

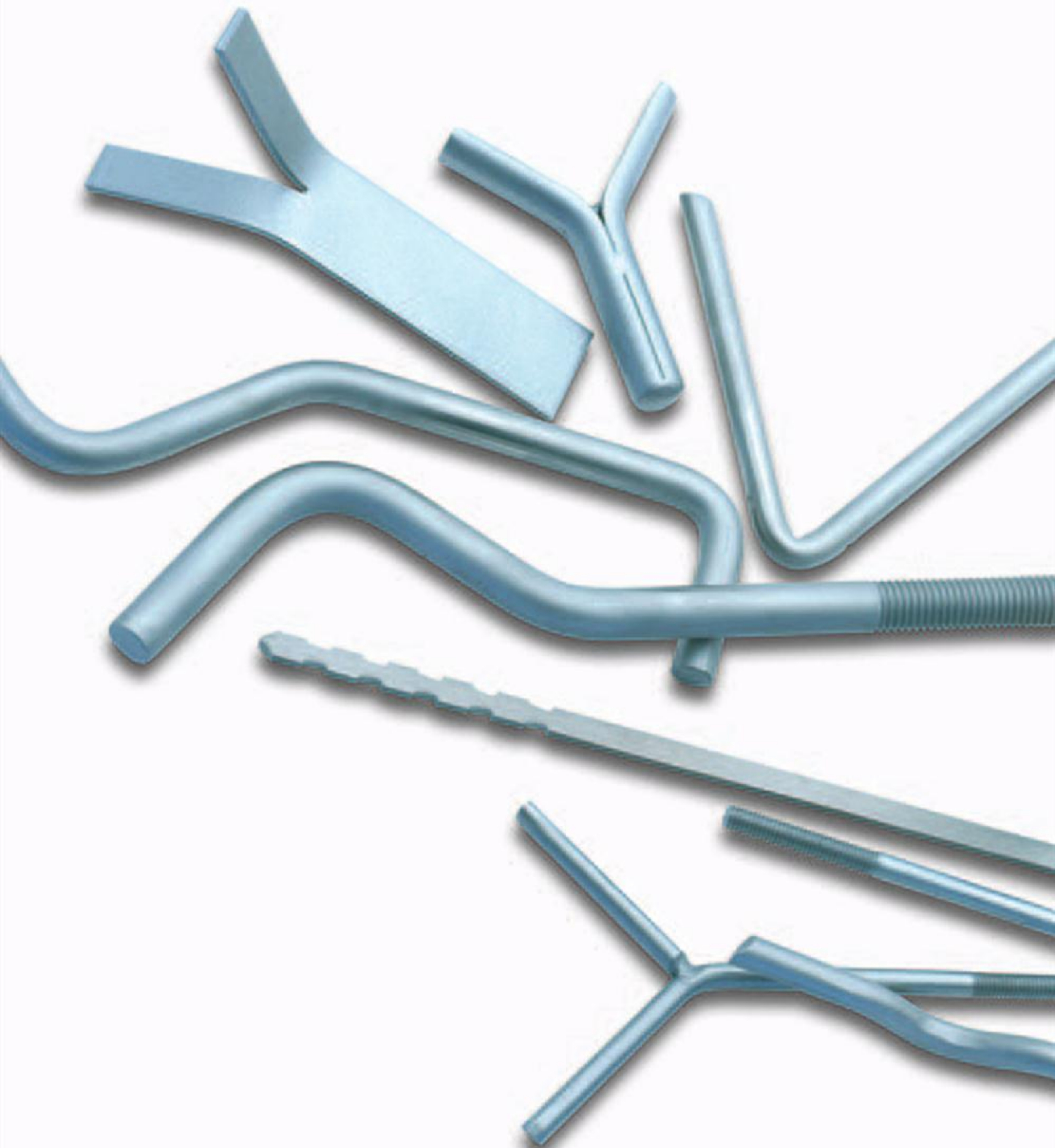
CI/SIB	(21)	Hh	
October 2007			



## Refractory Fixings for the Heat Treatment Industry

**Ancon**<sup>®</sup>  
BUILDING PRODUCTS







**Ancon designs and manufactures high integrity steel products for the construction industry. Through continuous programmes of new product development, inward investment and employee advancement, the company is committed to maintaining the highest level of customer service within a dynamic and challenging industry.**



- Masonry Support Systems
- Windposts and Lintels
- Wall Ties and Restraint Fixings
- Channel and Bolt Fixings
- Tension Systems
- Special Fabrications
- Flooring and Formed Sections
- Shear Load Connectors
- Reinforcing Bar Couplers
- Reinforcement Continuity Systems
- Punching Shear Reinforcement
- Insulated Balcony Connectors

**Refractory Fixings**

Ancon manufactures fixings for most types of insulation material, such as fibre linings, castable linings and refractory bricks. Standard fixings are available in stainless steel grades 1.4301 (304) and 1.4845 (310), and Inconel 601. Other grades of stainless steel, mild steels and alloys are also available.

Ancon is pleased to advise on the correct selection of fixings and also provides a quick response to quotation requests.

- Materials 4
- Stainless Steel at Elevated Temperatures 4
- Material Specification 4
- Using Stainless Steel at High Temperatures 4
- Refractory Anchor Systems 5
- Cast-in Anchors 5
- Anchors for Brick Installation 6
- Bespoke Anchors 6
- Mesh Anchors 6
- Special Fabrications 6
- Ceramic Fibre Fixing Systems 7



ISO 9001: 2000  
FM 12226



ISO 14001: 2004  
EMS 505377





# Refractory Fixings

## MATERIALS

Ancon manufactures refractory anchors and fibre fixing systems to exacting tolerances in a wide range of stainless steel and higher alloys. Standard fixings are available in stainless steel grade 1.4301 (304) and grade 1.4845 (310), and Inconel 601. Other grades of stainless steel, mild steels and alloys are available to suit requirements, including Stainless Steel grade 1.4401 (316).

## STAINLESS STEEL AT ELEVATED TEMPERATURES

Standard Stainless Steels provide corrosion resistance in a number of aggressive situations. They also provide very good oxidation and scaling resistance at elevated temperatures.

In situations where standard steels reach their temperature limits, higher alloy and specially designed stainless steels provide a combination of increased strength and oxidation resistance, extending the useful working range up to higher temperatures around 1200°C.

Specification	Type 304	Type 310	Inconel™ Alloy 601
Nearest Werkstoff	1.4301	1.4845	-
Maximum service temp. under certain conditions	800°C	1100°C	1150-1230°C
Melting point	1440°C	1490°C	1300-1375°C

Notes: Inconel™ is a trademark of INCO Ltd

## Typical Chemical Specification (%)

Specification	Type 304	Type 310	Inconel Alloy 601	Type 309	Type 316	Type 321	330 Alloy	600 Alloy	800H Alloy
Euronorm/ Werkstoff Ref	1.4301	1.4845	-	1.4833	1.4401	1.4878	-	-	-
C	0.040	0.050	0.500	0.060	0.040	0.050	0.060	0.050	0.060
S	0.20 - 1.00	0.20 - 1.00	0.500	1.000	1.000	1.000	1.750	0.500	1.000
Mn	0.50 - 2.00	0.50 - 2.00	1.000	2.000	2.000	2.000	2.000	1.000	1.500
P (Max)	0.045	0.045	-	0.450	0.045	0.045	0.400	0.015	-
S (Max)	0.030	0.030	0.015	0.030	0.030	0.030	0.300	0.015	-
Cr	18.30	25.00	21.00 - 24.00	22.50	16.80	17.30	19.000	14.00 - 17.00	19.00 - 23.00
Al	-	-	1.00 - 1.70	-	-	-	-	-	0.15 - 0.60
Ni	8.70	20.00	58.00 - 63.00	12.50	10.70	9.20	35.000	72.000	30.00 - 35.00
Others	-	-	Cu 0.5 Bal Fe	-	-	Ti less than /equal to 5 x C	-	Cu 0.5	Cu 0.75 max S=0.015 max Al + Ti=0 x 85-1.20
Mo	-	-	-	-	2.20	-	-	-	-
Ti	-	-	0.500	-	-	-	-	-	0.10 - 0.60

## MATERIAL SPECIFICATION

Refractory fixings are available in a range of stainless steels and higher alloys:

### Grade 1.4301 (304) (18/8)

The most widely used stainless steel grade containing typically 18% Chromium and 8% Nickel as the main alloying elements. This grade has excellent welding properties and is easily formed and fabricated.

### Grade 310

A heat resisting steel that combines excellent resistance to both corrosion and oxidation at elevated temperatures. It is resistant to moderate thermal shock and shows high strength at high temperatures.

### Inconel Alloy 601

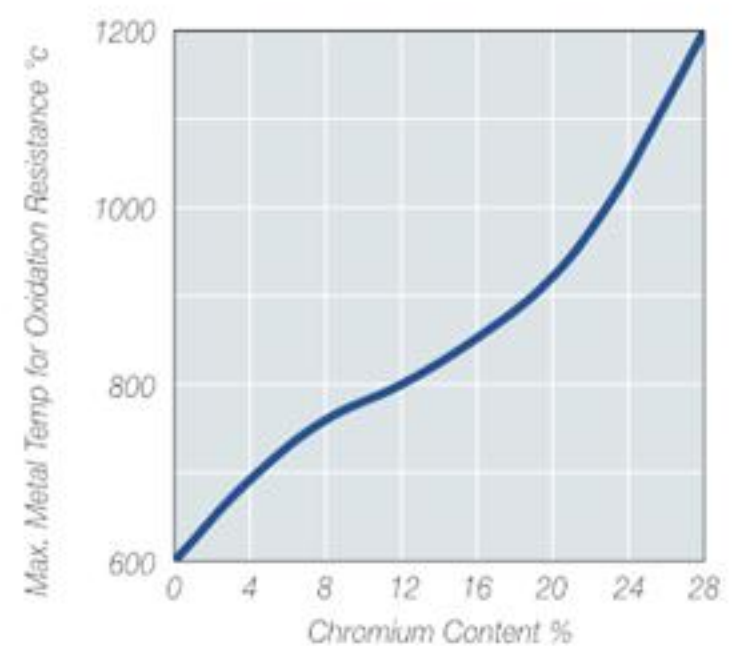
Inconel 601 has an outstanding resistance to corrosion and to high temperature oxidation. The material also has good resistance to aqueous corrosion and high mechanical strength.

### Other Grades

Refractory fixings can be supplied in other grades on request, including Stainless Steel grade 1.4401 (316). Please contact Ancon for more details.

## USING STAINLESS STEEL AT HIGH TEMPERATURES

The resistance to oxidation of stainless steel depends largely on the chromium content. Two other alloying elements, nickel and silicon, can also be instrumental in enhancing the oxidation resistance of the steels. Nickel in the alloy minimises oxide spalling. Silicon increases oxidation resistance by improving the compaction of the scale formed and thereby allows the steel to be used at higher operating temperatures. Corrosion in air or steam occurs relatively slowly due to the formation of a compact adherent chromium oxide based scale.



Effect of Chromium Content in Steel on the Resistance to Oxidising Products of Combustion



Tel: +44 (0) 114 275 5224 Web: www.ancon.co.uk

**REFRACTORY ANCHOR SYSTEMS**

Ancon manufactures a wide range of refractory anchor fixings to suit any particular application for retaining castable and brick installations.

- Refractory Anchors
- Refractory Brick Fixings
- Special Fixings and Special Fabrications

Manufactured from round bar or plate section, the anchors are available in a number of standard shapes. They are fixed with a thread or a weld, and can be supplied with a weld foot. The fixings are available in the full range of stainless steels and alloys, and can be made to suit any depth of lining.

**CAST-IN ANCHORS**

**'Y' Anchors**

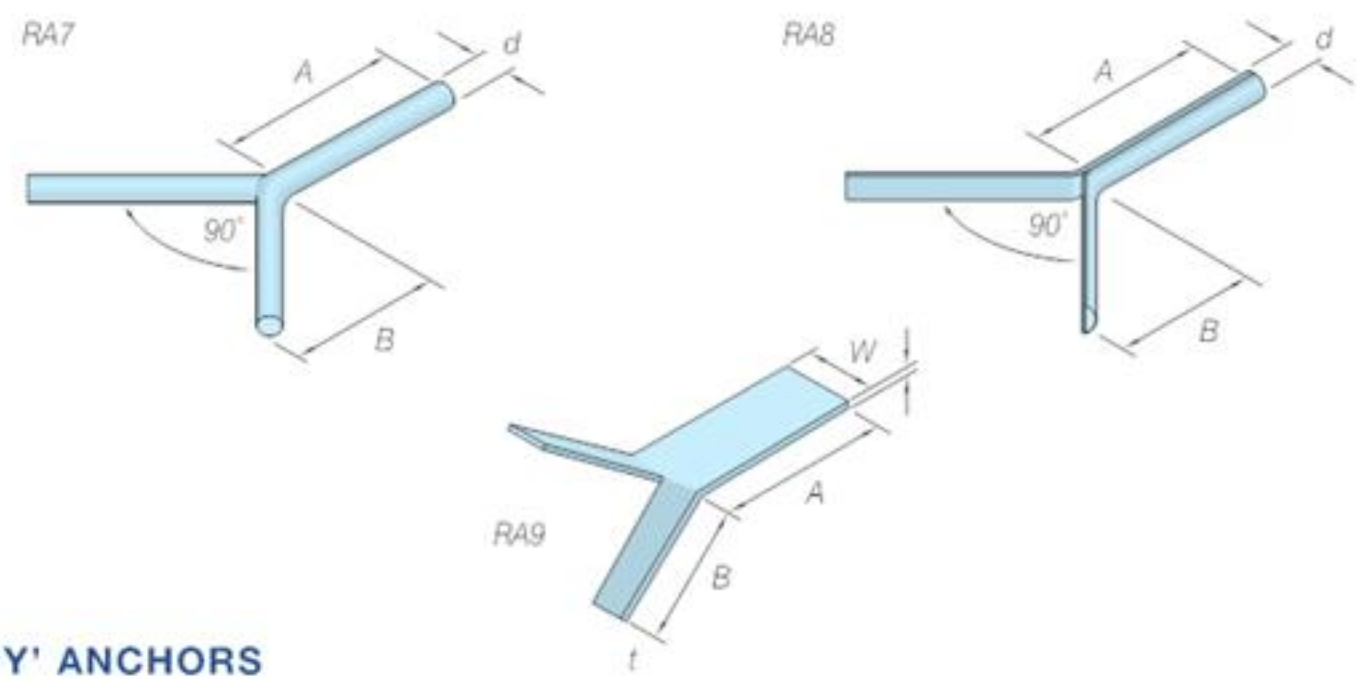
These anchors are manufactured from 5-12mm diameter bar or from plate section. 'Y' anchors made from round bar can be supplied open to any angle, with a plain end, weld leg or thread. The tips can be fitted with plastic caps to enable expansion of the tips at temperature. 'Y' anchors from plate section can be supplied open to any angle, or supplied closed for installation of pre-drilled fibreboard or other initial layers prior to opening on site. Anchors can also be supplied pre-welded to a mild steel base plate for ease of installation on site.

**'V' Anchors**

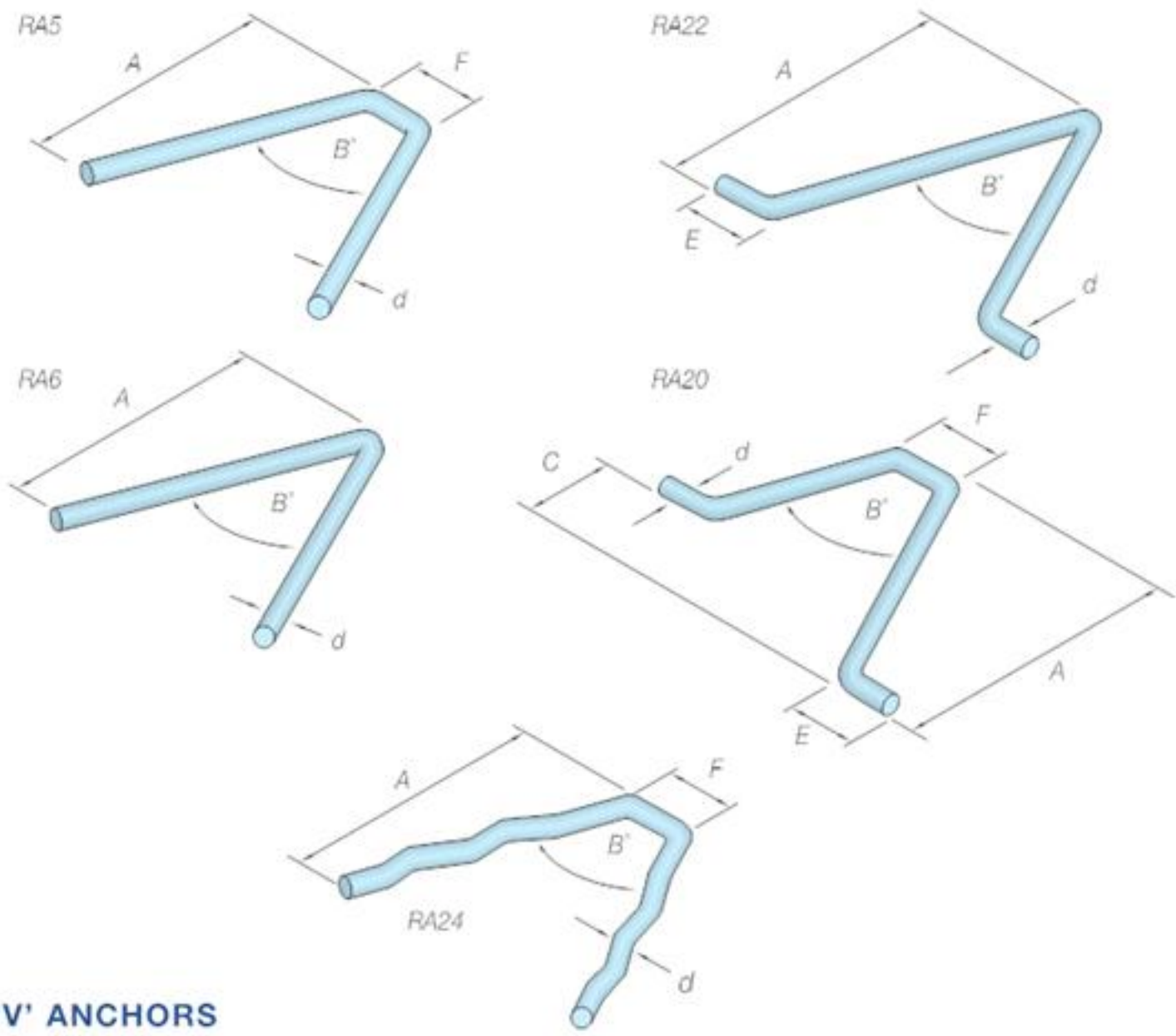
Manufactured from bar diameter 5-12mm. The anchor legs can be supplied to individual requirements with odd lengths, with bends or crimps, and with plastic end caps.

**Crook Anchors**

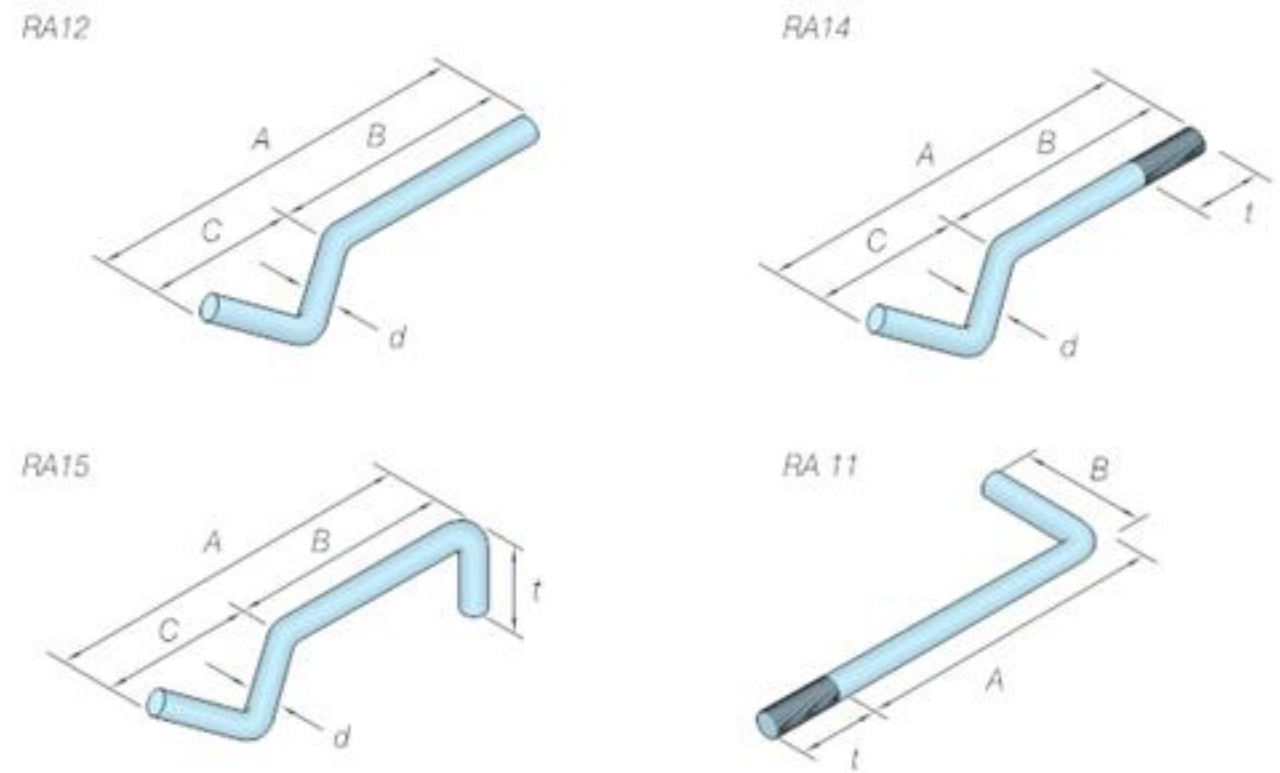
Crook anchors are manufactured from 5-12mm diameter bar. The crook is available with a span of 75mm, 100mm or 125mm. Crook anchors can be supplied with a plain end, weld leg, thread or bent to fit a pre-welded cleat.



**'Y' ANCHORS**



**'V' ANCHORS**



**CROOK ANCHORS**



# Refractory Fixings

## ANCHORS FOR BRICK INSTALLATION

A range of refractory fixings for brick installations is available. The anchors are designed to fit refractory bricks, and can be made to customers' specifications to suit any furnace brick. The range includes brick hooks made from bar, C-clips manufactured from plate and 'scissor clips'.

## BESPOKE ANCHORS

Bespoke refractory anchors can be made to order, including two part anchors and fixings with multiple anchor legs. Please contact Ancon with your requirements.

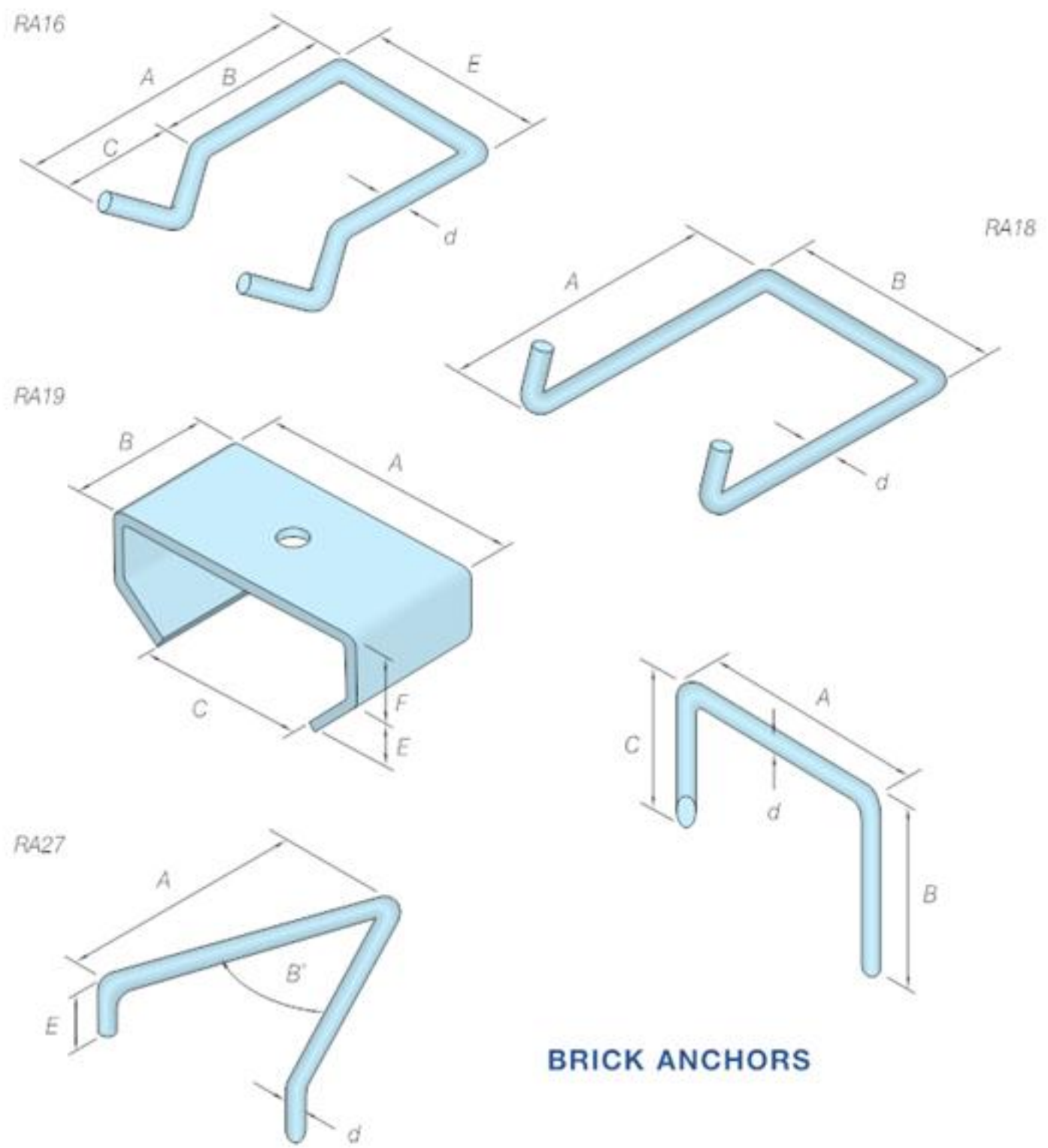
## MESH ANCHORS

A mesh fixing is available for retaining mesh lining. The fixing is supplied open, and is welded to the furnace lining.

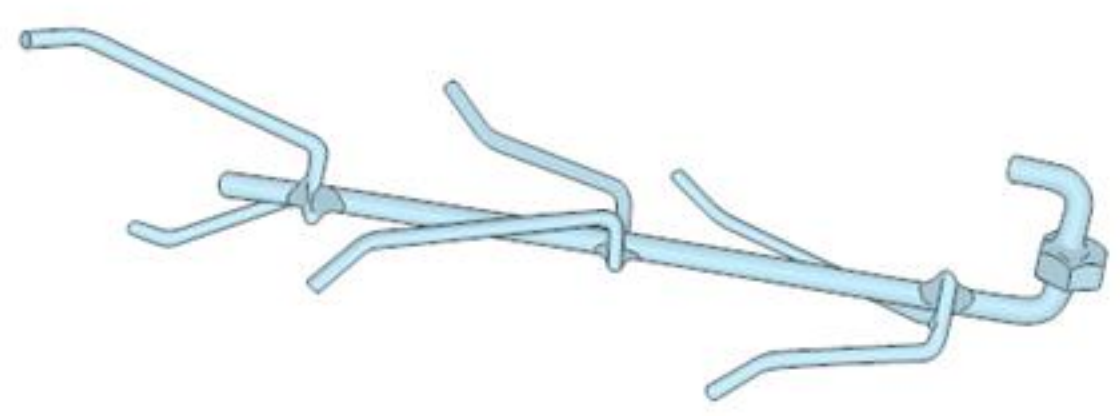
## SPECIAL FABRICATIONS

Ancon has many years experience producing special fabrications to individual customer requirements. Bespoke stainless steel refractory fabrications can be designed and manufactured to operate in high temperature environments. These include brickwork support systems for chimney and furnace applications, and incineration components.

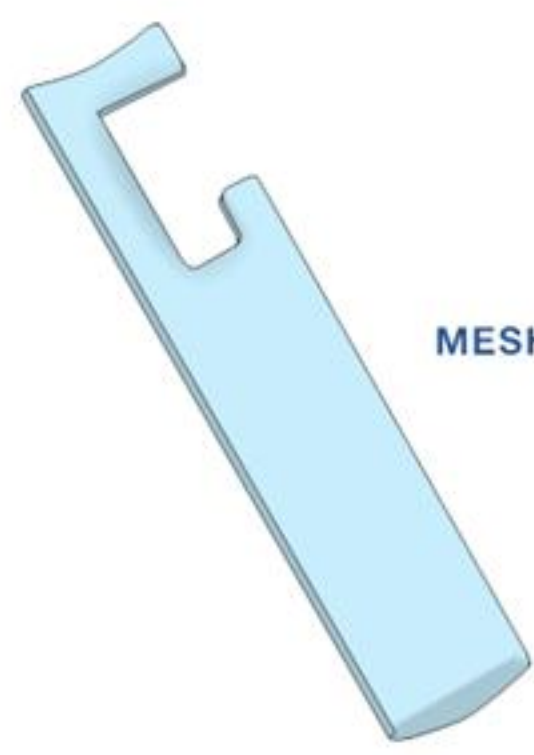
Advanced manufacturing equipment and a substantial raw material stock are available to provide a consistently high level of service.



**BRICK ANCHORS**



**BESPOKE ANCHOR**



**MESH RETAINER**

Tel: +44 (0) 114 275 5224 Web: www.ancon.co.uk

### CERAMIC FIBRE FIXING SYSTEMS

A range of fixing systems is available for retaining ceramic fibre layers onto the furnace casing. Fixing studs can be supplied with a plain end or with a weld foot if required.

#### Twistlock System

Twistlock is a fixing system for ceramic fibre blankets. The standard set comprises a twistlock stud, ceramic arc shield, carbon steel speedfix washer, and a stainless steel twistlock washer. The system provides fast, simple, and secure retention of the lining. The twistlock stud is manufactured from 6.35 x 3.18mm section in lengths from 40mm with notches to retain the twistlock stainless steel washer.



#### Threaded Fixing System

The threaded fixing system is used for new installations and repairs to existing plant. The standard set comprises an M5 threaded stud, ceramic arc shield, carbon steel speedfix washer, stainless steel clearance washer and M5 hex nut to hold the washer in place. The studs are available in any length from 40mm, and can be supplied fully threaded, threaded one or both ends, and incorporating a weld foot.

Threaded sets are also available in non-standard sizes as M6, M8, M10, M12 and M16.







**Ancon Building Products**  
President Way, President Park  
Sheffield S4 7UR  
United Kingdom  
Tel: +44 (0) 114 275 5224  
Fax: +44 (0) 114 276 8543  
Email: [info@ancon.co.uk](mailto:info@ancon.co.uk)  
Visit: [www.ancon.co.uk](http://www.ancon.co.uk)

**Ancon (Middle East) FZE**  
PO Box 17225  
Jebel Ali  
Dubai  
United Arab Emirates  
Tel: +971 (0) 4 883 4346  
Fax: +971 (0) 4 883 4347  
Email: [anconcl@emirates.net.ae](mailto:anconcl@emirates.net.ae)

**Ancon Building Products**  
114 Kurrajong Avenue  
Mount Druitt  
Sydney  
NSW 2770  
Australia  
Tel: +61 (0) 2 9675 1000  
Fax: +61 (0) 2 8808 1111  
Email: [pac.ancon@anconbp.com.au](mailto:pac.ancon@anconbp.com.au)  
Visit: [www.anconbp.com.au](http://www.anconbp.com.au)

**Ancon (Schweiz) AG**  
Gewerbezone Widalmi 10  
3216 Ried bei Kerzers  
Switzerland  
Tel: +41 (0) 31 750 3030  
Fax: +41 (0) 31 750 3033  
Email: [info@ancon.ch](mailto:info@ancon.ch)  
Visit: [www.ancon.ch](http://www.ancon.ch)

**Ancon Building Products GesmbH**  
Gerspergasse 9/3 Top 1  
A-1210 Vienna  
Austria  
Tel: +43 (0) 1 259 58 62-0  
Fax: +43 (0) 1 259 58 62-40  
Email: [info@ancon.at](mailto:info@ancon.at)  
Visit: [www.ancon.at](http://www.ancon.at)

**Ancon GmbH**  
Bartholomäusstrasse 26  
90489 Nuremberg  
Germany  
Tel: +49 (0) 911 955 1234 0  
Fax: +49 (0) 911 955 1234 9  
Email: [info@anconbp.de](mailto:info@anconbp.de)  
Visit: [www.anconbp.de](http://www.anconbp.de)



© Ancon Building Products 2004

The construction applications and details provided in this literature are indicative only. In every case, project working details should be entrusted to appropriately qualified and experienced persons.

Whilst every care has been exercised in the preparation of this document to ensure that any advice, recommendations or information is accurate, no liability or responsibility of any kind is accepted in respect of Ancon Building Products.

With a policy of continuous product development Ancon Building Products reserves the right to modify product design and specification without due notice.



ISO 9001: 2000  
FM 12226



ISO 14001: 2004  
EMS 505377