

Material Safety Data Sheet

FuranFlex®

Producer and distributor of the product:

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Code													
01	<p>Product Identification:</p> <p>Name of the product: FuranFlex® (registered trademark)</p> <p>Specification of the product: Chimney lining tube in a soft, pre-polymerized condition, made of a glass fibre reinforced resin composite. Diameter range: 60–1000 mm. Wall thickness: 2–2.5 mm The chimney lining tube consists of three different layers:</p> <ul style="list-style-type: none">- internal layer: 120 micron thick polyethylene hose (only necessary for installation)- middle layer: 2–4 layers of resin matrix impregnated fibreglass textile- external layer: thin polyester textile cover												
02	<p>Composition and Information on Ingredients</p> <p>Ingredients used for FuranFlex® production:</p> <p>Organic ingredients</p> <table><tr><td>Name</td><td>Phenol</td><td>Furfuryl alcohol</td><td>Formaldehyde</td></tr><tr><td>EINECS #</td><td>2036327</td><td>202-626-1</td><td>2000018</td></tr><tr><td>CAS #</td><td>108-95-2</td><td>98-00-0</td><td>50-00-0</td></tr></table> <p>Phenol resin Furan resin Epoxy resin Saturated polyester fibre textile</p> <p>Inorganic ingredients</p> <p>Glass-fibre textile Graphite Mineral powders Glass powder Water</p> <p>The above-mentioned components are only used for the production of FuranFlex®. The resin composition is in pre-polymerized (so-called “B”) state in the distributed FuranFlex® chimney liner, where the molecules of the listed components are partly bonded to each other.</p> <p>FuranFlex® does not contain any of the following fire-retardants:</p> <ul style="list-style-type: none">- Halogens- Antimony trioxide	Name	Phenol	Furfuryl alcohol	Formaldehyde	EINECS #	2036327	202-626-1	2000018	CAS #	108-95-2	98-00-0	50-00-0
Name	Phenol	Furfuryl alcohol	Formaldehyde										
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03	<p>Hazards Identification (only relates to the production of FuranFlex®!)</p> <p>Phenol and formaldehyde have an irritating effect especially for the skin, for the mucous membrane, and for the eyes. Furthermore, they also cause burns. Prolonged inhalation over the allowed concentration may have a damaging effect.</p> <p>Due to the furfuryl alcohol content of the furan resin, it is hazardous in case of skin contact, inhalation and swallowing.</p> <p>Epoxy resin: eye and skin irritant. In case of skin contact an allergic reaction may be caused.</p> <p>There is no hazard from chemical materials in the case of the installation of FuranFlex®</p> <p>It may cause itching for those with sensitive skin. The use of a skin-protector cream is recommended. There is no possibility of inhaling hazardous materials.</p>
04	<p>First Aid Measures (only in the case of the production of FuranFlex®!)</p> <ul style="list-style-type: none"> - In case of inhalation the patient should be taken outside for fresh air. - In case of skin contact the affected area should be washed with warm soapy water and treated with greasy skin cream. - In case of contact with the eyes, the eyes should be rinsed with clean, warm water for 15 minutes. In serious cases the patient should be treated by a doctor. - If swallowed the patient should be given olive or sunflower oil and should receive medical treatment. <p>In case of the installation of FuranFlex® there are no hazards from chemical materials.</p> <p>Wash hands with soap and water. Use protective gloves. Use skin-protection cream.</p>
05	<p>Fire and Explosion Data</p> <p>In its soft (transportation) state FuranFlex® is rated in the moderately flammable class "D".</p> <p>The polyester textile is a flammable material, but after being impregnated with the resin system, it is difficult to burn.</p> <p>The thin polyethylene hose inside the FuranFlex® tube (which is pulled out after hardening) cannot cause fire.</p> <p>After hardening, FuranFlex® is considered as a hardly flammable material. FuranFlex® does not fuel fire and does not burn independently.</p> <p>FuranFlex® resists durative against 210 °C hot air. This value reaches 250-350 °C in case of lower oxygen content flue gases.</p> <p>Extinguishing data: with water, CO₂ and foam.</p> <p>In case of exterior fires carbon dioxide, carbon monoxide, nitrogen oxides, ammonia and hydrocarbons are emitted into the environment. The smoke gas created is similar to the gases created when burning wood.</p> <p>FuranFlex® contains water in both the production and installation phase.</p>

06	<p>Accidental Release Measures</p> <p>Production phase: Any waste created is registered and disposed of in an incineration plant.</p> <p>Transportation phase: Soft FuranFlex[®] tube is packed in plastic foils. In the case of less than 80 kg, the tubes are transported in corrugated cardboard boxes, and in wooden boxes over 80 kg. Corrugated cardboard box size: 1.520x250x310 mm. Accidental spillage or leakage cannot occur and it cannot cause damage.</p>									
07	<p>Handling and Storage Storage and transportation conditions for FuranFlex[®] : Shelf-life between 30–25 °C 1–2 weeks between 25–20 °C 2–4 weeks between 20–15 °C 4–8 weeks between 15–10 °C 8–18 weeks</p> <p>- do not store under freezing point - avoid exposing the packed or unpacked product to heat-radiation or sunlight - ensure complete air circulation in the storage unit 1–2 times per hour - avoid exposure to water or rain whether packed or unpacked</p>									
08	<p>Exposure Controls/Personal Protection</p> <p>Production phase:</p> <ul style="list-style-type: none">- inhalation: maintain effective and proper ventilation in the production area.- hand protection: it is obligatory to use protective gloves, hand cream- eye protection: it is not obligatory to use protective glasses but recommended- skin protection: protective cotton clothing <p>Installation phase:</p> <ul style="list-style-type: none">- the use of protective gloves is recommended- protective glasses must be used during sawing- protective glasses must be used during the inflation of FuranFlex[®]									
09	<p>Physical and Chemical Properties The important compounds from health and environmental aspects are the pre-polymerised phenol and formaldehyde. The official fire and health hazard data only relates to free, pure phenol and formaldehyde, and, possibly, to a lesser degree to the phenol resin and to a negligible degree to the furan resin. Epoxy resin can be treated as neutral. In its state ready for delivery the finished FuranFlex[®] is soft and malleable, and behaves as a practically non-dangerous material. During the hardening process any dangerous components are built into the matrix, therefore, after hardening FuranFlex[®] becomes completely safe from a health aspect and behaves as a not easily combustible material from a fire hazard aspect. Immediately after production and before delivery, the concentrations of chemical materials emitted from the surface of the newly produced FuranFlex[®] are the following:</p> <table><tr><td>Ingredient</td><td>Measured value mg/m³</td><td>MAC value mg/m³</td></tr><tr><td>Phenol</td><td>1.8</td><td>4</td></tr><tr><td>Formaldehyde</td><td>0.013</td><td>0.6</td></tr></table> <p>(values measured 400 mm from the surface of FuranFlex[®])</p>	Ingredient	Measured value mg/m ³	MAC value mg/m ³	Phenol	1.8	4	Formaldehyde	0.013	0.6
Ingredient	Measured value mg/m ³	MAC value mg/m ³								
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Formaldehyde	0.013	0.6								

It can be observed that in its state (pre-polymerised) before transportation the measured phenol and formaldehyde concentrations are far below the permitted values. The evaporation of dangerous materials is suppressed by the inner polyethylene sheeting and the outer textile cover.
The phenol, formaldehyde, furfuryl alcohol data before polymerisation are the following:

	Phenol	Formaldehyde	Furfuryl alcohol
Phase	Liquid, solid	Gas	Liquid
Smell	Characteristic	Irritating	Pungent
pH	Slightly acidic		
Boiling point	182 °C	- 19 °C	170 °C
Melting point	41 °C	- 117 °C	-31 °C
Flash point	605 °C	430 °C	390 °C
Explosion danger	1,7 – 8,6 vol. %	7 – 73 vol. %	Not dangerous
Fire fuelling characteristics	does not fuel fire	does not feed fire	does not feed fire
Vapour pressure	40,7 hPa (26 °C)	Gas	n. a.
Density	1.071 kg/dm ³	1.03 times the density of air	1.129 kg/dm ³
Solubility in water	90 g/dm ³	Unlimited	Can be mixed in any concentration
Solubility in organic solvent	Alcohol, acetone	Alcohol, acetone	Alcohol, acetone

10 **Stability and Reactivity Data**

Exposed to heat the pre-polymerized resin in FuranFlex[®] starts to polymerize, while 3-4 mass% of water is released. The resin composition may also react with strong acids and oxidising agents at room temperature; therefore the material may be partly or totally polymerized and become useless.

11 **Toxicological Information**

Applies only for the FuranFlex[®] production phase

See sections 05 and 09, and the following information:

In the case of high concentrations (many times the MAC value, not bearable for humans) on contact with the eyes phenol and formaldehyde cause irritation and absorption. In the case of skin contact phenol and formaldehyde cause burns, and in the case of absorption the cause poisoning. The inhaled phenol vapour burns the respiratory tracts and the lungs. Formaldehyde inhalation causes strong watering of the eyes and coughing attacks.

Animal experiment values characterising toxicity (relative to kg bodyweight):

Name	Oral LD50 (rat) mg/kg	Dermal LD50 (rabbit) mg/kg	Inhalation (rat) mg/kg
Phenol	317	850	316
Formaldehyde	100	270	203
Installation phase: Hazardous material is not emitted from the surface of FuranFlex [®] in measurable quantities.			

12	Ecological Information Proper storage, delivery and packaging ensure that no solid or liquid material enters the environment from the product.
13	Disposal Considerations The waste originating from the production and installation of FuranFlex® needs to be collected and disposed of at a waste incineration facility.
14	Transport Information See section 07
15	Other Regulatory Information The labels on the product contain the information that is most important for users: besides the information about the producer and the customer there are also the production no. of FuranFlex®, the size (diameter, length and weight) and the production date of the tube.
16	Other Information The following standard “R” and “S” sentences relate to the hazardous ingredients contained in small quantities in FuranFlex®, free phenol molecules, formaldehyde and also furfuryl alcohol present in the phenol resin and to epoxy resin. The epoxy resin is the least hazardous component of the product. <u>Formaldehyde</u> R sentences: 23/24/25-34-40-43 R23/2425 Toxic by inhalation, in contact with skin and if swallowed R34 Causes burns. R40 Limited evidence of a carcinogenic effect R43 May cause sensitisation by skin contact S sentences: 1/ 2 -26-36/37-45-51 S1 Keep locked up S2 Keep out of the reach of children S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice S36/37 Wear suitable protective clothing and gloves S45 In case of accident or if you feel unwell seek medical advice immediately S51 Use only in well-ventilated areas <u>Phenol</u> R sentences: 24/25-34 R24/25 Toxic in contact with skin and if swallowed R34 Causes burns. S sentences: (1/2) 28-45 S(1/2) Keep locked up and out of the reach of children S28 After contact with skin, wash immediately with plenty of warm soapy water. S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible). In FuranFlex® (during the delivery phase) harmful ingredients are present only in small concentrations and in a pre-polymerized state. After polymerization these ingredients are entirely built into the resin composition and are no longer present as independent materials. The above reduces the danger of FuranFlex® to a minimum.

Furfuryl alcohol

R sentences: 20/21/22

20/21/22 Harmful by inhalation, in contact with skin and if swallowed

S sentences: 2-36/37-46-56

2 Keep out of the reach of children

36/37 Wear suitable protective clothing and gloves

46 If swallowed, seek medical advice immediately and show this container or label

56 Dispose of this material and its container at hazardous or special waste collection point

Epoxy resin

R sentences: 36/38-43-51/53

36/38 Irritating to eyes and skin

43 May cause sensitisation by skin contact

51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S sentences: 24-26-28-37/39-60

24 Avoid contact with skin

26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

37/39 Wear suitable gloves and eye/face protection

60 This material and its container must be disposed of as hazardous waste

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According to the study carried out by the Institut für Ökologische Chemie "Untersuchungsbericht Thermolyseprodukte von FuranFlex[®]" (08 July 2001) FuranFlex[®] does not emit any molecules harmful to health between 100-600 °C.

According to the study carried out by the DTC Dansk Toksikologi Center "Evaluation of FuranFlex[®]/Furanfix[®]" (April 2000) FuranFlex[®]/Furanfix[®] is not harmful to health, even in the case of a chimney fire.

ÁNTSZ (Hungarian National Public Health and Medical Officer Service) performed biological monitoring in the FuranFlex[®] production plant. The survey concluded that the concentration of the hazardous ingredients (phenol, formaldehyde) is only a fraction of the MAC value in the working area, so they cannot cause any damage to health.

Budapest, 08. April 2009

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