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PROVITA Smoke Hood

SPECIFICATION: The **PROVITA Smoke Hood** is a new personal escape hood, that provides personal protection from the effects of most toxic smoke fumes, allowing the wearer vital minutes to calmly evacuate a dangerous smoke filled environment.

The **PROVITA Smoke Hood** is manufactured from a transparent, heat resistant, gas impermeable material and incorporates a chevron shaped activated charcoal filter, back and front, with a rubber seal at the base. The transparent material extends over the head down to the shoulders which also protects the wearer's neck.

The **PROVITA Smoke Hood** reduces exposure to smoke and many of the toxic gases from fire situations, protecting the wearers head and respiratory system from heat and smoke particles allowing freedom from disorientation, and time for escape. The hood is relatively inexpensive, easy to don and when packed fits into the pocket, handbag or briefcase.

TECHNICAL DETAILS:

Head Covering: The effectiveness of a smoke hood such as ***PROVITA*** is largely dependent on the heat and flame retardant properties of the material from which the hood is made. In this case the head covering is composed of polyimide film sold under the registered trade mark KAPTON, a summary of which is given as follows:

KAPTON polyimide film possesses a unique combination of properties previously unavailable among polymeric film materials. The ability of KAPTON to maintain its excellent physical, electrical, and mechanical properties over a wide temperature range has opened new design and application areas to plastic films. KAPTON has proved to be especially useful in applications involving high operating temperatures.

KAPTON is synthesized by a bipolycondensation reaction between an aromatic dianhydride and an aromatic diamine. There is no known organic solvent for the film and it is infusible and flame resistant. The outstanding properties of KAPTON permit it to be used at both high and low temperature extremes where other organic materials would not be functional.

KAPTON polyimide films retain their physical properties over a wide temperature range. They have been used in field applications where the environmental temperatures have been as low as -269 C (-452 F) and as high as 400 C (752 F).

Neck Seal: The neck seal material is composed of flame retardant Neoprene Latex which is inherently less heat and flame resistant than the polyimide film given that it must be sufficiently elastic to stretch over a users head and then relax to form a good neck seal. In the case of the ***PROVITA*** Smoke Hood, the polyimide film extends over the neck seal down to the shoulders to afford added protection to the seal and the wearers neck.

Color: Black
Thickness: 0.25mm (.010") thick +/- 10% tolerance
Shore: 40
Antic Static: meets BS2891 requirements

Flame Retardant: meets BS3119 and BS3120 requirements

Filter: The chevron shaped filter which is part of the *PROVITA* smoke hood is composed of 2 layers of charcoal impregnated material, one layer of particulate material and an outer layer of especially treated fire retardant material, all bonded to the polyimide film. Tests have been carried out relating to Absorption of Hydrogen Cyanide and the results of these are shown below:

One or two layers of charcoal impregnated material and one layer of the particulate material were placed in a tube with a diameter of 5.00 cm. Through this tube an airflow of 70.7 l/hour, containing 200 or 400 PPM HCN was led, and the breakthrough concentration of HCN was measured in the effluent air. The airflow through the tube is comparable with an airflow of 900 l/hour through a filter pad with a surface area of 250 cm².

The experimental conditions were:

Temperature: 24 +/- 1 C
Relative humidity: 80 +/- 2 %
HCN-concentration: 200 or 400 PPM
Airflow: 70.7 l/hour

PHYSIOLOGICAL EFFECTS of HCN:

200 PPM Lethal in less than 1 minute
400 PPM Immediately lethal

Four types of experiments were performed:

Experiment 1: 1 layer charcoal, 1 layer particulate, 200 PPM HCN

Experiment 2: 1 layer charcoal, 1 layer particulate, 400 PPM HCN

Experiment 3: 1 layers charcoal, 1 layer particulate, 200 PPM HCN

Experiment 4: 1 layers charcoal, 1 layer particulate, 400 PPM HCN

Results: In the table the weight of the samples of active carbon, the HCN-concentration and the breakthrough times at which the concentration in the effluent air reaches a value of 10 PPM HCN and 20 PPM HCN are presented.

Table 1:

ALL BREAKTHROUGH TIMES FAR EXCEEDED RECOMMENDED SAFETY LIMITS

Experiment	Sample Weight [grams]	HCN-Con [PPM]	Breakthrough HCN 10 PPM [Min]	Time of 20 PPM [Min]
1	0.6762	200	38	43
	0.6858	200	32	38
	0.6600	200	31	37
2	0.7532	400	26	31
	0.6688	400	14	19
	0.7580	400	20	25
3	1.4303	200	88	96
	1.4765	200	109	117
	1.3625	200	79	85
4	1.3997	400	45	49
	1.4560	400	54	57
	1.4899	400	55	60