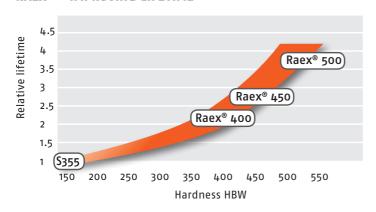


RAEX® 400, RAEX® 450 AND RAEX® 500 WEAR-RESISTANT STEEL GRADES

RAEX® - IMPROVING LIFETIME 1)





SAFETY AT WORK

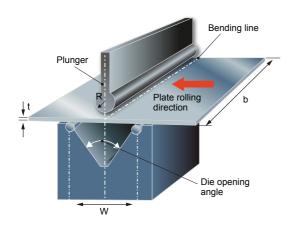
The safety instructions must be adhered to in detail in all workshop processing of wearresistant steels.

¹⁾ As a reference, an ordinary S355 structural steel.

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

| Ruukki Raex | Minimum inside bending radius Plate thickness = t mm | | Springback Degree | Gap width / plate thickness W/t | | Bending to 90° V groove W/t |
|-------------|---|----------------|----------------------|------------------------------------|----------------|--------------------------------|
| | Transverse ¹⁾ | Longitudinal1) | | Transverse1) | Longitudinal1) | |
| Raex 400 | 3 x t | 4 x t | 9° – 13° | 9 | 11 | ~15 |
| Raex 450 | 4 x t | 5 x t | 9° – 14° | 11 | 13 | ~15 |
| Raex 500 | 5 x t | 6 x t | 10° – 15° | 13 | 15 | ~15 |

¹⁾ Bending line position vs. rolling direction of the plate. It is recommended to do flanging in a single pass. It is recommended to consult Ruukki Technical Support when bending of Raex 500 or plates thicker than 20 mm.



BENDING FORCE (F, NEWTON) IN FLANGING

$$F = 1.6 \cdot \frac{R_m \cdot b \cdot t^2}{W}$$

 $R_m = Raex 400/450/500 \sim 1250/1450/1600 \text{ N/mm}^2$

b = Bending length, mm

t = Plate thickness, mm

W = Die gap, mm

(R = Plunger radius)

UNDERMATCHING FERRITIC WELDING CONSUMABLES, YIELD STRENGTH ~ 500 MPA

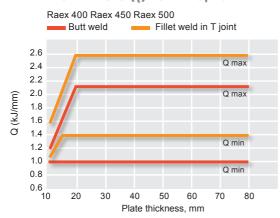
| Welding method | Classification of consumables | Consumables (Esab) | | | | | |
|--------------------------------|-------------------------------|--------------------|--|--|--|--|--|
| MAG solid wire | EN ISO 14341: G 42 X | OK Autrod 12.51 | | | | | |
| | EN ISO 14341: G 46 X | OK AristoRod 12.63 | | | | | |
| FCAW / Metal-cored wire | EN ISO 16834: T 42 X | OK Tubrod 14.12 | | | | | |
| FCAW / Rutile flux-cored wire | AWS A5.20 E71T-X | OK Tubrod 15.14 | | | | | |
| MMA (Manual Metal Arc) welding | EN ISO 2560: E 42 X | OK 48.00 | | | | | |
| | EN ISO 2560: E 46 X | OK 55.00 | | | | | |

WORKING TEMPERATURES^{1,2)} FOR WELDING. HEAT INPUT RANGE BELOW

| Ruukki Raex | Plate thickness, mm | | | | | | | | | | |
|-------------|---------------------|-------|------|------|------|--------|--------|---------|------|----|--|
| | 1 | 10 | 2 | 0 | 3 | 0 4 | 0 5 | 60 6 | 0 70 | 80 | |
| | hantan | hiiii | ш | Liii | ш | Luutuu | Luntum | Luutuud | | шш | |
| Raex 400 | + | 20 | | +75 | +100 | +125 | +150 | | +175 | | |
| Raex 450 | +20 | +75 | +1 | 00 | +125 | +150 | +175 | | +200 | | |
| Raex 500 | +20 | +100+ | -125 | +150 | | +175 | | +2 | 00 | | |

¹) Applicable for undermatching ferritic consumables with low hydrogen content (HD≤5 ml/100g).

HEAT INPUT RANGES (0) FOR MAG. FCAW AND MMA WELDING



$$Q = \frac{0.8 \times 60 \times U \times I}{1000 \times V}$$

Q = Heat input (kJ/mm)

0.8 = Thermal efficiency for

MAG, FCAW and MMA = Voltage (V), I = Current (A)

v = Welding speed (mm/min)

GUIDELINES FOR WORKING TEMPERATURE¹⁾ IN FLAME CUTTING

| Ruukki Raex | Plate thickness, mm | | | | | | | | | |
|-------------|---------------------|------|--------|----------|-----------|------------|---------------|----|--|--|
| | 10 20 | | 0 3 | 0 4 | 0 5 | 0 6 | 0 70 8 | 80 | | |
| | <u>landandan</u> | Ш | luntuu | Limition | limitiini | liiiitiiii | lantan lantan | | | |
| Raex 400 | +20 | | +75 | +100 | +125 | +150 | +175 | | | |
| Raex 450 | +20 | +75 | +100 | +125 | +150 | +175 | | | | |
| Raex 500 | +20 | +100 | +125 | +150 | | +1 | 75 | | | |

¹⁾ Working temperatures higher than +220°C may not be used. NOTE: Preheating can be avoided by reducing the cutting speed and by choosing nozzles and other cutting equipment correspondingly.

Ruukki provides its customers with energy-efficient steel solutions for better living, working and moving.

This publication is accurate to the best of our knowledge and understanding. Although every effort has been made to ensure accuracy, the company does not assume any responsibility for any errors or omissions, or any direct, indirect or consequential damage caused by incorrect application of the information. We reserve the right to make changes. Always use original standards for accurate comparison.



²⁾ Working temperatures or interpass temperatures higher than +220°C may not be used.