ABRASERVICE
UK

ROC / ABRO 500

WATER QUENCHED
ABRASION RESISTANT STEEL PLATE

Chemical composition

C	Si	Mn	P	S
≤ 0.30	≤ 0.50	≤ 1.60	≤ 0.025	≤ 0.010

— The steel is fully killed and fine-grain treated.
Typical values for the carbon equivalent:

Thickness	≤ 25 mm	25-70 mm	70-100 mm
CEV*	0.46	0.60	0.75
CET**	0.38	0.39	0.44

* CEV = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15
** CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40

— **Hardness:**
As supplied 500 HB average.

Thickness	Hardness (HB)
≤ 30 mm	470-530
> 30 mm	450-530

— Depending on thickness the following alloying elements are used singularly or in combination:

Mo	Ni	Cr	V	B	Nb
≤ 0.50	≤ 1.00	≤ 1.50	≤ 0.08	≤ 0.005	≤ 0.05

— **Thickness range:**
3-120 mm.

— **Applications:**
Earthmoving and loading equipment, skip liners, buckets and edges, dredgers, conveyors, knives and shears as well as recycling plants.

Mechanical properties in delivery condition (indicative values)

Ys (MPa)	UTS (MPa)	E (%)	Impact ISO V-notch (J) -20°C
1300	1650	8	25

— **Size range:** 6-50 mm thickness. Ex-stock.

Processing information

— **Profiling:**
All conventional oxy-gas, plasma and laser methods can be used. Preheating prior to cutting:

- 8-30 mm: 50 °C;
- 30-70 mm: 100 °C.
- > 70 mm: 180 °C.

— **Shearing and punching:**
Not recommended, due to the grade's very high strength.

— **Cold bending:**

It is advisable to use as generous a radius as possible and ensure the plate temperature is above 10 °C. Power requirements are extremely high and springback should be allowed for. To avoid cracking, flame cut or sheared edges should have a 2-3 mm wide chamfer ground on top and bottom edges, along the bend circumference.
The following table is valid for bending angles up to 90°, where th = plate thickness:

	Internal minimum radius	Die opening minimum
Transversal	7 x th	16 x th
Longitudinal	9 x th	20 x th

— **Hot forming:**

This grade is not suitable for hot forming. Heating above 250 °C reduces the as-supplied hardness.

— **Drilling:**

8 % cobalt armour piercing drills are recommended. The plate to be drilled should be firmly clamped and positioned close to the drill post. An abundant flow of cutting fluid is also required.
The following speeds/feeds are recommended:

Ø 10 mm		Ø 15 mm		Ø 20 mm		Ø 30 mm	
rpm	feed (mm/rev)	rpm	feed (mm/rev)	rpm	feed (mm/rev)	rpm	feed (mm/rev)
130	0.10	105	0.20	65	0.20	45	0.30

— **Processing facilities:**

- CAD / CAM Profiling;
- Plasma Profiling;
- Laser Profiling;
- Oxy – gas Profiling;
- DXF Compatible;
- Perforating;
- Forming;
- Drilling and Countersinking;
- Bevelling;
- Welded Fabrications.

— **Welding:**

This material is weldable using MMA, MIG and SAW processes. Correct weld preparation is required; grind edges clear of scale and rust and ensure all traces of oil, paint or moisture are removed. For manual arc welding, basic coated rods with a very low residual moisture content should be used, if necessary stoved in accordance with the manufacturer's recommendations. Additionally, the following recommendations are to be considered: In cases of high restraint, to eliminate the possibility of cracking in the welded joint a preheating temperature of 150 °C -200 °C (305 °F -395 °F) is recommended for thicknesses over 8 mm. Preheating above 200 °C (395 °F) will cause a decrease in properties as shown in the graph.
Welding consumables should be selected to give the maximum strength possible taking into consideration the type of abrasive wear at the joints.
The temperature band of 300 °C - 400 °C (570 °F - 750 °F) should be avoided as this will result in temper embrittlement as well as loss of properties.
Stud welding is possible without preheat and is an alternative to fixing liner plates by drilling and bolting.

General note

— IMS UK and its suppliers undertake continual material development and the data is a general guide, accurate at the time of printing. Buyers and users should satisfy themselves as to the suitability of the selected steel for their particular application.

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