

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

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/US2024/041215

International filing date (day/month/year)
07.08.2024

Priority date (day/month/year)
01.09.2023

International Patent Classification (IPC) or both national classification and IPC
INV. C08L23/06 C08F210/16 C08F110/02 C08F2/00 C08F4/641 B32B27/32

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:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Balmer, J

Telephone No. -0



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.
 - b. ☐ furnished subsequent to the international filing date for the purposes of international search (Rule 13ter.1(a)),
 - ☐ accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the international application as filed.
4. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established to the extent that a meaningful opinion could be formed without a WIPO Standard ST.26 compliant sequence listing.
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>7-15</u>
	No: Claims	<u>1-6</u>
Inventive step (IS)	Yes: Claims	<u>7-15</u>
	No: Claims	<u>1-6</u>
Industrial applicability (IA)	Yes: Claims	<u>1-15</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

- 1 Reference is made to the following documents:

D1	WO 2021/214584 A1
D2	WO 2022/195513 A1
D3	WO 2022/195512 A1
D4	CA 2 629 576 C

- 2 The document D1 discloses the preparation of a high density polyethylene composition prepared in a dual reactor in solution polymerization. Two different catalysts are used in the examples, one being a phosphinimide single site catalyst and the other is a Ziegler-Natta (ZN) catalyst. Table 2 discloses the characteristics of the single polymers of the compositions and table 3a discloses the characteristics of the compositions. As can be seen in these tables the compositions fall within the present claims as regard to the polydispersity of the single polymer components, their content, the density, Mz, polydispersity of the composition. Solely the I2 of the composition is 6.4 g/min. In the claims of D1, the I2 can vary from 4 to 10 g/min, the polydispersity can vary from 2.3 to 5.5. The compositions of D1 are used for rotomolding, not for films. D1 is considered to attack the novelty of present claims 1-6 with regard to Art. 33(2) PCT.

- 3 The document D2 discloses the preparation of a high density polyethylene composition prepared in a dual reactor in solution polymerization. Two different catalysts are used in the examples, one being a phosphinimide single site catalyst and the other is a metallocene catalyst. Table 4 discloses the characteristics of the single polymers of the compositions and table 2 discloses the characteristics of the compositions. As can be seen in these tables the compositions of examples 1-4 fall within the present claims as regard to the polydispersity of the single polymer components, their content, the density, Mz, I2, polydispersity of the composition. Films can be prepared with these compositions but they are not characterized.

D2 is considered to attack the novelty of present claims 1-6 with regard to Art. 33(2) PCT.

- 4 The document D3 discloses the preparation of a high density polyethylene composition prepared in a dual reactor in solution polymerization. Two different catalysts are used in the examples, one being a metallocene catalyst and the other is a Ziegler-Natta (ZN) catalyst. Table 3 discloses the characteristics of the single polymers of the compositions and table 2 discloses the characteristics of the compositions. As can be seen in these tables the composition of example 1 fall within the present claims as regard to the polydispersity of the single polymer components, their content, the density, M_z , I_2 , polydispersity of the composition. The density of the compsoion of example 1 is 0.9498 g/cm³ which gives 0.950 g/cm³ rounded up.
- Films are prepared with the compositions (see table 5). For inventive example 1 the haze is rather low as compared to what is presently claimed, probably due to the stretching process which may limit the crystallization.
- D3 is considered to attack the novelty of present claims 1-6 with regard to Art. 33(2) PCT.
- 5 The document D4 discloses the preparation of a high density polyethylene composition prepared in a dual reactor in solution polymerization. A phosphinimide single site catalyst is used for the polymerization. Table 3 discloses the characteristics of the single polymers of the compositions and table 2 discloses the characteristics of the compositions. As can be seen in these tables the inventive composition 2 fall within the present claims as regard to the content of the single polymer components, the density, M_z , I_2 , polydispersity of the composition. Solely the polydispersity of the single polymers is not disclosed, but since the catalyst used is a single site catalyst, it is suposed that the polydispersity of each single polymer of the composition falls within the scope of the present claims.
- D4 is considered to attack the novelty of present claims 1-6 with regard to Art. 33(2) PCT.

Re Item VIII

Certain observations on the international application

- 6 On p.16, l.18 there is mentioned that the polymer of CE1 is prepared in a single reactor whereas in table 1 there is mentioned that it is a dual series reactor system. Clarification is requested.

- 7 The methods to determine the different characteristics of the polymers and compositions should be mentioned in the claims. In particular the gloss measurement.