

DATA SHEET 01

Brand Name of Abrasion Resistant Steel

ABREX™ 400

Available Thickness 6(4.5) ~ 100mm

SPECIFICATION

Brinell Hardness (HBW)		360 ~ 440	
Impact Test	Temperature (°C)	-	
	Absorbed Energy (J)	-	
Chemical Composition (%)	Thickness (mm)	4.5 ≤ t ≤ 25	25 < t ≤ 100
	C	≤ 0.21	
	Si	≤ 1.20	
	Mn	≤ 2.00	
	P	≤ 0.025	
	S	≤ 0.010	
	Cr	≤ 1.20	
	Ni	≤ 1.00	
	Mo	≤ 0.60	
	B	≤ 0.0050	
Pcm	≤ 0.30	≤ 0.35	

TYPICAL VALUE

Thickness (mm)		25	
Chemical Composition (%)	Pcm	0.27	
	CEV	0.49	
	CET	0.30	
Mechanical Properties	Yield Strength (MPa)	1025	
	Tensile Strength (MPa)	1259	
	Bend Test	JIS Z2248 No.1 R=3t, 180°, No crack	
Hardness	HBW	406	
Impact Test	Temperature (°C)	0	-20
	Absorbed Energy (J)	38	30

 $P_{cm} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$
 $CEV = C + Mn/6 + (Cu + Ni) / 15 + (Cr + Mo + V) / 5$
 $CET = C + (Mn + Mo) / 10 + (Cr + Cu) / 20 + Ni/40$

Element other than those listed in the table could be added as necessary.

Particular Information for this Grade (Designation)

● Features & Application

As for hardness, this Grade is the lowest grade among ABREX series.

In that sense, respective Fabrication (Weldability, Bendability, etc) is easier compared to the other harder Grade.

(Application Example)

Mining & Earthmoving wearparts, Agricultural & Tillage equipment, Ripper Tynes, Forestry equipment, Cutting edges,

Mining liner plates, Conveyor & Chute Liners, Tipper for dump truck

● Precaution for Fabrication

Especially Bending shall be paid attention to. Kindly refer to the brochure of 'ABREX™' and try hard to comply to the described tips.

Stress Relief Heat treatment is not recommendable. Heating above 200°C will reduce its hardness.

If it occurs magnetic arc blow during welding, kindly refer to our brochure of 'Steel Plate'.

● Product Size Availability for Width and Length

Kindly refer to our brochure of 'ABREX™'.

● Primer Coating Colour ※If nessesary.

Brown (Low Zn type)

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Inspection & Testing

● Tolerances

Thickness: (Standard) Min. and Max. according to JIS G3193 (Special) Min. and Max. according to respective agreement.

Width: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Length: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Weight: According to JIS G3193, that means values are by calculation, not an actual weight.

● Flatness

Comply to JIS G 3193.

● Ultrasonic Testing

(Standard) It is not a specification but we usually do for Internal quality control purpose. (Option) Please ask us if any.

● Visual Inspection

Comply to JIS G 3193 Clause 7.

● Camber and Squareness

Comply to JIS G 3193.

● Mechanical Testing

Test frequency is as per reheated slab unit and as per respective heat treatment condition.

Brinell Hardness: JIS Z 2243 Decarburized layer is ground off by about 0.7mm, and the surface should be used as test location.

Supplied Condition

● Identification on a Plate

(Standard items for Stencil) 1. NIPPON STEEL's Brand Mark, 2. Name of material Grade (Designation),

3. Plate Size (Thickness x Width x Length) , 4. Plate Weight, 5. Plate No.

(Option) If some other information, kindly let us know your request.

(Standard items for Stamp) Plate No.

(Option) If some other information, kindly let us know your request.

● Supplied Condition of Heat Treatment

Q or QT (or TMCP)

● Surface Supplied Condition

(Standard) As mill scale condition.

(Option1) Shot blasted and Primer Coating.

(Option2) Shot blasted and Primer Coating and Marking over the whole of a plate.

Others

● Contact

(Both Commercial & Technical for further information) Please contact to us NIPPON STEEL through Designated Trading House or Stockist.

● Japanese Industry Standard (JIS)

The details of respective JIS Standard listed above are available at the following link. Kindly check the Web Site.

http://www.jisa.or.jp/default_english.asp

● Disclaimer

NIPPON STEEL will not take any responsibilities for damage, loss, and injury caused by using above mentioned information.

Typical values of Chemical Composition and Mechanical Properties are just examples only, thus, any guarantee that a particular plate will have the same properties is not given.

All information is subject to change without any prior notice to customers.

DATA SHEET 02

Brand Name of Abrasion Resistant Steel

ABREX™ 400LT

Available Thickness 6(4.5) ~ 60mm

SPECIFICATION

Brinell Hardness (HBW)		360 ~ 440	
Impact Test	Temperature (°C)	-40	
	Absorbed Energy (J)	≥27	
Chemical Composition (%)	Thickness (mm)	4.5≤t≤25	25<t≤60
	C	≤0.21	
	Si	≤1.20	
	Mn	≤2.00	
	P	≤0.020	
	S	≤0.010	
	Cr	≤1.20	
	Ni	≤1.00	
	Mo	≤0.60	
	B	≤0.0050	
Pcm	≤0.30	≤0.35	

TYPICAL VALUE

Thickness (mm)		19
Chemical Composition (%)	Pcm	0.25
	CEV	0.52
	CET	0.29
Mechanical Properties	Yield Strength (MPa)	1035
	Tensile Strength (MPa)	1274
	Bend Test	JIS Z2248 No.1 R=3t, 180°, No crack
Hardness	HBW	403
Impact Test	Temperature (°C)	-40
	Absorbed Energy (J)	47

 $P_{cm} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$
 $CEV = C + Mn/6 + (Cu + Ni)/15 + (Cr + Mo + V)/5$
 $CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40$

Element other than those listed in the table could be added as necessary.

Particular Information for this Grade (Designation)

● Features & Application

As for hardness, this Grade is the lowest grade among ABREX series.

In that sense, respective Fabrication (Weldability, Bendability, etc) is easier compared to the other harder Grade.

It is also suitable for the region under Low Temperature and for the application that is seriously demanding better toughness.

(Application Example)

Mining & Earthmoving wearparts, Agricultural & Tillage equipment, Ripper Tynes, Forestry equipme, Cutting edges,

Mining liner plates, Conveyor & Chute Liners, Tipper for dump truck

● Precaution for Fabrication

Especially Bending shall be paid attention to. Kindly refer to the brochure of 'ABREX™' and try hard to comply to the described tips.

Stress Relief Heat treatment is not recommendable. Heating above 200°C will reduce its hardness.

If it occurs magnetic arc blow during welding, kindly refer to our brochure of 'Steel Plate'.

● Product Size Availability for Width and Length

Kindly refer to our brochure of 'ABREX™'.

● Primer Coating Colour ※If nessesary.

Brown (Low Zn type)

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Inspection & Testing

● Tolerances

Thickness: (Standard) Min. and Max. according to JIS G3193 (Special) Min. and Max. according to respective agreement.

Width: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Length: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Weight: According to JIS G3193, that means values are by calculation, not an actual weight.

● Flatness

Comply to JIS G 3193.

● Ultrasonic Testing

(Standard) It is not a specification but we usually do for Internal quality control purpose. (Option) Please ask us if any.

● Visual Inspection

Comply to JIS G 3193 Clause 7.

● Camber and Squareness

Comply to JIS G 3193.

● Mechanical Testing

Test frequency is as per reheated slab unit and as per respective heat treatment condition.

Brinell Hardness: JIS Z 2243 Decarburized layer is ground off by about 0.7mm, and the surface should be used as test location.

Charpy impact* : JIS Z 2242 We guarantee the specified value under -40 °C and put onto MTC.

Charpy testing shall be applied to thicker than 12mm, unless otherwise agreed for the thinner thickness.

Supplied Condition

● Identification on a Plate

(Standard items for Stencil) 1. NIPPON STEEL's Brand Mark, 2. Name of material Grade (Designation),

3. Plate Size (Thickness x Width x Length) , 4. Plate Weight, 5. Plate No.

(Option) If some other information, kindly let us know your request.

(Standard items for Stamp) Plate No.

(Option) If some other information, kindly let us know your request.

● Supplied Condition of Heat Treatment

Q or QT (or TMCP)

● Surface Supplied Condition

(Standard) As mill scale condition.

(Option1) Shot blasted and Primer Coating.

(Option2) Shot blasted and Primer Coating and Marking over the whole of a plate.

Others

● Contact

(Both Commercial & Technical for further information) Please contact to us NIPPON STEEL through Designated Trading House or Stockist.

● Japanese Industry Standard (JIS)

The details of respective JIS Standard listed above are available at the following link. Kindly check the Web Site.

http://www.jsa.or.jp/default_english.asp

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DATA SHEET 03

Brand Name of Abrasion Resistant Steel

ABREX™ 450

Available Thickness 6(4.5) ~ 50mm

SPECIFICATION

Brinell Hardness (HBW)		410 ~ 490
Impact Test	Temperature (°C)	—
	Absorbed Energy (J)	—
Chemical Composition (%)	Thickness (mm)	4.5 ≤ t ≤ 50
	C	≤ 0.23
	Si	≤ 1.20
	Mn	≤ 2.00
	P	≤ 0.025
	S	≤ 0.010
	Cr	≤ 1.20
	Ni	≤ 1.00
	Mo	≤ 0.60
	B	≤ 0.0050
Pcm	≤ 0.36	

TYPICAL VALUE

Thickness (mm)		25
Chemical Composition (%)	Pcm	0.31
	CEV	0.50
	CET	0.34
Mechanical Properties	Yield Strength (MPa)	1192
	Tensile Strength (MPa)	1469
	Bend Test	JIS Z2248 No.1 R=3t, 180°, No crack
Hardness	HBW	457
Impact Test	Temperature (°C)	0
	Absorbed Energy (J)	57

 $P_{cm} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$
 $CEV = C + Mn/6 + (Cu + Ni)/15 + (Cr + Mo + V)/5$
 $CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40$

Element other than those listed in the table could be added as necessary.

Particular Information for this Grade (Designation)

● Features & Application

As for hardness, this Grade is the middle grade among ABREX series.

Compared to ABREX 400, this 450 is more durable and compared to ABREX 500 this is easier to fabricate.

(Application Example)

Mining & Earthmoving wearparts, Agricultural & Tillage equipment, Forestry equipment, Cutting edges,

Conveyor & Chute Liners, Tipper for dump truck

● Precaution for Fabrication

Especially Bending shall be paid attention to. Kindly refer to the brochure of 'ABREX™' and try hard to comply to the described tips.

Stress Relief Heat treatment is not recommendable. Heating above 200°C will reduce its hardness.

If it occurs magnetic arc blow during welding, kindly refer to our brochure of 'Steel Plate'.

● Product Size Availability for Width and Length

Kindly refer to our brochure of 'ABREX™'.

● Primer Coating Colour ※If necessary.

Green (Low Zn type)

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Inspection & Testing

● Tolerances

Thickness: (Standard) Min. and Max. according to JIS G3193 (Special) Min. and Max. according to respective agreement.

Width: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Length: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Weight: According to JIS G3193, that means values are by calculation, not an actual weight.

● Flatness

Comply to JIS G 3193.

● Ultrasonic Testing

(Standard) It is not a specification but we usually do for Internal quality control purpose. (Option) Please ask us if any.

● Visual Inspection

Comply to JIS G 3193 Clause 7.

● Camber and Squareness

Comply to JIS G 3193.

● Mechanical Testing

Test frequency is as per reheated slab unit and as per respective heat treatment condition.

Brinell Hardness: JIS Z 2243 Decarburized layer is ground off by about 0.7mm, and the surface should be used as test location.

Supplied Condition

● Identification on a Plate

(Standard items for Stencil) 1. NIPPON STEEL's Brand Mark, 2. Name of material Grade (Designation),

3. Plate Size (Thickness x Width x Length) , 4. Plate Weight, 5. Plate No.

(Option) If some other information, kindly let us know your request.

(Standard items for Stamp) Plate No.

(Option) If some other information, kindly let us know your request.

● Supplied Condition of Heat Treatment

Q or QT (or TMCP)

● Surface Supplied Condition

(Standard) As mill scale condition.

(Option1) Shot blasted and Primer Coating.

(Option2) Shot blasted and Primer Coating and Marking over the whole of a plate.

Others

● Contact

(Both Commercial & Technical for further information) Please contact to us NIPPON STEEL through Designated Trading House or Stockist.

● Japanese Industry Standard (JIS)

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Typical values of Chemical Composition and Mechanical Properties are just examples only, thus, any guarantee that a particular plate will have the same properties is not given.

All information is subject to change without any prior notice to customers.

DATA SHEET 04

Brand Name of Abrasion Resistant Steel

ABREX™ 450LT

Available Thickness 6(4.5) ~ 50mm

SPECIFICATION

Brinell Hardness (HBW)		410 ~ 490	
Impact Test	Temperature (°C)	-40	
	Absorbed Energy (J)	≥27	
Chemical Composition (%)	Thickness (mm)	4.5≤t≤25	25<t≤50
	C	≤0.28	≤0.28
	Si	≤1.20	≤1.20
	Mn	≤2.00	≤2.00
	P	≤0.020	≤0.020
	S	≤0.010	≤0.010
	Cr	≤1.20	≤1.50
	Ni	≤1.00	≤1.00
	Mo	≤0.60	≤0.60
	B	≤0.0050	≤0.0050
Pcm	≤0.36	≤0.40	

TYPICAL VALUE

Thickness (mm)		25
Chemical Composition (%)	Pcm	0.31
	CEV	0.50
	CET	0.33
Mechanical Properties	Yield Strength (MPa)	1089
	Tensile Strength (MPa)	1465
	Bend Test	JIS Z2248 No.1 R=3t, 180°, No crack
Hardness	HBW	469
Impact Test	Temperature (°C)	-40
	Absorbed Energy (J)	43

 $P_{cm} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$
 $CEV = C + Mn/6 + (Cu + Ni)/15 + (Cr + Mo + V)/5$
 $CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40$

Element other than those listed in the table could be added as necessary.

Particular Information for this Grade (Designation)

● Features & Application

As for hardness, this Grade is the middle grade among ABREX series.

Compared to ABREX 400, this 450 is more durable and compared to ABREX 500 this is easier to fabricate.

It is also suitable for the region under Low Temperature and for the application that is seriously demanding better toughness.

(Application Example)

Mining & Earthmoving wearparts, Agricultural & Tillage equipment, Forestry equipment, Cutting edges,

Conveyor & Chute Liners, Tipper for dump truck

● Precaution for Fabrication

Especially Bending shall be paid attention to. Kindly refer to the brochure of 'ABREX™' and try hard to comply to the described tips.

Stress Relief Heat treatment is not recommendable. Heating above 200°C will reduce its hardness.

If it occurs magnetic arc blow during welding, kindly refer to our brochure of 'Steel Plate'.

● Product Size Availability for Width and Length

Kindly refer to our brochure of 'ABREX™'.

● Primer Coating Colour ※If nessesary.

Green (Low Zn type)

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Inspection & Testing

● Tolerances

Thickness: (Standard) Min. and Max. according to JIS G3193 (Special) Min. and Max. according to respective agreement.

Width: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Length: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Weight: According to JIS G3193, that means values are by calculation, not an actual weight.

● Flatness

Comply to JIS G 3193.

● Ultrasonic Testing

(Standard) It is not a specification but we usually do for Internal quality control purpose. (Option) Please ask us if any.

● Visual Inspection

Comply to JIS G 3193 Clause 7.

● Camber and Squareness

Comply to JIS G 3193.

● Mechanical Testing

Test frequency is as per reheated slab unit and as per respective heat treatment condition.

Brinell Hardness: JIS Z 2243 Decarburized layer is ground off by about 0.7mm, and the surface should be used as test location.

Charpy impact* : JIS Z 2242 We guarantee the specified value under -40 °C and put onto MTC.

Charpy testing shall be applied to thicker than 12mm, unless otherwise agreed for the thinner thickness.

Supplied Condition

● Identification on a Plate

(Standard items for Stencil) 1. NIPPON STEEL's Brand Mark, 2. Name of material Grade (Designation),

3. Plate Size (Thickness x Width x Length), 4. Plate Weight, 5. Plate No.

(Option) If some other information, kindly let us know your request.

(Standard items for Stamp) Plate No.

(Option) If some other information, kindly let us know your request.

● Supplied Condition of Heat Treatment

Q or QT (or TMCP)

● Surface Supplied Condition

(Standard) As mill scale condition.

(Option1) Shot blasted and Primer Coating.

(Option2) Shot blasted and Primer Coating and Marking over the whole of a plate.

Others

● Contact

(Both Commercial & Technical for further information) Please contact to us NIPPON STEEL through Designated Trading House or Stockist.

● Japanese Industry Standard (JIS)

The details of respective JIS Standard listed above are available at the following link. Kindly check the Web Site.

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Typical values of Chemical Composition and Mechanical Properties are just examples only, thus, any guarantee that a particular plate will have the same properties is not given.

All information is subject to change without any prior notice to customers.

DATA SHEET 05

Brand Name of Abrasion Resistant Steel

ABREX™ 500

Available Thickness 6(4.5) ~ 50mm

SPECIFICATION

Brinell Hardness (HBW)		450 ~ 550
Impact Test	Temperature (°C)	—
	Absorbed Energy (J)	—
Chemical Composition (%)	Thickness (mm)	4.5 ≤ t ≤ 50
	C	≤ 0.35
	Si	≤ 1.20
	Mn	≤ 2.00
	P	≤ 0.015
	S	≤ 0.010
	Cr	≤ 1.20
	Ni	≤ 1.00
	Mo	≤ 0.60
	B	≤ 0.0050
Pcm	≤ 0.42	

TYPICAL VALUE

Thickness (mm)		25
Chemical Composition (%)	Pcm	0.36
	CEV	0.54
	CET	0.38
Mechanical Properties	Yield Strength (MPa)	1373
	Tensile Strength (MPa)	1552
	Bend Test	JIS Z2248 No.1 R=3t, 180°, No crack
Hardness	HBW	514
Impact Test	Temperature (°C)	0
	Absorbed Energy (J)	43

 $P_{cm} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$
 $CEV = C + Mn/6 + (Cu + Ni)/15 + (Cr + Mo + V)/5$
 $CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40$

Element other than those listed in the table could be added as necessary.

Particular Information for this Grade (Designation)

● Features & Application

This is the second hardest grade among ABREX and is more suitable for fixed liner parts which require severe wear resistance. It is possible to fabricate, but its have to care to fabricate. If you use under high binding effect, you have to care to occur a crack. (Application Example)

Concrete pumping equipment, Cutting edges, Mining liner plates, Mixing blades, Shredder blades, Conveyor & Chute Liners

● Precaution for Fabrication

Welding (including welding material) and Bending shall be paid attention to. Kindly refer to the brochure of 'ABREX™'.

Stress Relief Heat treatment is not recommendable. Heating above 200°C will reduce its hardness.

If it occurs magnetic arc blow during welding, kindly refer to our brochure of 'Steel Plate'.

● Product Size Availability for Width and Length

Kindly refer to our brochure of 'ABREX™'.

● Primer Coating Colour ※If nessesary.

Gray (Low Zn type)

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Inspection & Testing

● Tolerances

Thickness: (Standard) Min. and Max. according to JIS G3193 (Special) Min. and Max. according to respective agreement.

Width: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Length: (Standard) Min. 0 (Special) Min. 0 / Max. according to respective agreement.

Weight: According to JIS G3193, that means values are by calculation, not an actual weight.

● Flatness

Comply to JIS G 3193.

● Ultrasonic Testing

(Standard) It is not a specification but we usually do for Internal quality control purpose. (Option) Please ask us if any.

● Visual Inspection

Comply to JIS G 3193 Clause 7.

● Camber and Squareness

Comply to JIS G 3193.

● Mechanical Testing

Test frequency is as per reheated slab unit and as per respective heat treatment condition.

Brinell Hardness: JIS Z 2243 Decarburized layer is ground off by about 0.7mm, and the surface should be used as test location.

Supplied Condition

● Identification on a Plate

(Standard items for Stencil) 1. NIPPON STEEL's Brand Mark, 2. Name of material Grade (Designation),

3. Plate Size (Thickness x Width x Length) , 4. Plate Weight, 5. Plate No.

(Option) If some other information, kindly let us know your request.

(Standard items for Stamp) Plate No.

(Option) If some other information, kindly let us know your request.

● Supplied Condition of Heat Treatment

Q or QT (or TMCP)

● Surface Supplied Condition

(Standard) As mill scale condition.

(Option1) Shot blasted and Primer Coating.

(Option2) Shot blasted and Primer Coating and Marking over the whole of a plate.

Others

● Contact

(Both Commercial & Technical for further information) Please contact to us NIPPON STEEL through Designated Trading House or Stockist.

● Japanese Industry Standard (JIS)

The details of respective JIS Standard listed above are available at the following link. Kindly check the Web Site.

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All information is subject to change without any prior notice to customers.