

PATENTS ACT 1953 (AS AMENDED)

DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT

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licant)

In support of an Application made by:

Chemie Linz Gesellschaft m.b.H., St.Peter-Straße 25, A-4021 Linz

tle)

for a patent for an invention entitled: LATEX-BONDED FIRE-
PROTECTION COMPOUND

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We, Carl M. Peabody and Harald Leitner
of St. Peter-Straße 25, A-4021 Linz

do solemnly and sincerely declare as follows:

We are

1. ~~Exam~~ authorised by the above mentioned applicant for the patent to make the
Declaration on its behalf.

2. The name and address of each actual inventor of the invention is as follows

Heinz HORACEK of Bockgasse 43, A-4020 Linz

Hermann WUDY of Preyßgasse 24, A-2511 Pfaffstätten

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and the fact(s) upon which the applicant is entitled to make this application are
as follows:The inventors are employees of the applicant company who was
entitled to the invention by virtue of the inventors contract
of employment3. The basic application(s) as defined by Section 141 of the Act was(were) made
as follows:

Country Austria on April 7, 1988

in the name(s) ... Chemie Linz Gesellschaft m.b.H.

and in on

in the name(s) on

and in on

in the name(s) on

4. The basic application(s) referred to in the preceding paragraph of this
Declaration was(were) the first application(s) made in a Convention country in
respect of the invention the subject of this application.

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Declared at Linz this 7th day of November 19 90
Chemie Linz Gesellschaft m.b.H.

Signed: Carl M. Peabody Harald Leitner

Position: Authorized Officers

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LATEX-BOUND FIRE PROTECTION COMPOUND

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(56) Prior Art Documents
GB 2012296
GB 1497118

(57) Claim

1. A thermally expandable fire-protection compound, which comprises 25 to 60% by weight of expandable graphite, 5 to 25% by weight, calculated as solids, of a chloroprene latex with at least 0.3 mol of carboxyl groups per 1 kg of latex solids, 3 to 25% by weight of substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides, and, if appropriate, further additives.

2. A process for producing a fire-protection compound or a fire-protection laminate as claimed in any one of claims 1 to 6, which comprises mixing expandable graphite, a latex dispersion which contains carboxyl groups and is preferably aqueous, substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol, polyimides and, if appropriate, further additives, with one another with good homogenization, if desired applying the compound obtained to a carrier web and, if desired, laminating the resulting laminate to a covering layer.

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ropäisches Patent), MC, MG, ML (OAPI Patent), MR
(OAPI Patent), MW, NL (europäisches Patent), NO,
RO, SD, SE (europäisches Patent), SN (OAPI Patent),
SU, TD (OAPI Patent), TG (OAPI Patent), US.

Veröffentlicht

Mit internationalem Recherchenbericht.

(54) Title: LATEX-BOUND FIREPROOFING MATERIAL

(54) Bezeichnung: LATEXGEBUNDENE BRANDSCHUTZMASSE

(57) Abstract

Thermally-expandable fireproofing material containing expanded graphite, an aqueous chloroprenlatex containing car-
boxyl groups and substances which form a paracrystalline carbon network in the event of fire.

(57) Zusammenfassung

Thermisch expandierbare Brandschutzmasse bestehend aus Blähgraphit, einem Carboxylgruppen enthaltenden wäßrigen
Chloroprenlatex und Substanzen, die im Brandfall ein parakristallines Kohlenstoffgerüst bilden.

Latex-bonded fire-protection compound

Description

5 The invention relates to thermally expandable fire-protection compounds or fire-protection laminates, which comprise expandable graphite, a chloroprene latex containing carboxyl groups and substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides, and to a process for the production
10 thereof.

15 Thermally expandable fire-protection compounds, which consist of expandable graphite, chloroprene rubber, a phenolic resin, an organic solvent and, if appropriate, additionally of hydrated alumina and inorganic fibers, have been described, for example, in Austrian Patent 360,130. In preventive fire protection, they prove to be particularly effective above all because of their excellent resistance to moisture, frost, heat, light and industrial climates, and because of their high expansion
20 pressure. Under the action of heat and fire, they expand in the event of fire in the opening which is to be protected, at a relatively low flowability. As a result, the expanding compound also does not avoid obstacles in an opening which is not completely sealed and, due to its
25 high expansion pressure or extension pressure, which normally is above 2 bar, forms a tightly sealing barrier layer, whereby a further spread of heat, fire and smoke gases is reduced or delayed, or completely prevented. This sealing material has a high mechanical strength even
30 in the expanded state. A disadvantage in the production, processing and application of such compounds is, however, their brittleness and low flexibility. A further disadvantage is that, in producing them, organic solvents are used which require a greater expenditure on equipment and a greater labor effort for solvent recovery and for minimizing any environmental pollution and health hazard caused by solvents.



The use of solvent-free fire-protection compounds consisting of expandable graphite and a polymeric binder has been described in WO 88/02,019. The polymeric binder can be either a flexible binder, for example polyvinyl acetate, an elastomeric binder, for example a chloroprene polymer, a thermosetting binder, for example a formaldehyde resin, or a thermosetting binder with an addition of a flexible binder. However, the disadvantage of these fire-protection compounds is that, in the case of using flexible or elastomeric binders, although they have a sufficient flexibility which is required for easy handling, the stability and hardness, which are necessary for perfect sealing against further spreading of the fire, of the barrier layer formed after the expansion in the event of fire is too low. Because of their high hardness, fire-protection compounds based on thermosetting binders can be processed only with great difficulty, and although the crust formed after the expansion in the event of fire is hard, it is also cracked and brittle and does not form a sufficiently stable and tight barrier layer.

It was the object of the invention to eliminate these disadvantages arising with the known fire-protection compounds and, above all, to obtain less brittle compounds which form a sufficiently stable and hard barrier layer in the event of fire and do not require any organic solvents in the production thereof. It was possible to achieve the object by means of a fire-protection compound which was obtained by the combination of three defined components.

The subject of the present invention is accordingly a thermally expandable fire-protection compound, which comprises 25 to 60% by weight of expandable graphite, 5 to 25% by weight, calculated as solids, of a chloroprene latex with at least 0.3 mole of carboxyl groups per 1 kg of latex solids, 3 to 25% by weight of substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides, and, if

appropriate, further additives.

It proves here to be particularly advantageous if the fire-protection compounds do not contain any organic solvents but, instead, if latex dispersions on an exclusively aqueous basis are used. Because of the residual water content present, these fire-protection compounds show a more favorable fire behavior than in the case of the use of organic solvents. Because of the absence of organic solvents, they can be produced and processed with substantially greater ease and substantially less pollution of the environment. Above all because of the content of elastomeric chloroprene polymer, the fire-protection compounds according to the invention show good elasticity and flexibility so that they, or laminates or boards produced from them, can easily be applied, processed and handled. Depending on the particular composition of the fire-protection compound, very high expansion pressures, preferably more than 5 bar, and hence particularly effective sealing can be achieved in the event of fire. The barrier layer formed after the expansion is distinguished by its strength, hardness and stability, so that it does not form cracks and is not destroyed by the thermal, mechanical and aerodynamical stresses and fire turbulence in the event of fire.

The expandable graphite used can be produced, for example, by acid treatment of a natural graphite with fuming nitric acid, as described in US Patent 3,574,644 or by H. Spatzek, Carbon 86 (1986).

The chloroprene latex is usually produced by copolymerization of chloroprene with acrylic acid or methacrylic acid. Such latices are, for example, commercially available as Skyprene® (Toyo Soda), Bayprene® (Bayer), Butaclor® (Distugil), Denka Chloroprene® (Druki Kagaku Kogyo), Nairit® (USSR) or Neoprene® (Du Pont).

The substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides form a paracrystalline carbon skeleton in the event of



fire. When they are heated in the event of fire, these substances first crosslink, and the strong intermolecular bonds are preserved even during further thermal stress, which leads to pyrolytic decomposition and finally to the formation of the paracrystalline carbon skeleton (Chemie-Ing.-Techn. 42 No. 9/10 (1970), pages 659-669). Three-dimensionally crosslinked thermosets such as, for example, phenol/formaldehyde resins prove to be particularly suitable in this case. Phenolic resins with tertiary butyl groups such as, for example, p-tert-butylphenol/formaldehyde resin 7520E or 7522E made by Rousselot, show particularly good results.

Examples of additives which modify the fire behavior are melamine and its derivatives, various graphite salts, cyanuric acid derivatives, dicyandiamide, halogenated hydrocarbons, polyammonium phosphates and guanidine salts. These substances also expand with decomposition under the action of heat. Since they have a decomposition temperature which differs from that of expandable graphite, the expansion pressure also increases with rising temperature in the event of fire, so that more complete sealing of the opening takes place.

Moreover, further additives, which above all improve the strength of the sealing compound in the expanded state, consolidate the crust and increase the cohesion, such as, for example, inorganic fibers, for example mineral fibers or glass fibers, glass powders, vermiculites, bentonites, silica, silicates, borax, starch, sugar, chloroparaffins, aluminum sulfate, hydrated alumina or magnesium hydroxide, can also be used. Furthermore, flame-proofing agents can be added, for example halogenated or phosphorus-containing hydrocarbons such as, for example, tris-chloropropyl phosphate, dibromoneopentyl glycol or antimony trioxide. Moreover, those additives can also be used which assist in increasing the foam formation in the event of flame action. Examples of these are salicylic acid, p-hydroxybenzoic acid, PVC and also nitrogen hydrazides or sulfo hydrazides, triazoles, urea-dicarboxylic anhydride and



ammonium carbonate.

5 The fire-protection compound according to the invention can be used both as a paste and in the form of boards, strips, tapes or moldings. Fire-protection
10 laminates, in which the fire-protection compound has been laminated to a carrier web, for example a glass fiber mat, are particularly advantageous and easy to apply. For decorative reasons or, for example, for protecting the fire-protection compound, the laminates or boards can be
15 covered by a covering layer, for example a plastic film, e.g. a PVC film, paper or aluminum sheet, on one side or both sides. It is also possible to finish the fire-protection laminates or boards with an adhesive layer which is then advantageously covered by a backing film.

20 The fire-protection compounds according to the invention are produced by mixing and homogenizing expandable graphite, a latex dispersion which contains carboxyl groups and is preferably aqueous, substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides, preferably a phenol/formaldehyde resin or polyimide resin, and, if appropriate, further additives which modify the fire behavior, for example in a kneader, dissolver or mixer. The compound thus obtained can either be used as such or it can
25 be applied to a carrier web, for example a sheet or a nonwoven (for example by means of a blade). After drying, the laminate can be compressed on a calender, if appropriate with an embossing roller, and if appropriate with simultaneous lamination to a covering layer, for example
30 of PVC or aluminum.

35 The fire-protection compounds according to the invention are used for fire-protecting sealing or isolation of openings in building components which form a fire section, such as, for example, gaps between walls, cavities or interspaces, wall breaks, cable ducts or the like. Likewise, door seals, window seals or other seals can be produced which foam up in the event of fire and seal the slot or the opening located in front. The joint



between glass and frame in fire-protection glazing by means of the fire-protection compounds or laminates according to the invention also gives perfect fire protection. The fabrication of complete bricks, with which breakthroughs for cables or pipes are lined and which form a barrier under the action of fire, is also possible. In the event of fire, these compounds foam up under the action of heat and seal the opening, so that the further passage of fire and smoke and hence further spreading of the fire are prevented.

Examples 1-15 and Comparison Example 16

Process The raw materials (stated in parts by weight) listed in Tables 1 and 2 are added in a stirred vessel in the following order: additives, $\text{Al}(\text{OH})_3$, phenolic resin, 50% aqueous chloroprene latex dispersion, expandable graphite, mineral fibers (Inorphil® 061-60, made by G.M. Langer, Federal Republic of Germany). The compound was in each case homogenized for 1 hour by means of a dissolver with a toothed disk at 30°C and at a pH of 10 (adjusted by means of KOH). The viscosity was about 4 Pas, measured at 30°C in a Brookfield viscometer (spindle 7, 20 rpm). The fire-protection compound obtained was then applied by means of a blade to a glass mat having a weight per unit area of 50 g/m² and dried at 190°C.

The expandable graphite was obtained by acid treatment of a natural graphite with fuming nitric acid. The phenolic resin used was a tert-butylphenol/formaldehyde resin, type 7520E made by Rousselot, France.

Commercially available latex dispersions based on a copolymer of chloroprene and methacrylic acid were used. The carboxyl group content indicated in each case in Tables 1 and 2 was adjusted by mixing the following latices of different carboxyl group contents: Neoprene® 115 (Du Pont): 0.33 mole of COOH per 1 kg of latex solids, Neoprene® 750 and Neoprene® 824A: no COOH content, Bayprene® 4R (Bayer): 0.23 mol of COOH per 1 kg of latex solids. In Comparison Example V 16, a 10% chloroprene solution in toluene was used in place of the aqueous latex dispersion, under otherwise the same conditions.



The properties of the fire-protection laminates are also listed in Tables 1 and 2. The expansion pressure was measured at 250°C on samples having a diameter of 113 mm and inserted between two heatable metal plates.

5 The pressure generated on expansion was transmitted from the lower plate to a force transducer with pressure indication. The expanding material was here not delimited sideways and was able to spread unhindered in the plane.

10 The expansion height was measured on samples having a diameter of 50 mm and inserted into a metal cylinder of 100 mm height and an internal diameter of 50 mm. The cylinder with the sample, preloaded with 100 g via a ram, was heated for 10 minutes in an oven at 300°C.



Table 1

(Raw materials in parts by weight)

Example	1	2	3	4	5	6	7	8
5 Moles of carboxyl per 1 kg of latex solids	0.33	0.33	0.05	0.33	0.05	0.33	0.33	0.33
Latex	21	30	30	27	21	27	27	27
Phenolic resin	3	4	4	4	10	10	4	12
Inorphil®	-	2	2	-	2.1	-	-	-
10 Expandable graphite	57	53	53	57	57	48	57	57
Al(OH) ₃	-	11	-	-	9.9	-	-	4
Additives ³	19/A	-	11/B	12/B	-	12/B	12/C	-

Properties

15 Unexpanded ¹	+	+	-	+	-	+	+	+
Expanded ²	+	+	-	+	-	+	+	+
Thickness (mm)	2.4	2.5	2.8	2.5	2.5	2.4	2.6	2.2
Weight per unit area (kg/m ²)	2.56	2.02	2.16	2.50	2.50	2.43	2.47	2.05
20 Expansion pressure (bar)	12.5	6.8	7	8	6	8.5	9.6	8.7
Expansion height (mm)	19	17	20	20	13	15	13	17

¹ + flexible, - brittle

25 ² + stable and hard, - unstable

³ A aluminum sulfate

B dicyandiamide

C melamine



Table 2

(Raw materials in parts by weight)

Example	9	10	11	12	13	14	15	V16
5 Mole of carboxyl per 1 kg of latex solids	0.33	0.17	0	0.23	0.33	0.33	0.23	0
Latex	27	27	27	27	25	40	22	55
								(toluene)
10 Phenolic resin	4	4	4	4	6	7	6.5	5
Inorphil®	-	-	-	-	1.4	-	1.5	1.3
Expandable graphite	57	57	57	57	54.6	37	42	29.3
Al(OH) ₃	-	-	-	-	13	5	14	9.4
Additives ³	12/D	12/E	12/F	12/G	-	11/H	14/H	-
15 <u>Properties</u>								
Unexpanded ¹	+	-	-	-	+	+	-	+/-
Expanded ²	+	-	-	-	+	+	-	+
Thickness (mm)	2.3	2.5	2.2	2.2	2.5	2.6	2.5	2.5
Weight per unit area (kg/m ²)	2.79	3.53	2.47	1.84	3.6	2.8	3.0	2.5
20 Expansion pressure (bar)	12	13	8.6	8.8	13	10	8	3
Expansion height (mm)	12	19	13	17.5	19	17	12	18
25 ¹ + flexible, - brittle, +/- a little flexible								
² + stable and hard, - unstable								
³ D starch								
E borax								
F guanylurea sulfate								
30 G guanidine phosphate								
H guanidine carbonate								



Example 17:

Small-fire test with laminates according to Examples 13 and V16

5 In order to prove effective sealing of an opening
by the fire-protection compound according to the inven-
tion in the event of fire, two 20 cm long PVC pipes
having an external diameter of 16 cm and a wall thickness
of 3.5 mm were each wound with 230 g of 15 cm wide fire-
protection laminate according to Example 13, which was
10 also laminated on the mat side to a 0.05 mm thick alumin-
um foil, so that the expandable graphite was located on
the pipe side. The wound pipes were each packaged in a
zinc sheet sleeve and each inserted into a bore (22 cm
diameter) in a 10 cm thick light concrete slab (Ytong®).
15 The pipes protruded for 5 cm from the bore on both sides
of the slab.

Two analogously wound pipes were inserted into
two further, similar bores of the light concrete slab,
but a fire-protection laminate according to Comparison
20 Example V16 was used in place of the fire-protection
laminate according to the invention. The laminate, which
was slightly less flexible, showed small cracks and
points of easy fracture during winding.

The light concrete slab was then installed
25 analogously to DIN 4102 in a small fire chamber and
subjected to a flame from one side up to a temperature of
about 1,000°C in accordance with the standard temperature
curve. The fire-protection compounds started to expand
after about 4 minutes as a result of the heat, all 4 PVC
30 pipes being softened and compressed. The isolations with
the laminates according to Example 13 were completely
sealed after 13 or 14 minutes respectively, and those
with the laminates according to Comparison Example V16
after 13 or 17 minutes respectively, so that smoke gases,
35 fire or soot no longer penetrated outwards. After 40
minutes, the outward-protruding pipe ends of the isola-
tion according to the invention started to break apart,
whereas the pipe ends of the isolations according to the
Comparison Example started to melt off. After 60 minutes,



the pipe ends had fully broken off or melted off, and the temperature of the expanded foam according to Example 13 was 290°C, and that of the expanded foam according to Comparison Example V16 was 310 or 370°C.

5 After 80 minutes, the test was terminated, without breakthroughs of flames or smoke gas being detectable. It was also found that, when the fire-protection compound according to Example 13 is used, the
10 temperature on the side facing away from the fire was 20-80°C lower during the fire test than in the case of using the conventional fire-protection compound according to Comparison Example V16.

15 The hardness of the expanded foam according to Example 13 was measured after cooling by means of a compressive strength test on a pinching device 4045 according to DIN 53,421 and was 0.2 N/mm² (60% compression).



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A thermally expandable fire-protection compound, which comprises 25 to 60% by weight of expandable graphite, 5 to 25% by weight, calculated as solids, of a chloroprene latex with at least 0.3 mol of carboxyl groups per 1 kg of latex solids, 3 to 25% by weight of substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides, and, if appropriate, further additives.

2. A fire-protection compound as claimed in claim 1, wherein the latex employed is exclusively an aqueous based latex.

3. A fire-protection compound as claimed in claim 1 or 2, wherein the chloroprene latex is composed of a copolymer of essentially chloroprene and acrylic acid or methacrylic acid.

4. A fire-protection compound as claimed in any one of claims 1 to 3, which contains a phenol/formaldehyde resin.

5. A fire-protection laminate, wherein a fire-protection compound as claimed in any one of claims 1 to 4 is applied to a carrier web.

6. A fire-protection laminate as claimed in claim 5, wherein the fire-protection compound is covered by a covering layer.

7. A process for producing a fire-protection compound or a fire-protection laminate as claimed in any one of claims 1 to 6, which comprises mixing expandable graphite, a latex dispersion which contains carboxyl groups and is preferably aqueous, substances from the group comprising

polyacrylonitrile, cellulose or derivatives thereof,
phenol/formaldehyde resins, polyfurfuryl alcohol,
polyimides and, if appropriate, further additives, with
one another with good homogenization, if desired applying
the compound obtained to a carrier web and, if desired,
laminating the resulting laminate to a covering layer.

8. A thermally expandable fire-protection compound
substantially as herein described with reference to any
one of the Examples excluding Example 16.

9. A process for producing a fire-protection compound or
a fire-protection laminate substantially as herein
described with reference to the section Process.

DATED this 4th day of July 1991

CHEMIE LINZ GESELLSCHAFT MBH
by their Patent Attorneys
GRIFFITH HACK & CO.

14
- 13 -

Abstract

A thermally expandable fire-protection compound consisting of expandable graphite, an aqueous chloroprene latex containing carboxyl groups, and substances from the group comprising polyacrylonitrile, cellulose or derivatives thereof, phenol/formaldehyde resins, polyfurfuryl alcohol and polyimides.



INTERNATIONAL SEARCH REPORT

International Application No. PCT/EP 89/00371

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl ⁴ : C 09 K 21/00		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System ¹	Classification Symbols	
Int.Cl ⁴	C 09 K; C 09 D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	WO, A, 88/02019 (DIXON) 24 March 1988, see claims 1, 6, 12, 13; page 2, lines 25-27; page 5, lines 14, 15	1, 2, 3, 5, 6, 8
Y	see claims 1, 16; page 4, line 27	1, 3-8
Y	FR, A, 2265838 (CHEMIE LINZ) 24 October 1975, see claims 1, 3, 11	1, 3-8
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Δ" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
07 June 1989 (07.06.89)	12 July 1989 (12.07.89)	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE		

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

EP 8900371

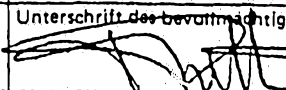
SA 27793

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 23/06/89.
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A- 8802019	24-03-88	AU-A- 7913287	07-04-88
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		BE-A- 827342	29-09-75
		CA-A- 1058455	17-07-79
		CH-A- 596292	15-03-78
		DE-A, B, C 2421332	02-10-75
		GB-A- 1497118	05-01-78
		JP-A- 51098736	31-08-76
		LU-A- 72151	04-02-76
		NL-A- 7503719	01-10-75
		SE-B- 418752	22-06-81
		SE-A- /503272	30-09-75
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INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen PCT/EP 89/00371

I. KLASSIFIKATION DES ANMELDUNGSGEGENSTANDS (bei mehreren Klassifikationssymbolen sind alle anzugeben) ⁶		
Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC		
Int. Cl. 4 C 09 K 21/00		
II. RECHERCHIERTE SACHGEBIETE		
Recherchierter Mindestprüfstoff ⁷		
Klassifikationssystem	Klassifikationssymbole	
Int. Cl. 4	C 09 K; C 09 D	
Recherchierte nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Sachgebiete fallen ⁸		
III. EINSCHLÄGIGE VERÖFFENTLICHUNGEN⁹		
Art*	Kennzeichnung der Veröffentlichung ¹¹ , soweit erforderlich unter Angabe der maßgeblichen Teile ¹²	Betr. Anspruch Nr. ¹³
X	WO, A, 88/02019 (DIXON) 24. März 1988, siehe Ansprüche 1,6,12,13; Seite 2, Zeilen 25-27; Seite 5, Zeilen 14,15	1,2,3,5,6,8
Y	siehe Ansprüche 1,16; Seite 4, Zeile 27 --	1,3-8
Y	FR, A, 2265838 (CHEMIE LINZ) 24. Oktober 1975, siehe Ansprüche 1,3,11 ----	1,3-8
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Besondere Kategorien von angegebenen Veröffentlichungen¹⁰:</p> <p>"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist</p> <p>"E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist</p> <p>"L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)</p> <p>"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht</p> <p>"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist</p> </div> <div style="width: 45%;"> <p>"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist</p> <p>"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden</p> <p>"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist</p> <p>"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist</p> </div> </div>		
IV. BESCHEINIGUNG		
Datum des Abschlusses der internationalen Recherche		Absenddatum des internationalen Recherchenberichts
7. Juni 1989		12 JUL 1989
Internationale Recherchenbehörde		Unterschrift des bevollmächtigten Bediensteten
Europäisches Patentamt		 P.C.G. VAN DER PUTTEN

ANHANG ZUM INTERNATIONALEN RECHERCHENBERICHT ÜBER DIE INTERNATIONALE PATENTANMELDUNG NR.

EP 8900371

SA 27793

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentedokumente angegeben.

Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am 23/06/89

Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

Im Recherchenbericht angeführtes Patentedokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
WO-A- 8802019	24-03-88	AU-A- 7913287	07-04-88
FR-A- 2265838	24-10-75	AT-A, B 330320	25-06-76
		BE-A- 827342	29-09-75
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