

# EXPOSURE MEASUREMENTS ON PORTABLE X-RAY FLUORESCENCE SPECTROMETERS (XRF)

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## measurement performance



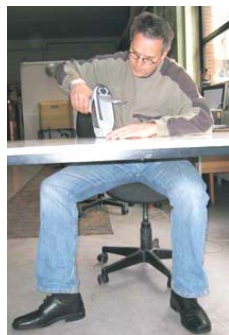
scattered radiation on steel, XRF fitted on the probe surface



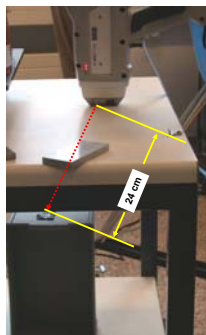
scattered radiation on acrylic glass, XRF tilted to the probe surface



primary beam, dosimeter fixed in 10 cm distance on an Alderson phantom



operator sitting on a wooden table



primary beam under the table



primary beam, dosimeter fixed on the surface of the exit window



primary beam, dosimeter fixed in 100 cm distance on an Alderson phantom

## maximum results for the dose rate

XRF	voltage (kV)	current (µA)	maximum dose rate of the primary beam [mSv/h] by distance r from the exit window				
			r = 0 cm	r = 10 cm	r = 50 cm	r = 100 cm	under table r = 24 cm
1	50	40	570	31	1.2	0.2	1.6
2	40	20	1564	229	15.0	3.6	0.1
3	40	100	650	26	1.4	0.3	1.9
4	40	50	75683	2385	91.0	20.0	4390.0
5	45	40	2240	152	11.0	2.6	12.3
6	50	50	38240	175	66.5	15.7	30.9

## conclusions

- if every protection equipment of the portable XRF works, the annual dose for the operator will be less than 1 mSv
- in case of incorrect using of the XRF - especially if the probes were hand-held – or malfunction of the protection equipment, deterministic health effects are possible