RAEX STEEL

Wear-resistant, hardness and impact toughness.
A true fact.

LÁMINA Y PLACA COMERCIAL

VILLACERO | PLANOS, LARGOS Y TRANSFORMACIÓN

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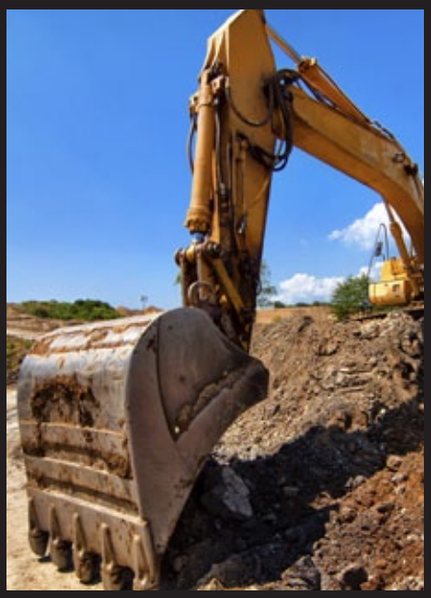

Raex® is highstrength and wearresistant steel with favourable hardness and impact toughness. The plate thicknesses range now from 2 mm up to 80 mm providing a solution to all wear needs. With Raex wear plate you can extend the lifespan of machinery, decrease wear in structural components and save costs. Raex steel grades also enable innovative design and lightweight products improving energy efficiency and lowering fuel costs. Raex is utilised in various applications of mechanical engineering by, for example, the automotive, heavy lifting and transportation, and mining industries.

APPLICATIONS:

- Buckets and containers
- Cutting edges for earth moving machines
- Wear parts for mining machines
- Wear parts for concrete mixing plants and wood processing machines
- Platform structures
- Feeders, funnels
- Tipper bodies

DATA SHEET

CUT LENGTHS WITH MILL EDGES

RUUKKI RAEX	THICKNESS MM	WIDTH MM	LENGTH M
Raex 400	0.078″ - 0.314″	39.3″ - 68.0″ 1)	6.5´ - 39.3´ 2)
Raex 450	0.098″ - 0.314″	39.3″ - 66.9″ 1)	6.5´ - 39.3´ 2)
Raex 500	0.118″ - 0.255″	39.3″ - 60.0″ 1)	6.5´ - 39.3´ 2)

1) Maximum width of a cut length depends on the thickness and steel grade.
2) Cut lengths with lengths 1213 metres are available subject to special agreement.

HEAVY PLATES

RUUKKI RAEX	THICKNESS RANGE MM	WIDTH MM	LENGTH M
400/450/500	0.236″ - 1.57″	70.86″ - 125.98″ 1)	6.5´ - 39.3´ 2)
400/450/500	1.57″ - 2.36″ 3)	78.74″ - 94.49″	13.1´ - 31.1´ 4)
400/450/500	1.57″ - 2.36″ 3)	94.53″ - 98.42″	13.1´ - 31.1´ 4)
400/450/500	2.36″ - 3.14″ 3)	78.74″ - 94.49″	13.1´ - 22.6´ 4)
400/450/500	2.36″ - 3.14″ 3)	94.53″ - 98.42″	13.1´ - 21.3´ 4)

1) Minimum and maximum width of a heavy plate depend on the thickness.
2) Plates with lengths 1216 metres are available subject to special agreement.
3) In thicknesses of 40.01 – 80 mm the maximum plate weight is 10 tons instead of 11 tons which is possible for thicknesses < 40 mm.
4) In case of 2000 – <4000 mm of minimum length, two plates is the minimum amount to be ordered.
Other dimensions are available subject to special agreement only.
Plate width 1000mm 1600mm is possible in thickness range 10 80mm respecting maximum and minimum lengths is given table. Number of the ordered pieces must be double.

TOLERANCES

CUT LENGTHS

- Tickness EN 10051:2010 category A
- Width and length EN 10051
- Flatness EN 10029 Class N normal tolerances on flatness, steel type H.

HEAVY PLATES

- Thickness EN 10029 Class A
- Width and length EN 10029
- Flatness EN 10029, Class N normal tolerances on flatness, steel type H.

PROPERTIES

DELIVERY CONDITION

The delivery condition of Raex steel is hardened.

HARDNESS VALUES

RUUKKI RAEX	HARDNESS (HBW)	ESFUERZO DE CEDENCIA (X 1,000 PSI)	ESFUERZO ULTIMO (X 1000 PSI)	ELONGATION A%	IMPACT STRENGTH CHARPY V 30 J
RAEX™ 400	360 - 440	145.0	181.3	10	- 40 ºC
RAEX™ 450	420 - 500	174.0	210.3	8	- 40 ºC
RAEX™ 500	450 - 540	181.3	232.0	8	- 40 ºC

MATERIALS TESTING

Hardness is measured in Brinell units (HBW) in compliance with EN ISO 65061 on a milled surface 0.3–2 mm below plate surface. The measurement depth is determined on the basis of product form and plate thickness.

CHEMICAL COMPOSITION

CONTENIDO % MÁXCONTENT % MAXIMUM (CAST ANALYSIS). THE STEEL IS GRAIN REFINED									
Ruukki Raex	**C**	**Si**	**Mn**	**P**	**S**	**Cr**	**Ni**	**Mo**	**B**
Raex 300	0,18	0,80	1,70	0,025	0,015	1,50	1,00	0,50	0,005
Raex 400	0,23	0,80	1,70	0,025	0,015	1,50	1,00	0,50	0,005
Raex 450	0,26	0,80	1,70	0,025	0,015	1,50	1,00	0,50	0,005
Raex 500	0,30	0,80	1,70	0,025	0,015	1,50	1,00	0,50	0,005

PREFABRICATION SERVICES

SHOPPRIMED PLATES

Shop priming gives steel temporary corrosion protection for the transport period, shortterm storing and workshop processing. In engineering workshop operation it improves the cleanliness of working environment and occupational safety. Cutting and welding shopprimed plates is easy. Moreover, the adherence of spatters on the steel structure is significantly decreased.

FLAT CUT SHAPES

Using flat cut shapes, the manufacture and throughput time of installation will decrease. The customer will receive the needed components ready for installation, and can thus avoid unnecessary material and storing costs. If ordered, the products are delivered as shopprimed, bevelled and bent.

PROCESSING INSTRUCTIONS

WELDING AND THERMAL CUTTING

The weldability of Raex steels has been developed to the top class among wearresistant steels on the market. Practical welding instructions for the Raex 400, Raex 450 and Raex 500 grades are presented on the separate technical brochure. Moreover, the brochure specifies the special features regarding thermal cutting of Raex steels.

COLD FORMING

Raex steels can be cold formed up to the thickness of 20 mm, see the table below. Forming temperature must be a minimum of +20°C and a maximum of +200°C.

STANDARD VALUES FOR FREE BENDING AND FLANGING. THICKNESS ≤20MM.

RUUKKI RAEX	FREE BENDING < 90° PLUNGER RADIUS OR CURVATURE / PLATE THICKNESS R/T BEND LINE POSITION VS. ROLLING DIRECTION		GAP WIDTH / PLATE THICKNESS W/T		BENDING TO 90° V CHANNEL W/T
	Transverse	**Longitudinal**	**Transverse**	**Longitudinal**	
RAEX™ 400	3	4	9	11	≈15
RAEX™ 450	4	5	11	13	≈15
RAEX™ 500	5	6	13	15	≈15

It is recommended to consult Ruukki Technical Customer Service when bending Raex 500 steel or plates thicker than 20 mm.

HEAT TREATMENT
Hardened steels are not intended to be heat treated. Tempering in the maximum temperature of +200 °C is the only heat treatment which will maintain the abrasion resistance properties of the plate at a good level. Heat treatment in higher temperatures decreases the strength, hardness and abrasion resistance properties of steels.

DRILLING
Raex 400 and Raex 450 can be drilled with HSS drills. For drilling of Raex 500, hard metal drills are recommended.

General instructions for drilling of wearresistant steels are:
- The drilling machine has to be rigid and stable in order to minimize vibrations
- Clamp the work piece securely and close to the area to be machined
- Shorthole drills (DIN 1897) are recommended
- The service life of the drilling tool can be prolonged by decreasing the speed
- Provide an abundant supply of cutting fluid

OCCUPATIONAL SAFETY
Special care must be taken in all stages of handling hardened steels. Flanging is challenging due to the high strength and high flexural stresses of the plate. If the bending radius, for example, is too small and a crack is created in the bending point, the plate may fly from the bending tool in the direction of the bend.

Those bending the plate must take appropriate precautions to protect themselves and no unauthorised persons must be allowed in the area. The safest location is usually by the bending machine. The handling instructions of the steel supplier and safety instructions of the workshop must be adhered to in detail. New employees must receive appropriate training before they are allowed to process hardened steels.

ORDER & DELIVERY

DELIVERY CONDITION
The delivery condition of Raex steel is hardened.

INSPECTION DOCUMENT
On the customer's request, either a Test report 2.2 or Inspection certificate 3.1 in compliance with EN 10204 is granted to Raex steels. The inspection document states the chemical composition of steel based on cast analysis and hardness in delivery condition.

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