

Manufacturers of Imaging Accessories

## **WOLF X-RAY PROTECTIVE APRONS INSTRUCTIONS FOR USE**

*Updated: 08/2021*

### **INFORMATION FOR GENERAL USE**

Wolf X-Ray's lead and lead-equivalent products will provide safe protection from scatter radiation if used properly. Product recommendations and limitations for use are shown below. The information below is regarding the use, fit, manufacturing, labeling, proper maintenance, design, ergonomics and overall protection of Wolf's lightweight garments. Before using Wolf's apparel, please thoroughly read the information provided below.

### **CE CERTIFICATION**

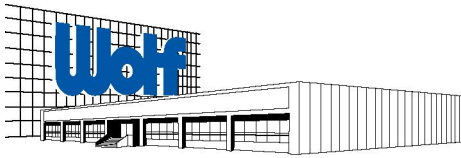
Article 10 & Article 11B certification for Directive 89/686/EEC issued by Notified Body number 0120 SGS.

### **ERGONOMICS AND USE OF ACCESSORIES**

Wolf X-Ray's aprons and other garments use a proprietary bi-layer mixture that reduces the total weight up to 40% compared to traditional lead or other conventional materials. The lightweight aprons aim to reduce excess strain and fatigue and are suitable for use in all procedures. All full size aprons come with built in shoulder pads for added comfort. Wolf's EZ Wrap or Quick Drop Apron styles offer hook and loop closures to allow the wearer to custom fit the weight distribution. Additional styles such as the Coat Apron, Vest & Skirt or Special Procedure Apron offer an adjustable belt to help lift the apron weight off of the shoulders. Wolf's Quick Drop Apron can be worn between a scrub-suit and sterile gown and offers built-in shoulder tabs that allow the apron to be quickly removed to maintain an uncontaminated sterile field. We recommend that all protective garments be worn over cotton clothes to remain cool. The use of a thyroid collar is recommended at all times for additional protection. Aprons are made in standard sizes and can also be custom-fit to ensure maximum comfort and protection.

### **MANUFACTURER PRODUCT SAFETY SPECIFICATIONS**

Wolf X-Ray's radiation protection aprons meet the health and safety requirements of the PPE directive 89/686/EEC. All protective garments are in compliance with these requirements and have been proven by testing using the IEC 61331-1:2014 standard. Minimum apron lead equivalency is at least 0.50mm Pb @ 50-110 kVp in the front (for frontal aprons) and at least 0.25mm Pb @ 50-110 kVp in the back (for front and back aprons). All thyroid collars, gonad shields and apronettes are at least 0.50mm Pb @ 50-110 kVp. Each batch and lot of core protective material is tested under the ASTM method to obtain Attenuation results. The Attenuation results are used to calculate the lead equivalency using the conversion chart below. This ensures that the protective material meets all industry standards and complies with the safety and health requirements of the PPE directive 89/686/EEC.



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### ATTENUATION CHART

		REGULAR LEAD			LIGHTWEIGHT LEAD			LEAD-FREE		
		0.25mm	0.35mm	0.50mm	0.25mm	0.35mm	0.50mm	0.25mm	0.35mm	0.50mm
Area Density (Ws)		Ws 3.04	Ws 4.26	Ws 6.08	Ws 2.61	Ws 3.66	Ws 5.23	Ws 2.55	Ws 3.66	Ws 5.09
DIRECT BEAM	50 kVp	98.8%	99.7%	99.9%	98.9%	99.6%	99.9%	98.7%	99.6%	99.9%
	70 kVp	95.1%	97.6%	99.1%	96.5%	98.1%	99.4%	96.1%	98.0%	99.4%
	90 kVp	90.7%	94.5%	97.4%	92.5%	95.6%	98.0%	92.0%	95.3%	97.8%
	110 kVp	87.5%	92.3%	96.1%	88.5%	93.1%	96.5%	87.8%	92.7%	96.3%

### PROTECTION, ATTENUATION/ TRANSMISSION VALUES

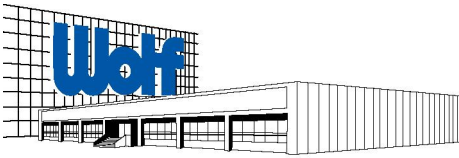
How core protective material is used to gain different lead equivalencies

LEAD		LIGHTWEIGHT LEAD	
1 layer	2 layers	1 layer	2 layers
1 layer	4 layers	1 layer	4 layers

### RECOMMENDATIONS AND LIMITATIONS OF USE

The recommendations shown below are general and may be subjected to local statutory or safety procedures mandated within your facility. Consult your Radiation Safety Officer or a qualified radiation physicist or radiologist for further information and resources regarding proper usage, storage or protection. It is recommended to wear at least one personal dosimeter inside the garment at chest level and/or one dosimeter worn outside, usually on the chest pocket.

PROTECTION TYPE	MODEL	FRONT (mm Pb)	BACK (mm Pb)	RECOMMENDED USE/ LIMITS
FRONT PROTECTION	• EZ WRAP	0.50 mm	0	X-Ray protection for the front side only.  Used for general radiology and x-ray or operating rooms etc., where radiation comes from the front.  NOT intended to be used for nuclear/ gamma use.
	• COAT	0.50 mm	0	
	• QUICK DROP	0.50 mm	0	
	• CONVENTIONAL	0.50 mm	0	
	• C-ARM APRON	0.50 mm	0	
	• BREAST STOLE	0.50 mm	0	
	• APRONETTE	0.50 mm	0	
	• PROTEK-TO PAD	0.50 mm	0	
FULL PROTECTION	• VEST & SKIRT	0.50 mm	0.30 mm	X-Ray protection for both the front and back.  Used in X-Ray, Operating Room, cardiac cath labs, angio, etc. Suitable for long duration procedures.  NOT intended to be used for nuclear/ gamma use.
	• SPECIAL PROCEDURE	0.50 mm	0.30 mm	
	• FRONT CLOSING SPECIAL PROCEDURE	0.50 mm	0.30 mm	
GONAD PROTECTION	• GONAD SHIELD	0.50 mm	0	Gonad protection for X-Ray
	• 3 PIECE SET	0.50 mm	0	
THYROID PROTECTION	• STANDARD	0.50 mm	0	Thyroid and neck protection
	• SOF-T	0.50mm	0	
HEAD PROTECTION	• RAD CAP	0.50 mm (sides)	0.25 mm (top)	Head and brain protection



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## **CARE/ MAINTENANCE & INSPECTION**

Protective aprons should NEVER be machine laundered, bleached, dry cleaned, ironed or autoclaved. To clean the surface of an apron, use a soft bristle brush and a mild soap solution such as a hand soap or laundry detergent. Never use bleach or solvents (mineral spirits, paint thinner, etc) to clean an apron as they may damage the interior lining and compromise the protective properties of the apron. Rinse with water and hang FLAT to dry. NEVER fold or crease an apron. To prevent damage to the interior lining material, an apron should be hung on an apron hanger or apron rack when drying and when not in use. Avoid contact with sharp objects. For transportation, the apron should be carefully rolled up and put in a box, tube or carrying bag. Aprons should be X-Rayed periodically (at least annually) using radiographic or fluoro operating at 70-90kV to check for holes or cracks. Lines may indicate cracks; dots may indicate air bubbles which are not harmful (seen as lighter on fluoro and darker on film). Replacement should be considered every 18-24 months, depending on the amount of usage and general wear and tear. Modifications made to the aprons after purchase/use may affect protection and will void the manufacturer's warranty.

## **MANUFACTURER WARRANTY**

Wolf X-Ray manufactured products are warranted, under normal use and service, to be free from defects in material and workmanship for a period of one year from the original date of shipment by Wolf. The evaluation, and determination to repair or replace defective part or parts, will remain the sole right of Wolf. All repairs and replacements made under warranty are F.O.B. factory shipping point. Purchaser's sole remedy for any defect is for repair or replacement pursuant to the foregoing. Labor costs are not covered by this warranty; unless the product has been returned by the distributor to the Wolf factory, and the parts in question have proven to be defective as determined by Wolf. All freight costs associated with returning the product to the factory must be prepaid. A Wolf return authorization number must be obtained prior to any enforcement of this warranty. Product that has been improperly installed or altered in any way is not covered by this warranty. Variable transformers, ballasts, switches, and Plexiglas panels will be replaced provided notification of defect is received and confirmed by Wolf within 90 days of shipments. This warranty is in lieu of all other warranties, expressed and implied, including warranties of merchantability and fitness for purpose.