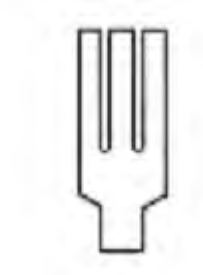




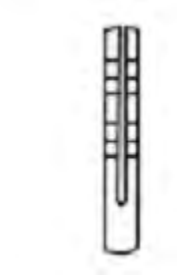
**REFRACTORY STUDS**



**RECTANGULAR  
TWO TINE**



**RECTANGULAR  
THREE TINE**



**RECTANGULAR  
CORRUGATED**



**INSULTWIST**



**BULL HORN**



**"Y" ANCHOR**



**SPLIT PIN**



**"T" PLATE**



**KNURLED**

\*OTHER STUDS AVAILABLE ON REQUEST.

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# GENERAL SPECIFICATIONS ARC STUD WELDED ANCHORS

ARC STUD WELDED REFRACTORY ANCHORS			
<b>MATERIAL:</b>	Standard in low carbon steel and 302/304/305 stainless. Monel, inconel, and other grades of stainless steel are available.		
<b>PLATING:</b>	Plating is not standard. Cadmium to ASTM A 165, type TS and zinc to ASTM B 633 are available. Non-weldable plating is removed from the weld end to avoid contamination of the weld.		
<b>ANNEALING:</b>	Low carbon steel can be annealed to a maximum of 75 Rockwell B and stainless steel to a maximum of 90 Rockwell B.		
<b>WELD BASE:</b>	Solid flux is provided where required.		
<b>STUD LENGTH:</b>	<b>SUNBELT</b> arc stud length designations are BEFORE WELD. AFTER WELD lengths are shown in the table.	<b>STUD DIAMETER</b>	<b>APPROX. REDUCTION</b>
		3/16" thru 1/2"	1/8"
		5/8" thru 7/8"	3/16"
		7/8" and over	1/4"
<b>FERRULES:</b>	All orders include ferrules when they are required.		

<p style="text-align: center;"><b><u>DESIGNING WITH SUNBELT ARC STUD WELDED REFRACTORY ANCHORS:</u></b></p> <p><b>Advantages:</b> SUNBELT arc stud welded refractory anchors reduce costs and downtime and increase production through speedier installation and improved product quality. Arc stud welding systems are portable and require minimal instruction or maintenance for use. Speed of anchor application and ease of use reduce labor requirements and eliminate other complicated fastening systems while maintaining excellent weld quality and improved refractory holding power.</p>	<p style="text-align: center;"><b><u>HOW TO CHOOSE THE PROPER REFRACTORY ANCHOR</u></b></p> <p><b>STYLE:</b> See table on 11-3</p> <p><b>MATERIAL:</b> The following temperature limits at the hot face or surface of the refractory, are recommended for anchors of the steel grades shown.</p> <table border="1" style="width: 100%;"> <thead> <tr style="background-color: yellow;"> <th>STEEL TYPE</th> <th>HOT FACE TEMP. LIMIT</th> </tr> </thead> <tbody> <tr> <td>Low Carbon Steel</td> <td>1000° F</td> </tr> <tr> <td>Stainless-304 or 305</td> <td>2000° F</td> </tr> <tr> <td>Stainless-309 or 310</td> <td>2500° F</td> </tr> </tbody> </table> <p>The temperatures indicated are those encountered in continuous service. Slightly higher temperatures can be withstood if the fluctuation is cyclic in nature. For applications above 2500° F, the anchors can be made of inconel or other special metals.</p>	STEEL TYPE	HOT FACE TEMP. LIMIT	Low Carbon Steel	1000° F	Stainless-304 or 305	2000° F	Stainless-309 or 310	2500° F
STEEL TYPE	HOT FACE TEMP. LIMIT								
Low Carbon Steel	1000° F								
Stainless-304 or 305	2000° F								
Stainless-309 or 310	2500° F								

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# ARC STUD WELDED REFRACTORY ANCHOR APPLICATION GUIDE (TABLE #2)

APPLICATION		REFRACTORY ANCHOR STYLE													
		RA EJ-256	ARC ST	ARC B-NT	ARC R-WH	ARC R-TS	RA R-2T	RA R-3T	RA R-C	RA UL	RA BH	RA Y	RA SP	RA T-PLT	RA EJ-801
REBAR & MESH	a) Reinforcing Bar														
	b) Wire Mesh														
	c) Hex-Mesh Steel														
BLOCK INSULATION ONLY															
CONCRETE CONSTRUCTION															
REFRACTORY CONSTRUCTION	a) Castables														
	b) Plastics														
	c) Gunning Mixes														
	d) Block Insulation														
SINGLE COMPONENT	a) Under 5" Thick														
	b) Over 5" Thick														
TWO COMPONENT LININGS	a) Under 5" Thick														
	b) Over 5" Thick														
	c) Brick Backing														
	d) Castable Backing														
	e) Block Insulation Backing														

## HOW TO APPLY THE REFRACTORY ANCHOR

**ANCHOR LENGTH & SPACING:** All information given in this section is general and may vary according to special service conditions encountered. Therefore, this information should only be used as a guide. The anchor length shown is the after-weld length of the longest section of the anchor. The lengths (in table #3) are recommended to insure good refractory holding power, while preventing rapid oxidation of the anchor and preventing spalling of the refractory surface. Generally the anchor length should be about 75% of the refractory depth, however, the end of the anchor should never be closer to the refractory hot face than 1". The anchor spacing will be determined by the type and density of the refractory used, and how and where it is to be applied. For anchoring purposes, the refractory can be classified as LOW DENSITY (25-90 lbs. per cu. Ft.) and HIGH DENSITY (100-200 lbs. per cu. Ft.). High-density material can be used in one component linings of any thickness. Low-density material is only used in one component linings to a depth of 6". Frequently, in sections more than 6" thick, high-density material composes the working lining with a back up of low-density material.

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**REFRACTORY ANCHOR  
PLACEMENT (TABLE #3)**

REFRACTORY THICKNESS	ANCHOR LENGTH	REFRACTORY DENSITY	CENTER – CENTER ANCHOR SPACING	
			WALL	ROOF
2"	1"	Low	12" x 12"	9" x 9"
		High	18" x 18"	12" x 12"
3"	2"	Low	12" x 12"	12" x 12"
		High	18" x 18"	18" x 18"
4"	3"	Low	12" x 12"	12" x 12"
		High	18" x 12"	18" x 12"
5"	3-1/2"	Low	12" x 12"	12" x 9"
		High	18" x 12"	18" x 12"
6"	4-1/2"	Low	12" x 9"	9" x 9"
		High	18" x 12"	12" x 12"
7"	5"	High	18" x 12"	12" x 12"
8"	6"	High	18" x 12"	12" x 12"
9"	6-1/2"	High	18" x 12"	12" x 9"
10"	7-1/2"	High	12" x 12"	12" x 9"
11"	8"	High	12" x 12"	12" x 9"
12"	9"	High	12" x 12"	12" x 9"
13"	10"	High	12" x 12"	12" x 9"

**QUANTITY OF ANCHORS REQUIRED (TABLE #4)**

ANCHOR SPACING	9" X 9"	12" X 9"	12" X 12"	18" X 12"	18" X 18"
ANCHORS REQ. PER SQ. FOOT	1.80	1.33	1.00	0.67	0.44

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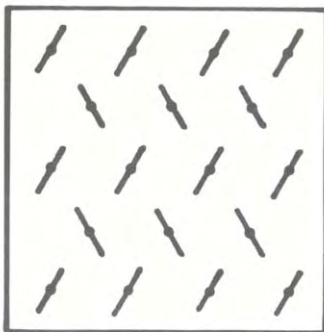
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713-939-8903  
fax 713-939-9013



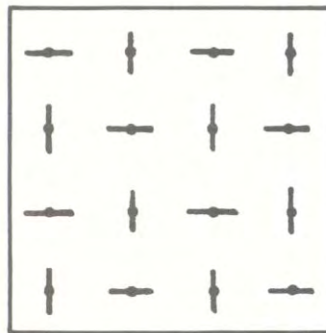
## **REFRACTORY ANCHORS: ANCHOR PATTERNS**

### **ANCHOR PATTERNS**

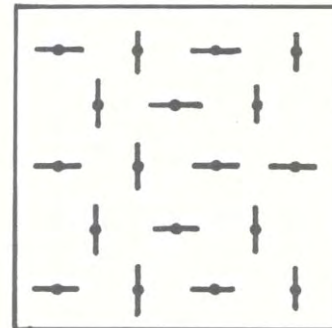
The three anchor patterns (shown below) are in use today; the latter two being the more popular. The important factor is that an irregular pattern is achieved by opposing anchors so that secure retention of the refractory in all directions is achieved.



**DIAMOND PATTERN**



**SQUARE PATTERN**



**STAGGERED PATTERN**

#### **NOTE:**

The expansion of the steel anchor is usually greater than that of the refractory material, especially in dense, high strength castables. Metallic refractory anchors can be coated with various materials that will burn off and allow room for the anchor to expand

Consult your refractory supplier for the proper refractory and coating material to meet your application needs.

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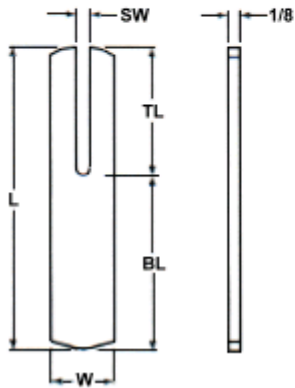
**11-5**

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**REFRACTORY STUDS:  
RECTANGULAR TWO TINE**

<b>To order or specify give:</b>				
Product	Size:	Length:	Tine Length:	Material:
Code:	Specify	Specify	Specify	Specify
<b>RA R-2T</b>	<b>1/8 x W</b>	<b>L</b>	<b>TL</b>	



<i>STUD</i>					
W	SW	MIN L	MIN BL	MIN TL	FERRULE CODE
3/8	1/8	1-1/4	1/4	1"	R375
5/8	5/32	1-1/4	5/8	5/8	R625

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 304 standard Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile ..... 60,000 psi (min.) Yield ..... 50,000 psi (min.) Elongation ..... 20% (in 2 inches)	Values for various grades available upon request.
<b>PLATING</b>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

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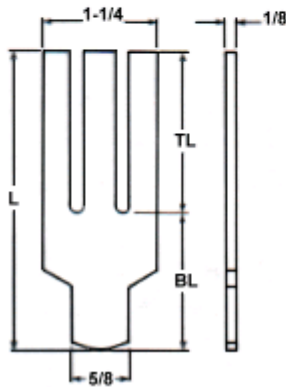


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**REFRACTORY STUDS:  
RECTANGULAR THREE TINE**

<b>To order or specify give:</b>				
Product	Size:	Length:	Tine Length:	Material:
Code:	Specify	Specify	Specify	Specify
<b>RA R-31</b>	<b>1/8 x 5/8</b>	<b>L</b>	<b>TL</b>	



<i>STUD</i>			
MIN L	MIN BL	MIN TL	FERRULE CODE
2-1/4	1-1/4	1	R265

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 304 standard Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile ..... 60,000 psi (min.) Yield ..... 50,000 psi (min.) Elongation ..... 20% (in 2 inches)	Values for various grades available upon request.
<b>PLATING</b>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

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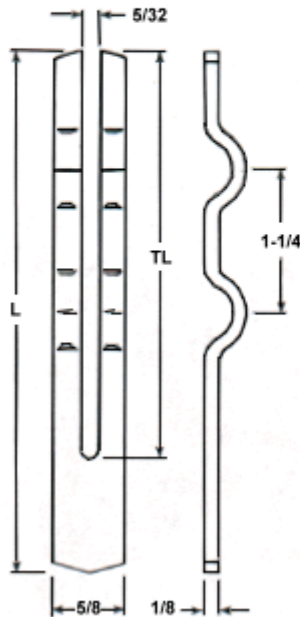
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**713-939-8903**  
**fax 713-939-9013**



## REFRACTORY STUDS: RECTANGULAR CORRUGATED

**To order or specify give:**

Product Code: RA RC Size: Specify 1/8 x 5/8 Length: Specify L Material: Specify



<i>STUD</i>			
L	TL	CORRUGATIONS	FERRULE CODE
2-1/8 thru 3"	1-5/8	1	R625
3-1/8 thru 4"	2-5/8	2	R625
4-1/8 thru 13"	3-5/8	3	R625

<i>MATERIAL</i>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 304, 310 and 316 standard Other grades available upon request.
<i>MECHANICAL PROPERTIES</i>	Tensile ..... 60,000 psi (min.) Yield ..... 50,000 psi (min.) Elongation..... 20% (in 2 inches)	Values for various grades available upon request.
<i>PLATING</i>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

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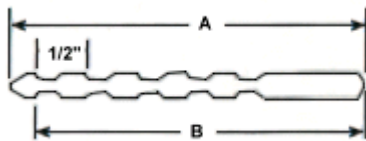
**1-800-462-9353**  
**713-939-8903**  
 fax **713-939-9013**





# REFRACTORY WELD STUDS: INSULTWIST

**To order or specify give:**  
 Product Code: **IT**    Diameter: Specify **D**    Length: Specify **L**    Material: Specify

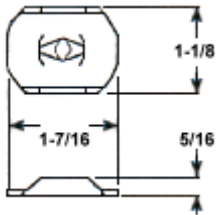


STUD	
<b>MIN L</b>	<b>FERRULE CODE</b>
2"	F187

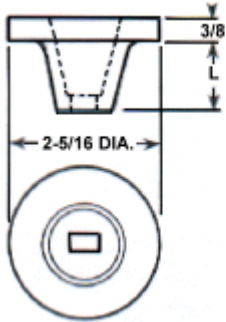
<b>MATERIAL</b>	<b>INCONEL</b> AISI grade - 601 std. Other grades available upon request.	<b>STAINLESS STEEL</b> AISI grade - 304, 310 and 330 standard Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Values for various grades available upon request.	Values for various grades available upon request.

### Lok Washer

Product Code  
WCN ULWSHR



<b>APPLICATION</b>	Designed for 1/4 turn locking on to SUNBELT INSULTWIST refractory anchors.
<b>MATERIAL</b>	Stainless Steel: 304 Stainless Steel: 310 Stainless Steel: 330 Inconel: 601



### Insultwist Lok Cup

Product Code  
WCN ULCUP

<b>APPLICATION</b>	Designed for 1/4 turn locking on to Sunbelt Stud Welding Insultwist refractory anchors.	
<b>MATERIAL</b>	Ceramic (High Temperature)	
<b>SIZE</b>	<b>L</b>	Short - 1" Long - 2"

**Note:** Washers are not a component part of studs.

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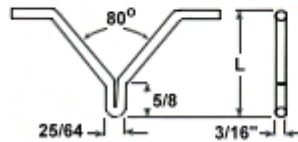


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**REFRACTORY STUDS: BULL HORN**

**To order or specify give:**  
 Product Code: **RA BH** Diameter: Specify **3/16** Length: Specify **L** Material: Specify



<i>STUD</i>	
<b>MIN L</b>	<b>FERRULE CODE</b>
1-1/8	F187

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 304/310/316/330 std. Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile .....60,000 psi (min.) Yield .....50,000 psi (min.) Elongation.....20% (in 2 inches)	Values for various grades available upon request.
<b>PLATING</b>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

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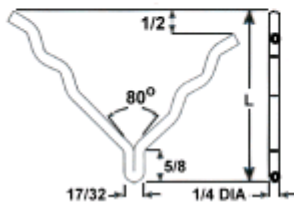
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## REFRACTORY STUDS: "Y" ANCHOR

**To order or specify give:**

Product Code: **RA Y** Diameter: Specify **1/4** Length: Specify **L** Material: Specify



STUD	
<b>MIN L</b>	<b>FERRULE CODE</b>
2-7/16	RA250

Studs shorter than L MIN will have no bends.

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 304/310/316/330 std. Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile ..... 60,000 psi (min.) Yield ..... 50,000 psi (min.) Elongation ..... 20% (in 2 inches)	Values for various grades available upon request.

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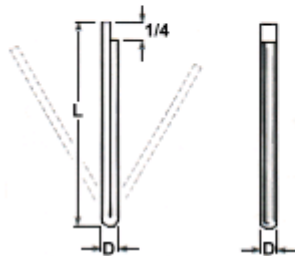
11-11

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**REFRACTORY STUDS: SPLIT PIN**

**To order or specify give:**  
 Product Code: **RA SP** Diameter: Specify **D** Length: Specify **L** Material: Specify



STUD		
D	MIN L	FERRULE CODE
3/16	7/8	P250
1/4	7/8	P312
5/16	7/8	P375

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 3021/304/305 std. Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile .....60,000 psi (min.) Yield .....50,000 psi (min.) Elongation.....20% (in 2 inches)	Values for various grades available upon request.
<b>PLATING</b>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

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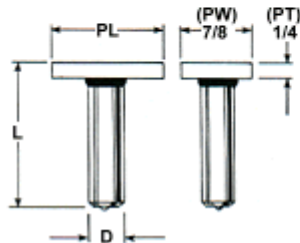
1-800-462-9353  
 713-939-8903  
 fax 713-939-9013



# REFRACTORY STUDS: "T" PLATE

**To order or specify give:**

Product	Diameter:	Length:	Plate Length:	Material:
Code: <b>RA T-PLT</b>	Specify <b>D</b>	Specify <b>L</b>	Specify <b>PL</b>	Specify



STUD			
L	MIN L	PL	FERRULE CODE
3/8	1-1/8	2-1/2	F375
3/8	1-1/8	3	
1/2	1-1/8	2-1/2	F500
1/2	1-1/8	3	

NOTE: Other sizes are available upon request

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max. P - 0.04% max. Mn - 0.90% max. S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 302/304/305 std. Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile .....60,000 psi (min.) Yield .....50,000 psi (min.) Elongation.....20% (in 2 inches)	Values for various grades available upon request.
<b>PLATING</b>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

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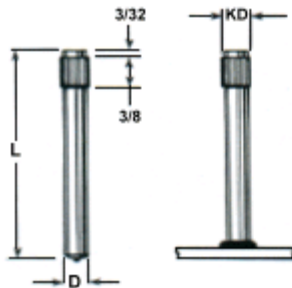


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# REFRACTORY STUDS: KNURLED

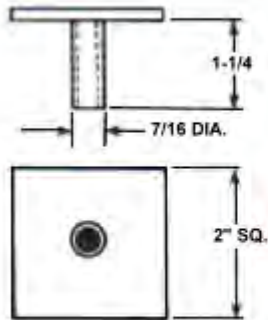
**To order or specify give:**  
 Product Code: **RA KNRL**    Diameter: Specify **D**    Length: Specify **L**    Material: Specify



STUD			
D	MIN L	KD	FERRULE CODE
5/16	1"	.327	F312

<b>MATERIAL</b>	<b>MILD STEEL</b> C - 0.23% max.    P - 0.04% max. Mn - 0.90% max.    S - 0.05% max.	<b>STAINLESS STEEL</b> AISI grade - 302/304/305/316 standard Other grades available upon request.
<b>MECHANICAL PROPERTIES</b>	Tensile ..... 60,000 psi (min.) Elongation ..... 20% (in 2 inches)	Values for various grades available upon request.
<b>PLATING</b>	Plating is not standard. Cadmium, Copper, Nickel, and Zinc available upon customer request.	Does not apply to Stainless.

**Refractory Anchor: Drive Plate**



<b>APPLICATION</b>	Designed to lock on to Sunbelt Stud Welding 5/16" diameter Knurled Studs.
<b>MATERIAL</b>	Mild Steel

Part No.  
183-1000-04

DRIVEPLATE: Sold separately. Not a composite part of stud.

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