



PROTECTION STEEL

BISALLOY® - performance for life.

KEY FACTS

BISALLOY® Protection steel has been the product of choice for:

- Riot and police vehicles
- Patrol vehicles
- Secured containers
- Guard houses
- Infrastructure protection

Since 1980, Bisalloy has proudly been Australia's only manufacturer of quenched and tempered steel plate used for armour, structural and wear-resistant steel applications and has established an outstanding international reputation for quality products and technical support.

Putting performance first, we work closely with manufacturers, specifiers, distributors and channel partners to deliver innovative products and service solutions and have become the trusted performance steel partner to customers across Australia and the world.



Technical data at your fingertips

Visit www.bisalloy.com.au to quickly access detailed:

- **Information on Bisalloy's products and solutions, services and distributors**
- **Reference materials including a range of Technical Guides with detailed information on fabrication, performance, specifications and product comparisons**
- **Case Studies on projects utilising Bisalloy's performance steel products and also the latest company news**



Your performance steel partner

As a specialist supplier of quenched and tempered steel plate, Bisalloy is highly responsive and agile in partnering with our customers to meet their demands, specialised needs and market challenges in Australia and across the globe.

- To fully meet the challenges of our customers, we focus on our performance first to ensure we consistently excel in our field of expertise and deliver the best in performance steel products
- We form strong partnerships with our customers and develop a deep understanding of their businesses and needs, enabling us to deliver value-added products and services that support their success
- We collaborate with leaders in science, technology and steel manufacture on intensive research programs involving critical testing and evaluation of materials to produce innovations at the forefront of steel technology worldwide



BISALLOY® Protection Steel

BISALLOY® Protection steel plate has been specifically developed for those shielding applications that do not require full military specification armour grade steel.

The strength and reliability of BISALLOY® Protection steel has long been chosen to protect and safe guard personnel, infrastructure and valuables in a range of situations.

From our experience, and using tailor made properties, BISALLOY®'s range of protection grade steels have not only been tested and validated by numerous independent global laboratories, but have been approved and used by a myriad of end users for critical applications.

Requiring vital characteristics including strength, toughness and shock loading resistance, the steel also needed to be readily formed, fabricated and welded.

The same approach and capabilities are deployed in

Bisalloy's development and manufacture of protection plate steel for use in land-based applications around the world, where lightweight steel plate with superior ballistic performance is required.

In addition to traditional support for manufacturers of protected vehicles, Bisalloy is increasingly supplying BISALLOY® Protection steel to police, military forces, government and civilian applications worldwide for use in security vehicles, training facilities, security booths, splinter boxes, embassy 'safe rooms' and myriad other applications.





The benefits of choosing BISALLOY® Protection steel

Australian made

This represents the highest standards in quality and service, which customers in Australia and our global markets have relied upon for decades.

Known and trusted

You have the confidence of working with known and trusted, quality products from an Australian steel manufacturer with more than 30 years of expertise in producing market-leading armour grade steel and other performance steel products for Australia and the world.

Technical expertise

Our people are experts in specifying, developing, manufacturing and using our products. Bisalloy's range of armour plate grades are specifically designed, hot rolled and heat treated to provide the best solution in military and defence applications.

Product quality

Bisalloy's product quality is second to none, with our protection steel the first choice in applications. BISALLOY® Protection steel is ideally suited to the protection of life, valuables and infrastructure.

Partnership Focused

With Bisalloy, you are partnering with a company that works closely with customers, and engages with leaders in science and technology, to deliver truly innovative and tailored product solutions and services.

Product range

We produce a wide range of quenched and tempered steel products to meet the varying requirements and needs of our many customers – and are committed to ongoing research and development to ensure Bisalloy's product range remains at the leading edge of available quenched and tempered steels.

BISALLOY® Protection 250 steel

Introduction

BISALLOY® Protection 250 steel is a quenched and tempered steel plate which offers unique blast resistance properties with excellent mechanical properties, without compromising weldability and formability. Applications include blast protection for vehicles, property and infrastructure protection.

Brinell hardness

Thickness (mm)	Specification	Typical
5 - 50 ¹	-	255 HB

Tensile properties

Property	Typical
0.2% Proof Stress	750 MPa
Tensile Strength	830 MPa
Elongation in 50 mm GL	26%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
5 - 50	10 x 10	-40°C	-	40J

Thickness tolerance

Thickness (mm)	Tolerance ²
5 - 25	-0.0 + 1.0
25 - 50	-0.0 + 1.2

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.
Contact Bisalloy ZA direct or visit www.bisalloy.co.za

¹ Other thicknesses may be available on application

² Tighter tolerance available by agreement

BISALLOY® Protection 300 steel

Introduction

BISALLOY® Protection 300 steel is a quenched and tempered steel plate suitable for use in protection applications where both high strength and ballistic resistance is required, such as infrastructure protection and for use in vehicles.

Brinell hardness

Thickness (mm)	Specification	Typical
5 - 50 ¹	260-310 HB	280 HB

Tensile properties

Property	Typical
0.2% Proof Stress	900 MPa
Tensile Strength	1020 MPa
Elongation in 50 mm GL	16%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
5	10 x Thk	-40°C	By Agreement	By Agreement
6 - <9.5	10 x 5	-40°C	20J	20J
9.5 - <12	10 x 7.5	-40°C	30J	30J
≥12	10 x 10	-40°C	40J	40J

Thickness tolerance

Thickness (mm)	Tolerance ²
5 - 25	-0.0 + 1.0
>25 - 50	-0.0 + 1.2

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.

Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² Tighter tolerance available by agreement

BISALLOY® Protection 360 steel

Introduction

BISALLOY® Protection 360 steel is a quenched and tempered steel plate, possessing very good weldability, suitable for use in applications where high rates of shock loading and resistance to penetration by ballistic projectiles are required.

Brinell hardness

Thickness (mm)	Specification	Typical
5 - 50 ¹	310-410 HB ²	350 HB

Tensile properties

Property	Typical
0.2% Proof Stress	1040 MPa
Tensile Strength	1140 MPa
Elongation in 50 mm GL	16%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
5	10 x Thk	-40°C	By Agreement	By Agreement
6 - <9.5	10 x 5	-40°C	12J	12J
9.5 - <12	10 x 7.5	-40°C	17J	17J
≥12	10 x 10	-40°C	22J ³	22J ³

Thickness tolerance

Thickness (mm)	Tolerance ⁴
5 - 25	-0.0 + 1.0
>25 - 50	-0.0 + 1.2

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.

Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² Hardness range varies depending on thickness

³ Minimum average energy will vary depending on hardness

⁴ Tighter tolerance available by agreement

BISALLOY® Protection 400 steel

Introduction

BISALLOY® Protection 400 steel is a quenched and tempered steel plate, possessing very good weldability, suitable for use in applications where high rates of shock loading and resistance to penetration by ballistic projectiles are required.

Brinell hardness

Thickness (mm)	Specification	Typical
5 - 50 ¹	370-430 HB	400 HB

Tensile properties

Property	Typical
0.2% Proof Stress	1100 MPa
Tensile Strength	1250 MPa
Elongation in 50 mm GL	16%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
5	10 x Thk	-40°C	By Agreement	By Agreement
6 - <9.5	10 x 5	-40°C	9J	9J
9.5 - <12	10 x 7.5	-40°C	13J	13J
≥12	10 x 10	-40°C	17J	17J

Thickness tolerance

Thickness (mm)	Tolerance ²
5 - 25	-0.0 + 1.0
>25 - 50	-0.0 + 1.2

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.

Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² Tighter tolerance available by agreement

BISALLOY® Protection 440 steel

Introduction

BISALLOY® Protection 440 steel is a quenched and tempered steel plate combining high resistance to both shock and penetration, and is suited to both blast and ballistic protection. Some applications include cash-in-transit vehicles, armoured vehicles, infrastructure protection and ship and frigate protection.

Brinell hardness

Thickness (mm)	Specification	Typical
2.5 - 50 ¹	420-470 HB	450 HB

Tensile properties

Property	Typical
0.2% Proof Stress	1150 MPa
Tensile Strength	1450 MPa
Elongation in 50 mm GL	14%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
2.5 - <8	10 x 5	-40°C	11J	11J
8 - <12	10 x 7.5	-40°C	17J	17J
≥12	10 x 10	-40°C	22J	22J

Thickness tolerance

Thickness (mm)	Tolerance ²
2.5 - 25	-0.0 + 1.0
>25 - 50	-0.0 + 1.2

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.
Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² Tighter tolerance available by agreement

BISALLOY® Protection 500 steel

Introduction

BISALLOY® Protection 500 steel is a quenched and tempered steel suitable for use in applications where light weight and resistance to ballistic projectiles are critical, including armoured cars and limousines, patrol vehicles, valuable transportation and protected buildings and rooms.

Brinell hardness

Thickness (mm)	Specification	Typical
2.5 - 50 ¹	477 - 534 HB	500 HB

Tensile properties

Property	Typical
0.2% Proof Stress	1350 MPa
Tensile Strength	1640 MPa
Elongation in 50 mm G.L.	14%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
2.5 - 5	10 x Thk	-40°C	By Agreement	By Agreement
6 - <9.5	10 x 5	-40°C	8 J	10 J
9.5 - <12	10 x 7.5	-40°C	12 J	15 J
≥12	10 x 10	-40°C	16 J	20 J

Thickness tolerance

Thickness	Tolerance ²
2.5 - 25mm	-0.0 + 1.0
>25 - 50mm	-0.0 + 1.2

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.
Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² Tighter tolerance available by agreement

BISALLOY® Protection 550 steel

Introduction

BISALLOY® Protection 550 steel is a low alloyed blast protection steel featuring low carbon and low manganese content in combination with a carefully controlled production process, BISALLOY® Protection 550 steel is a good combination of hardness, strength, fabrication and ballistic protection suitable for applications such as armoured vehicles, infrastructure protection and valuables transportation.

Brinell hardness

Thickness (mm)	Specification	Typical
2.5 - 16 ¹	530 - 570 HB	580 HB

Tensile properties

Property	Typical
0.2% Proof Stress	1400 MPa
Tensile Strength	1800 MPa
Elongation in 50 mm G.L.	11%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse)	Min. Energy (Longitudinal)
≥12	10 x 7.5	-40°C	10 J	12 J

Thickness tolerance

Thickness	Tolerance ²
2.5 - 16mm	-0.0 + 1.0

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.
Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² Tighter tolerance available by agreement

BISALLOY® Protection 600 steel

Introduction

BISALLOY® Protection 600 steel is a quenched and tempered steel plate which offers a very high degree of hardness making it suitable for ballistic resistance. This high hardness product is best suited to applications where protection from specific threats are required – please contact BISALLOY® for further discussion.

Brinell hardness

Thickness (mm)	Specification	Typical
2.5 - 16 ¹	570-640 HB	600 HB

Tensile properties

Property	Typical
0.2% Proof Stress	1500 MPa
Tensile Strength	2050 MPa
Elongation in 50 mm GL	8%

Charpy impact values

Thickness (mm)	Test Piece	Test Temp	Min. Energy (Transverse) ²	Min. Energy (Longitudinal) ²
≥12	10 x 10	-40°C	8J	8J

Thickness tolerance

Thickness (mm)	Tolerance ³
2.5 - 16	-0.0 + 1.0

Test frequency

Per Plate	By Agreement
Hardness	Charpy (L), Charpy (T) Thickness, Tensile, Ballistic Properties, Product Analysis

Fabrication

For advice on fabrication refer to relevant Bisalloy technical brochures.

Contact Bisalloy ZA direct or visit www.bisalloy.co.za

* Typical for 12mm plate

¹ Other thicknesses may be available on application

² For plate thickness under 12mm subsize charpy V-specimens are used. The specified minimum value is then proportional to the specimen cross-section.

³ Tighter tolerance available by agreement

PLEASE NOTE: Every care has been taken to ensure the accuracy of information contained in this manual which supersedes earlier publications, however Bisalloy Steels shall not be liable for any loss or damage whatsoever caused from the application of such information. Typical values are provided for reference information only and no guarantee is given that a specific plate will provide these properties. Information is subject to change without notice.



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