WINCRO



Reinforcement 6.0

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Ties & Restraints Masonry Support Systems			<u> </u>
Lintels	,	1	2
Channel & Bolt Fixings			
Windposts			
Reinforcements			
Flooring Systems			

REINFORCEMENTS

Our range of reinforcing bars and fixings have been developed over many years and are used in a wide variety of applications where long term durability is required in reinforced concrete structures.

COMPANY PROFILE

Wincro Metal Industries is a long established company founded on the principles of innovative design, quality manufacture and outstanding customer service. Our steadfast commitment to those values over the years has firmly established Wincro as one of today's leading designers and manufacturers of Stainless Steel Building Products. It has also earned the company an excellent reputation for quality and reliability amongst the many architects, specifiers, engineers and building contractors that the business serves.

Wincro is based in Sheffield, the home of stainless steel. We produce a wide range of corrosion resistant fixings, support systems, flooring and access equipment. Our range is constantly evolving and developing in order to keep pace with the demands of a fast-moving industry and the changing needs of our clients.

DESIGN SERVICE

All designs and details are supplied by Wincro's team of experienced technical design professionals who work closely with architects, engineers, specifiers, designers and contractors. Assistance can range from simple guidance or advice on standard product selection to a fully computerised design service and detailed consultations on incorporating special designs. Site visits can also be arranged.

MAINTAINING HIGH STANDARDS

We maintain the highest standards both in terms of the materials from which our products are made and the techniques we employ in manufacturing. Our products comply with and, in many cases, exceed all relevant British standards. We have invested in some of the most advanced machinery in the industry to help assure product quality and to enable us to provide a rapid turn-round of all orders, large or small, standard or bespoke.

QUALITY STAINLESS STEEL

All our reinforcements are manufactured from high quality grade 1.4301 (304) stainless steel for optimum performance and long life. Grade 1.4401 (316) stainless steel can be specified for use in corrosive environments.

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REINFORCEMENT PRODUCT RANGE

The Wincro comprehensive range of stainless steel reinforcing products ensure high resistance to corrosion, maintenance free construction, high temperature strength, with low magnetic properties.



1.0 '	AR CODES		
Notation	Material Grade		
S	BS 6744 stainless steel grades		
X	Special reinforcement		

REINFORCING BAR

Stainless Steel Reinforcing Bar has been used in structural applications over many years, providing strength and long term durability to reinforced concrete structures.

Stainless steel rebar has many important characteristics:

- High resistance to corrosion (no loss of cross sectional area)
- Long term durability
- Excellent mechanical properties (enhanced by warm or cold working)
- High ductility (readily bent, threaded etc. and excellent at low temperatures)
- Good high temperature performance
- Low magnetic permeability (considered non-magnetic)
- High limiting fatigue strength

High resistance to corrosion coupled with good mechanical properties, weldability and non-magnetic properties makes Wincro stainless steel rebar a highly durable and versatile product providing the designer with a long term, maintenance free solution to many types of construction applications.



1.0 ^{Rei}	INFORCING BAR DETAILS				
Nominal	Cross-sectional	Nominal mass	Cutting tolerances (mm)		
(mm)	(mm ²)	(kg)	Sheared bar	Sawn bar	
6	28.3	0.225	±2	±1	
8	50.3	0.399	±2	±1	
10	78.5	0.624	±2	±1	
12	113.1	0.899	±2	±1	
16	201.1	1.599		±1	
20	314.2	2.498		±1	
25	490.9	3.903		±1	
32	804.2	6.393		±1	

CORROSION RESISTANCE

The need for long term durability of concrete elements is essential to avoid future costly maintenance of structures. Wincro stainless steel rebar is highly resistant to corrosion and exhibits improved structural integrity over conventional carbon steel reinforcement. Our range of reinforcing bar is available in 1.4301 (304) and 1.4401 (316) stainless steel. It is recommended that a 316 grade of stainless steel is used where conditions are arduous.

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REINFORCING BAR BENDING CODES

Below we give the range of bending codes to British Standard BS 8666:2000 Shape Codes.

Non-standard shapes can be manufactured and the requirement for these must be accompanied by an appropriate dimensioned drawing.

The standard shapes below give the overall length of bar as a function of the standard dimensions.





CUTTING, BENDING AND FABRICATING

It is recommended that the Cutting, Bending and Fabricating of Stainless Steel Reinforcing Bars is carried out by a specialist reinforcement fabricator to achieve consistency and accuracy that cannot be achieved on site.

The accuracy of cutting and bending is vital to ensure:

- Proper fit on site
- To maintain the required lap lengths

- To maintain the required anchorage lengths
- To maintain the required cover

BENDING: Wincro Stainless Steel bars have high ductile properties and are therefore readily bent to meet BS4466. Due to the high cold working properties of stainless steel, higher bending loads are necessary.

size	Grad the req	Grade 250 bars complying with the requirements of BS 4449 (type R) and BS 6744 (type S)			e 460 bars complyi irements of BS 444 and BS 6744 (type	ing with 19 (type T) S)
d	r	n	h	r	n	h
6‡§	12	100	100	18	100	100
8	16	100	100	24	100	100
10	20	100	100	30	100	110
12	24	100	110	36	100	140
16	32	100	150	48	100	180
20‡	40	100	180	60	110	220
25‡	50	130	230	100	180	350
32‡	64	160	290	128	230	450
40‡	80	200	360	160	280	560
50‡§	100	250	450	200	350	700



PROPERTIES

1.0 CHEMICAL COMPOSITION TO BS:EN 10088-1									
Grade	Steel designation		Composition (%)						
		С	Si	Mn	S	Р	Cr	Мо	Ni
304S31	1.4301	0.07	1.0	2.0	0.030	0.045	17.0/19.0	-	8.0/11.0
316S33	1.4401	0.07	1.0	2.0	0.30	0.045	16.5/18.5	2.50/3.00	11.0/14.0

2.0 PHYSICAL PROPERTIES ROOM TEMPERATURE TO BS:EN 10088-1					
Grade	Density (kg/m³)	Thermal Expansion 20-100ºC (10-6º/C)	Thermal Conductivity (W/m ⁰ C)	Modulus o kN/i	of elasticity nm ²
				Tension	Shear
304S31	7900	17	15	200	80.0
316S33	8000	16	15	200	80.0

3.0 '	MECHANICAL PROPERTIES (TENSILE PROPERTIES) TO BS:EN 110088-2			
Grade	Bar	Normal size mm	Specified characteristic N/mm ²	Elongation Min %
250	Plain	6-40	250	22
460	Ribbed	6-40	460	12



BOND STRENGTH



MAGNETIC PERMEABILITY

Permeability is a measure of the extent to which a material is penetrated by a magnetic field, and for certain applications a very low magnetic permeability is necessary (as close to 1 as possible) Wincro stainless steel reinforcing bars have an extremely low magnetic permeability and may be considered non-magnetic. Wincro reinforcement has been used to reinforce structures where non-magnetic reinforcement was vital (Satellite testing pits, Electrical Installations, Transformer barriers etc).

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1 () MATERIAL SELECTION

Material Selection	Material Grade
For applications or components where a long design life or where access is limited for any future maintenance	1.4301 (304 S31)
For applications or components which are exposed to chloride contamination with no relaxation in durability design	1.4301 (304 S31)
Bridging joints or where there is fixing into the concrete surface and also exposure to chloride	1.4436 (316 S33)
Structures subject to chloride contamination where a reduction in normal durability requirements are proposed	1.4436 (316 S33)

COUPLERS

The use of Wincro Couplers avoid the costly and lengthy procedure of welding the reinforcing bars on site and not only achieves continuity but also reduces the amount of reinforcing bar required to fulfil the application.



1.0 COUPLERS		
Nominal Bar Dia (mm)	Thread Size (mm)	Torque Setting (Nm)
12	M12	125
16	M16	150
20	M20	200
25	M24	250
32	M30	300
40	M36	350

STANDARD COUPLER

Standard couplers are supplied threaded at both ends with a central unthreaded portion.

THROUGH COUPLER

Through couplers have a straight through internal thread.

TURNBUCKLE

The Turnbuckle coupler is threaded with both right hand thread at one end and left hand thread at the opposite end. Note: These couplers are also supplied as hexagonal.

SPECIAL COUPLERS

Special couplers may be manufactured to Speciers' requirements with any combination on internal thread forms.

BARS

Wincro bars both ribbed and plain can be threaded to take all specifications of couplers.

TYING WIRE

To prevent the movement of reinforcing bars before and during concrete pouring, the bars are wired together at sufficiently close intervals to provide a rigid framework.

Wincro stainless steel tying wire is ideal for this purpose. Tough and corrosion resistant, the wire is fully annealed for ease of forming and twisting around the bars.

COUPLER APPLICATIONS

Below are some typical applications for the use of Wincro Couplers.



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DOWEL BARS

Stainless steel Dowel Bars have been used in structural applications for many years providing a high integrity link to reinforced concrete structures.



The high resistance to corrosion coupled with good mechanical strength, weldability and non-magnetic properties of Dowel Bars provide the designer with a long term, maintenance free solution to road and bridge construction.

Wincro Dowel Bars are available in Grade 1.4301(304) or 1.4401(316) stainless steel.

Dowel Bars can also be threaded to use with the Wincro selection of Couplers.

Stainless steel Dowel Bars have a number of important features:

- High resistance to corrosion
- Long term durability
- Good tensile and shear properties
- High ductility
- Low magnetic permeability
- High limiting fatigue strength

1.0 ^{bar d}	ETAILS			
Nominal diameter (mm)	Cross-sectional area (mm ²)	Nominal mass per metre (kg)	Cutting tol (mm	erances ı)
			Sheared bar	Sawn bar
6	28.3	0.225	±2	±1
8	50.3	0.399	±2	±1
10	78.5	0.624	±2	±1
12	113.1	0.899	±2	±1
16	201.1	1.599	-	±1
20	314.2	2.498	-	±1
25	490.9	3.903	-	±1
32	804.2	6.393	-	±1
40	1256.2	9.990	-	±1



MASONRY REINFORCEMENT

Wincro also offer a full range of masonry reinforcement. For full details refer to our Ties and Restraints section or consult our Technical Design Team.



Benefits of the Wincro Reinforcement range:

- 3150mm lengths reduce the amount of laps required.
- Flattened parallel wires meet code requirements for cover.
- Complies with BS5628 Part 2: 2000.
- Available in a variety of widths.
- Supplied to the nearest length to reduce wastage on site.
- Also available in Galvanised finish.



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MASONRY REINFORCEMENT



TYPICAL APPLICATIONS

1.0 Bridges Wincro's superb strength and limiting fatigue stress values make it particularly suitable for conditions in cyclic stress on road bridges. Its high corrosion resistance is most effective against aggressive road salt conditions.
2.0 Rock Bolting Systems Wincro's superior tensile and high shear strength values give it excellent service in rock bolting systems.
3.0 Cladding Panels Wincro reinforcement is the ideal material for cladding panels, where reduced cover thickness can be confidently employed, bringing weight and cost reductions and assurance of dynamic and visual integrity.
4.0 Ancient Monuments and Cathedrals Stainless steel reinforcement bars play an essential role in restoring stability to ancient monuments and cathedrals, in concrete beams, as tendons, tie bars to stabilise stonework.
5.0 Marine Architecture Wincro's excellent corrosion resistance and high strength make it the ideal choice for stress chloride conditions encountered in marine architecture and marine defences.
6.0 Nuclear Power and Laboratory Structures Wincro's non-magnetic properties bring special benefits when used in electro, nuclear power and laboratory structures, removing problems of induced heating and screening.

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