

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2016/038481

International filing date (day/month/year)
21.06.2016

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30.06.2015

International Patent Classification (IPC) or both national classification and IPC
INV. C09K8/52 C09D5/00 C09K8/524 C08G59/18 C09D163/00

Applicant
DOW GLOBAL TECHNOLOGIES LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of
this opinion

see form
PCT/ISA/210

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>3, 8, 11</u>
	No: Claims	<u>1, 2, 4-7, 9, 10</u>
Inventive step (IS)	Yes: Claims	<u>8, 11</u>
	No: Claims	<u>1-7, 9, 10</u>
Industrial applicability (IA)	Yes: Claims	<u>1-11</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1 WO 2009/094235 A1 (DOW GLOBAL TECHNOLOGIES INC [US]; GAN JOSEPH [FR]; ECKERT MATTHIEU M []) 30 July 2009 (2009-07-30)
- D2 WO 2005/023941 A1 (DU PONT [US]; EDMONDSON STEPHEN J [US]; MARX EDWARD J [US]) 17 March 2005 (2005-03-17)
- D3 US 4 330 644 A (ALLEN ROY A) 18 May 1982 (1982-05-18)
- D4 KR 2014 0005476 A (KCC CORP [KR]) 15 January 2014 (2014-01-15)
- D5 US 2009/277625 A1 (BAI YUN [CA] ET AL) 12 November 2009 (2009-11-12)
- D6 WO 2014/169125 A1 (VALSPAR SOURCING INC [US]) 16 October 2014 (2014-10-16)
- D7 WO 2014/093117 A1 (DOW GLOBAL TECHNOLOGIES LLC [US]; ROHM & HAAS [US]) 19 June 2014 (2014-06-19)

Note: The examination with regard to novelty and inventive step was carried out in light of the description and the comments and objections raised under Item VIII.

Novelty (Art. 33(2) PCT)

The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 1, 4-7, 9 & 10 does not appear to be new. The reasoning is as follows:

Document D1 (whole document, but in particular examples 6 and 7 of table 1 with reference to example 2) discloses a powder coating material, which is the cured product of a composition which includes an alkanolamine modified epoxy resin (see product of example 2) and a hardener (also the product of example 2). The compositions of examples 6 and 7 further comprise "contaminant-capturing

material" (BaSO_4 and TiO_2). The wet and dry glass transition temperatures do not appear to be explicitly disclosed for the compositions in D1, but it is assumed that the requirement that the difference between dry glass transition temperature and the wet glass transition temperature is at least 14°C is inherently fulfilled, because the compositions comprise sufficient alkanolamine modified epoxy resin (see p. 9, l. 20-29 of the description of the current application). Thus, the disclosure of document D1 appears to be prejudicial to the novelty of the subject-matter of claims 1, 2, 4-7, 9 and 10.

Document D2 (example 6 in table 1 + the notes below table 1; page 22, l.21 - p.23, l. 29) discloses an epoxy powder composition, which comprises EPON Resin DPS-2034 (an alkanolamine modified epoxy resin: Bisphenol A/epichlorohydrin epoxy resin reacted with tris(hydroxymethyl)aminomethane), a hardener (Epicure curing agent P-104) and "contaminant-capturing material" (iron oxide). Again, the wet and dry glass transition temperatures do not appear to be explicitly disclosed for the compositions in D2, but it is assumed that the requirement that the difference between dry glass transition temperature and the wet glass transition temperature is at least 14°C is inherently fulfilled by the composition of example 6, because the compositions comprise a relatively large amount of alkanolamine modified epoxy resin. Thus, the disclosure of document D2 appears to be prejudicial to the novelty of the subject-matter of claims 1, 2, 4-7 and 10.

Similarly, document D3 (examples I-III, col.6, l.50-52) discloses resin compositions based on alkanolamine modified epoxy resins (Bisphenol A/Polyepoxide A/ tris(hydroxymethyl)aminomethane) with a hardener (epoxy curing agent X) and "contaminant-capturing materials" (barium sulphate & red iron oxide). Again, the wet and dry glass transition temperatures do not appear to be explicitly disclosed for the compositions in D3, but it is assumed that the requirement that the difference between dry glass transition temperature and the wet glass transition temperature is at least 14°C is inherently fulfilled by the composition of example III, because the compositions comprise a relatively large amount of alkanolamine modified epoxy resin. Thus, the disclosure of document D3 appears to be prejudicial to the novelty of the subject-matter of claims 1, 2, 4-7 and 10.

Document D4 (examples in table 1 - in particular example 3) may also be prejudicial to the novelty of claims 1, 2, 4-7 and 10, because this document also appears to disclose a composition which comprises alkanolamine modified epoxy resin, a hardener and a "contaminant capturing material".

Inventive Step (Art. 33(3) PCT)

The present application does not meet the criteria of Article 33(3) PCT, because the subject-matter of claim 3 does not involve an inventive step.

Forming a liner first rather than applying the composition directly as a coating to a substrate, seems to represent a standard alternative option for a person skilled in the art.

Provided the clarity objections under Item VIII are dealt with satisfactorily, the subject-matter of claims 8 and 11 would appear to involve an inventive step in the sense of Art. 33(3) PCT, because none of the documents anticipates removing a gloss layer from a alkanolamine-modified-epoxy-based coating to improve the exposure of a contaminant capturing material to the medium.

Re Item VIII

Certain observations on the international application

Claim 1 refers to "contaminant capturing materials", i.e. materials defined in terms of their function. For the purposes of examining novelty, it was assumed that if a coating contained BaSO₄ for example, then it was irrelevant whether BaSO₄ was described as being added as a pigment or a filler - instead of being referred to as a "contaminant capturing material".

The method of measurement used to determine the dry and wet glass transitions temperatures has not been defined in claim 1 (see the description page 26, l. 7-12). Thus, claim 1 is not clear (Art. 6 PCT).

It is currently not apparent, whether the difference in dry and wet glass transition temperatures represents an additional limitation or whether all compositions comprising an alkanolamine modified epoxy automatically or inherently fulfil this criterion. If said feature should represent an additional limitation/selection, then claim 1 lacks those features of the composition which are required to fulfil said criterion (Art. 6 PCT).

Is the dry glass transition temperature higher or lower than the wet glass transition temperature (Art. 6 PCT)?

Claim 1 refers to a liner, but in fact may also encompass a powder coating (see dependent claim 2). Claim 1 should read "A contaminant capturing liner or powder coating...".

Claim 4 refers to a liner, which "is formable directly on a base substrate". This claim does not appear to add any features over the previous claims.

Claims 5 and 6: that the base substrate is a pipe is not limiting for claims 5 and 6, because these claims are directed towards the liner or coating per se.

Claim 7: it is not apparent whether a difference in product features results if the coating is sprayed as opposed to being applied by a different method.

Claim 9 refers to 10 to 60 wt% epoxy component. Do the values refer to total epoxy and or only the alkanolamine modified epoxy component (Art. 6 PCT)? Please refer to p. 9, l. 20-l.29 of the description.

Working example 3 in table II & working example 6 in table V of the description of the current application, do not appear to contain any alkanolamine modified epoxy resin. Shouldn't these examples be designated as being comparative examples (Art. 6 PCT)? Furthermore, even though said example appears to contain no alkanolamine modified epoxy resin, the difference between dry and wet Tg's is 14 °C.

Regarding comparative examples A & B in table II, these examples are presumably designated as being comparative, because they contain no barium sulphate. However, they do contain wollastonite (VANSIL W-20), which could be regarded as being a material capable of capturing CO₂?

Table III shows that for an unsanded film working example 2 the radionuclide removal is worse than that for comparative example A.

Various passages in the description (p. 3, l. 23-26; p.4, l. 27-29; p.7, l. 29- p.8, l.2; p.8, l. 25 - 27; p.9, l. 30 - p.10, l.1; p.17, l. 25 - p.18, l. 2; p. 19, l. 17-20) suggest that the scope may be different to that defined in the claims - this casts doubt on the intended scope of the claims (Art. 6 PCT).