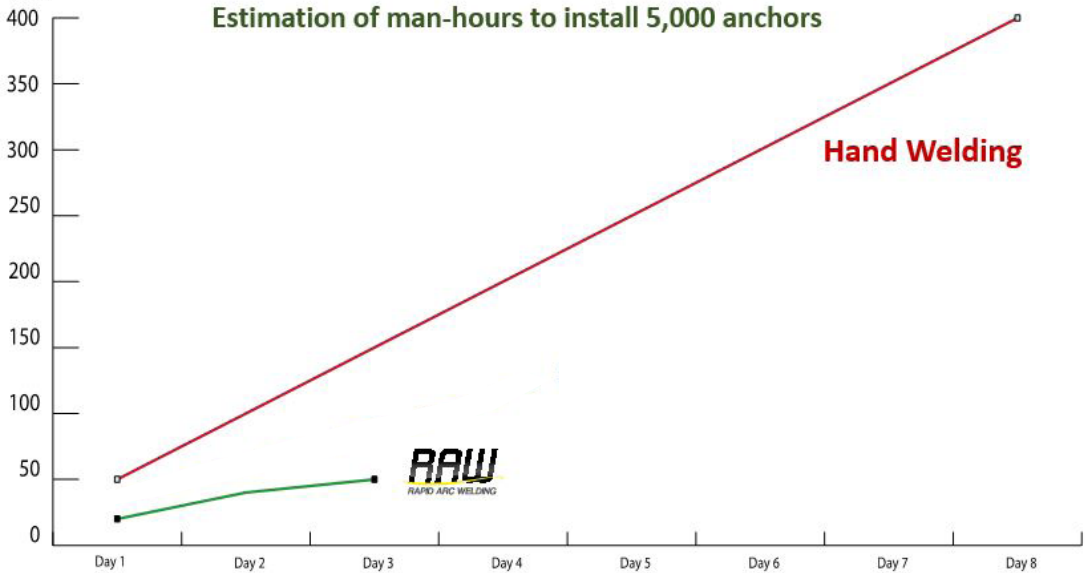
Our moveable anchors offer greater corrosion resistance and substantially reduce installation and repair time.

### **Key Features:**

- Once the operating temperature is reached, the plastic clip melts, giving the SpeedBolt® anchor freedom of movement in 3D.
- SpeedBolt® system reduces time and cost in future turnarounds. The SpeedBolt® anchor will not need replacement when the new Bullhorn anchor is fitted in the next turnaround. It is made of stainless steel and will resist corrosion for several turnarounds. The SpeedBolt® is resistant to demolition.
- The Bullhorn anchor part is available in different diameters, lengths and materials. Its wide corrugation holds the refractory in any movement providing flexibility and resistance to the refractory lining.
- The base of the SpeedBolt® has a diameter of 5/8 in. (16mm) that guarantees a solid weld for large volumes of refractory.
- A wide variety of alloys are possible. Produced mainly in AISI 316 material, providing a huge resistance to corrosion.
- Our goal is to cut installation time and reduce human error during the anchor installation process. Additionally, we eliminate health and safety risks associated with welding fumes, and welding sparks are minimized while working in confined spaces.



## Estimation of man-hours to install 5,000 anchors



## SpeedBolt® Installation “how it works”

The SpeedBolt® eye is welded onto a casing using SILICON's own Rapid Arc Welding (RAW) Technology.

The Bullhorn anchor is placed through the SpeedBolt® eye.

Finally, the plastic SpeedClip is put in place by hand or with a hammer to securely position the anchor.

The SpeedBolt® can be installed on flat and curved surfaces, sidehand, overhead and downwards.



# SpeedBolt® after 5 years of installation

## Find out why this reusable SpeedBolt® system works so well

Traditionally, these anchors face limited reusability, not only because of the process, but also due to the intense refractory removal process, resulting in their destruction.

In contrast, the SpeedBolt® stands out for its reusability, offering a sustainable solution that withstands the challenges of refractory maintenance.

### Bullhorn Anchor

Comparing the completely destroyed Bullhorn anchor with the look of the SpeedBolt®, shows that the Bullhorn will perform. However it will perform based on the environmental conditions.

This means Bullhorn anchors should be considered expendable, consumable. The SpeedBolt®'s shape is physically separated from the anchor and is on the colder side, and has retained its full shape despite the high temperature process and (importantly) the chipping hammer (part of the removal process of the refractory).

**That is why the SpeedBolt® should not be considered “just” an anchor, but a MECHANICAL UPGRADE to the cement processing vessel.**



**SpeedBolt® with Bullhorn anchor**



**SpeedBolt® after 5 years**

*Pictures taken on a recent jobsite at Cemex  
Rüdersdorf, in Germany (2022)*



Newly installed SpeedBolt® system



After 2 years of use



After 5 years of use



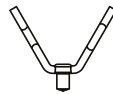
The SpeedBolt® resists demolition without problem and will be reused during the next Turnaround.

# STATIC AREAS

## Problem: Poorly welded standard wavy V anchors

Commonly welded by hand with an electrode, V anchors are unreliable, inefficient and have serious health hazards due to the presence of hexavalent chromium. These problems often lead planners to miss out critical preventative maintenance repairs during turnarounds.

V anchors are particularly prone to failure over the long term as a result of the steel becoming sensitized. This causes the anchor to break.

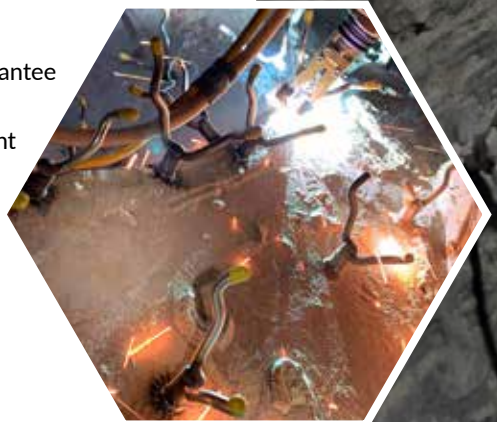


## Our Solution: Fixed anchor SpeedVee® highly resistant to corrosion

Our SpeedVee® anchors have outperformed conventional V anchors in every vessel they have been installed in. They're safer, more reliable and more cost-effective because they save time during Turnarounds. With these full fusion welds, V anchors are no longer just little refractory attachments. They become mechanical upgrades, with refractory features.

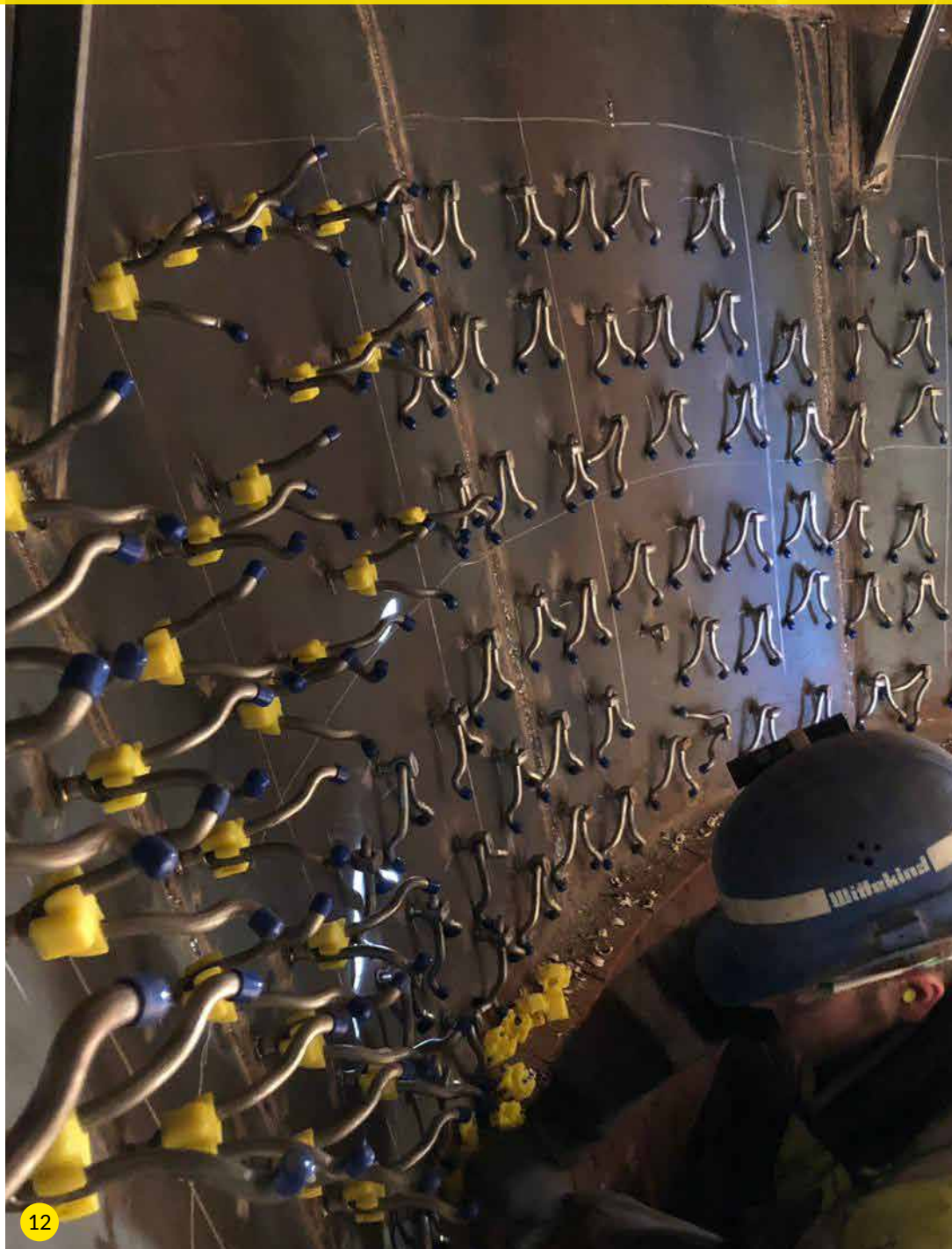
### Key Features :

- Produced from diameter  $\varnothing 16\text{mm}$  to guarantee a better corrosion resistance
- Possibility of manufacturing in different materials: V and Stud
- Dual alloy component anchors
- Solid welds
- Installation by RAW





## CYCLONES (UPPER AND LOWER)





# COOLER





# BURNER PIPES

## Problem: Anchors do not last long enough

Refractory failures in the hot zone of the burner.

## Our Solution: SpeedCell® 2G and SpeedCell® 3G

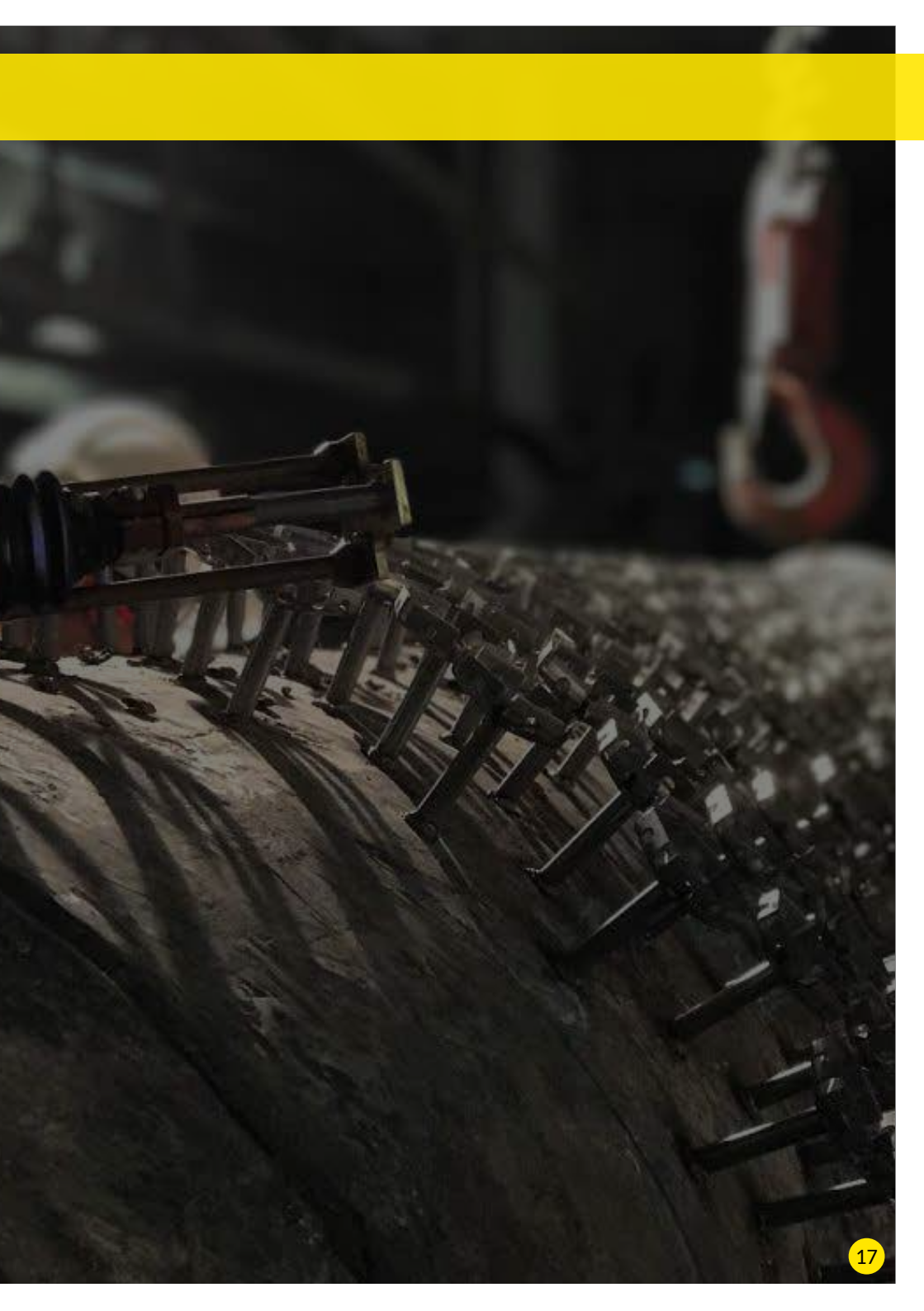
Burners will last two or three times longer thanks to our SpeedCell® system.

The single point fastening method, using a stud, allows for a safe and damage-free repetitive expansion and contraction of the refractory material.

### Key features:

- Installed with the RAW technology
- Strong refractory holding power
- Increasing the life time of the refractory
- Studs available in any alloy
- Fast installation
- Multi-layer refractory solutions





## PRE-HEATERS





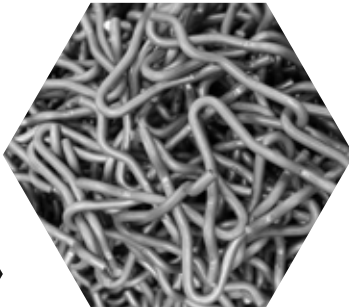
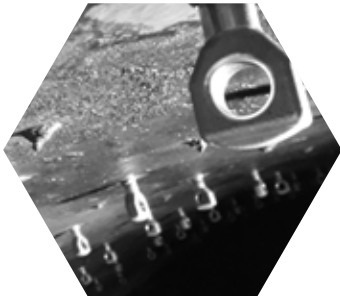
# RAW - Rapid Arc Welding

Developed by SILICON, Rapid Arc Welding (RAW) is an innovative method of attaching refractory anchors inside high-temperature vessels and furnaces. It is recognized industry-wide for its ability to optimize the quality, speed and safety of the anchor installation process.

When it comes to designing, manufacturing and installing refractory anchors, we are the experts. We recognize that it is crucial for our customers to minimize downtime on their plants and projects. That's why we make every effort to ensure our service delivery is geared to achieve that goal, while complying with COVID-19 safe work procedures.

## Benefits:

- 60 - 70% fewer staff required in one space
- 10 times faster
- Fast response and mobilization
- Countless more benefits





### SILICON RAW Team

Using RAW technology, rather than conventional welding methods, our teams dramatically reduce installation time while achieving unparalleled efficiency. They use automatic computer-controlled technology combined with years of hands-on experience to achieve **optimum and persistent quality, countless time-savings and exceptional safety performance.**

Do you face challenges beyond those listed in this brochure? Don't hesitate to inquire about our additional solutions tailored for rotary kilns, cyclones, coolers, burner pipes, preheaters, air ducts, calciners, and various other industrial process units. We're here to provide comprehensive support for all your needs.

**We have a solution for every anchoring problem.**





*Find out how  
we can help  
you.*

# SILICON

*Your partner for all refractory anchoring solutions*

## **Corporate Vision**

To positively impact industries by providing superior anchoring systems and time saving Rapid Arc Welding services.

## **Corporate Mission**

To provide the technical and metallurgical expertise required to bring Refractory Anchors, and their installations, to the next level.

### **SILICON Headquarters**

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