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(54) **Title**: POLYETHYLENE GLYCOL CONTAINING COMPOSITION FOR SHAVING

(57) **Abstract**: The invention provides a composition comprising one or more low molecular weight polyethylene glycols (LMW-PEG) and one or more high molecular weight poly ethylene glycols (HMW-PEG), wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 500 dalton, and wherein the one or more HMW-PEGs have a molecular weight in a range of 8,000 to 45,000 dalton. Such composition can be used as a (friction reducing) shaving lotion or as a condom lubricant.

Polyethylene glycol containing composition for shaving

FIELD OF THE INVENTION

The invention relates to a polyethylene glycol composition, to a container comprising such polyethylene glycol composition, to a human hair shaving apparatus comprising such container, as well as to the use of the polyethylene glycol composition.

BACKGROUND OF THE INVENTION

Lubricant compositions for personal care are known in the art.

US-2008/210580, for instance, describes arming personal lubricant compositions and condom products including such compositions. Further, US-2008/210580 describes methods of making such condom products. According to US-2008/210580, the warming lubricant compositions include at least about 50 % by weight of a polyalkylene glycol component, preferably including at least two portions of different molecular weights, and an effective amount of a viscosity inducing component.

WO-2009/051486 describes components and methods for recovery of damaged skin and improving skin moisturisation. Presented is a shaving composition, particularly an emulsion, which comprises preferably a volatile hydrocarbon propellant. A volatile nitrogen base is incorporated in the shaving composition to bring the pH of the shaven skin to a desired value of from 4 to 5 directly after application to boost the skin repair properties. Preferably the shaving composition is soap-free, yet in the alkaline pH range so as to have the shaving advantages of soap and the skin care advantages of the pH control system. The shaving composition according to WO-2009/051486 can be used as a two-in-one products, such as in the two-in-one products shave & aftershave, deodorant & shave and shower & shave

Further, WO-2008/150155 describes a composition for shaving, for replacing, for example, a shaving foam or shaving gel during shaving. For this, WO-2008/150155 provides a composition comprising: a) 5-20 % (w/w) of one or more vegetable oils; b) 20-50 % (w/w) of a lower alkyl, branched or unbranched, comprising 1 to 4 carbon atoms; c) 1-10 % (w/w) of one or more structure providing compounds; and d) 40-65 % (w/w) water.

Further, WO-2008/150155 describes a method for preparing such composition for use during shaving.

SUMMARY OF THE INVENTION

Friction during shaving may be irritating and is not desired. Hence, it is a first aspect of the invention to reduce friction during shaving. Reducing friction during shaving may improve shaving performance, which is desired by consumers. Traditional blade shavers may employ lubra strips to provide additional gliding properties. Friction between the cartridge and the skin may be further reduced by using a liquid additive. However, unfortunately the volume requirements to achieve noticeable friction reduction are too high.

It is a further aspect of the invention to provide an alternative composition that may reduce this friction. Due to enhanced friction reduction the amount of additive needed to achieve a certain level of friction between the skin and the shaver may be reduced. This means the user can shave more times with a same volume contained in his shaver and/or experiences less friction. Hence, it is a further aspect of the invention to reduce the volume needed for hosting the (shaving) composition. Yet, it is a further aspect of the invention to reduce clogging of the solution in for instance tubes.

Next to an alternative composition, the invention is also directed to the application of the composition, such as for a human hair shaving apparatus (especially a blade shaving apparatus). Hence, it is a further aspect of the invention to provide an alternative human hair shaving apparatus that may obviate one or more of the disadvantages of prior art human hair shaving apparatus.

This invention provides a solution to the above indicated problems in the form of a new composition ("additive") that may reduce the amount of additive needed to achieve noticeable friction reduction but may at the same time also reduce friction while shaving or during other activities. Hence, the invention provides in an aspect a composition that can be used while shaving.

In a specific embodiment of the invention solid polyethylene glycol (PEG) particles are incorporated in a liquid PEG solution, whereas the mixture remains pumpable (for instance via a dispenser). Once the solid PEG gets in contact with water on the face of the user it will dissolve and friction may decrease. It appears that mixing (different) PEG strains into a solution of PEG may provide a reduction in friction; further it appears that clogging of the additive is limited. Hence, the composition (i.e. the combination PEGs according to the invention, see also below) may for instance be applied in tubes, etc.

In a specific embodiment, the invention provides a composition comprising one or more low molecular weight polyethylene glycols (LMW-PEG) and one or more high molecular weight polyethylene glycols (HMW-PEG), wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 500 dalton, and wherein the one or more HMW-PEGs have a molecular weight in a range of 8,000 to 45,000 dalton. Such PEGs may also be indicated as PEG200, PEG500, PEG8,000, and PEG45,000, respectively. These numbers, 200, 500, 8,000 and 45,000, etc., refer to the molecular weight of the polyethylene glycol (in daltons).

Such composition may be pumpable. Such composition may also be applied in a tube. Further, such composition may reduce friction while (for instance) shaving, and may have a much smaller volume than comparable known compositions such as for instance HS800 shaving conditioner known in the art.

In yet a further aspect, the invention provides a container comprising a container volume containing a composition as defined above, and optionally a dispenser configured to dispense the composition from the container volume. Such container may be used to host the composition, for instance as storage container. However, such container may also be used as vessel that may be attached to a shaving apparatus. The dispenser may dispense the composition to the user or a contact part that is configured to contact the skin, such as the blade(s). In general, the dispenser may be arranged to provide the composition to the blades (or another contact part that is configured to contact the skin) while shaving. Such container may detachably be arranged to the human hair shaving apparatus.

Hence, in a further aspect, the invention provide a human hair shaving apparatus, especially a blade shaving apparatus, comprising such container, wherein the apparatus and the dispenser of the container are configured to provide the composition to the skin of a user while shaving with the human hair shaving apparatus. Especially, the human hair shaving apparatus may be an electric human hair shaving apparatus, such as an electric blade shaving apparatus. The term “human hair shaving apparatus” refers to an apparatus that is configured to shave hair of humans from their skin. The phrase “to provide the composition to the skin of a user” indicates that the composition is provided to the skin directly (when using a shaving apparatus) and/or indirectly. Applying the composition indirectly to the skin may for instance occur when the composition is provided to blade(s) of a shaving apparatus, and the blade(s) provide the composition (subsequently) to the skin.

The human hair shaving apparatus of the invention is not limited to those embodiments, wherein the container volume contains the composition. Hence, in a further

embodiment, the invention also provides a human hair shaving apparatus, especially a blade shaving apparatus, comprising container comprising a container volume, wherein the container volume is configured to contain the composition according to the invention, and wherein the apparatus and the dispenser of the container are configured to provide the composition to the skin of a user while shaving with the human hair shaving apparatus.

The composition as defined herein may be used as (blade) shaving lotion, especially as friction reducing (blade) shaving lotion, but may also be used as condom lubricant.

The composition may also be used as in a skin care device as lotion to be applied on the skin, in a massaging device, wherein the lotion is to be applied between the skin and the massaging device, in a skin exfoliating device, wherein the lotion is to be applied on the skin, and in a skin heater device, wherein the lotion is to be applied between the skin and the skin heater device.

In a specific embodiment, the lotion may also be used in a (warm) intimate massager, wherein the lotion is to be applied between the intimate massager and the skin or between the massager and tissue of (human) body cavities, such as the anus or vagina.

Further specific embodiments are described below.

DETAILED DESCRIPTION OF THE EMBODIMENTS

As mentioned above, in a preferred embodiment the invention provides a composition comprising one or more low molecular weight polyethylene glycols (LMW-PEG) and one or more high molecular weight polyethylene glycols (HMW-PEG), wherein the one or more LMW-PEGs preferably have a molecular weight in a range of 200 to 500 dalton (especially PEG 200 to PEG 400) and wherein the HMW-PEG comprises one or more PEGs selected from the group consisting of PEG 8,000 and larger, especially wherein the one or more HMW-PEGs preferably have a molecular weight in a range of 8,000 to 45,000 dalton.

Polyethylene glycol (PEG) is also known as polyethylene oxide (PEO) or polyoxyethylene (POE). PEG, PEO or POE refers to an oligomer or polymer of ethylene oxide. Here, the abbreviation PEG is used, whereby the prefixes “LMW” and “HMW” herein refer to the above-mentioned molecular weight (MW) ranges. The numbers behind “PEG” indicate the molecular weight in dalton (as known in the art). PEG may be a liquid or low-melting solids, depending on their molecular weights. PEGs may be prepared by

polymerization of ethylene oxide and are commercially available over a wide range of molecular weights from for instance about 200 dalton to 10,000,000 dalton.

Herein, the PEGs may in an embodiment also be branched.

In an embodiment, HMW-PEG, optionally comprising a composition of different molecular weights, may be incorporated in a liquid PEG (low molecular weight) solution. The latter is herein also indicated as LMW-PEG. The HMW-PEG may be provided as a (fine) powder and is mixed with the LMW-PEG. In this way a suspension or gel may be provided. Such composition may be provided to the blade(s) (or alternative contact part(s)) of a shaver via a dispenser, or may be used in other applications.

The composition may optionally further comprise one or more of water; one or more vitamins; one or more fragrances; one or more odors; one or more surfactant(s); and one or more propellant(s).

The composition may optionally (also) further comprise one or more of thickening agents; sequestrants; vitamins (e.g. retinol); vitamin derivatives (e.g. tocophenyl actetate, niacinamide, panthenol); sunscreens; anti-wrinkle/ anti- atrophy actives (e.g. N-acetyl derivatives, thiols, hydroxyl acids, phenol); anti-oxidants (e.g. ascorbic acid derivatives, tocopherol); skin soothing agents/skin healing agents (e.g. panthenoic acid derivatives, aloe vera, allantoin); skin lightening agents (e.g. kojic acid, arbutin, ascorbic acid derivatives); skin tanning agents (e.g. dihydroxyacteone); polymeric phase structurant (e.g. naturally derived polymers, synthetic polymers, cross-linked polymers, block copolymers, copolymers, hydrophilic polymers, non-ionic polymers, anionic polymers, hydrophobic polymers, hydrophobic ally modified polymers, associative polymers, and oligomers); anti-acne medicaments; essential oils; sensates; pigments; colorants; pearlescent agents; and particles (e.g. talc, kaolin, mica, smectite clay, cellulose powder, polysiloxane, silicas, carbonates, titanium dioxide, polyethylene beads). Other optional ingredients are most typically those materials approved for use in cosmetics and that are described in the CTFA Cosmetic Ingredient Handbook, Second Edition, The Cosmetic, Toiletries, and Fragrance Association, Inc. 1988, 1992. The composition is especially skin tolerant.

Especially good results were obtained when the weight ratio (in the composition) of the one or more LMW-PEGs to the one or more HMW-PEG is in the range of 2:1 to 8:1, especially in the range of 3:1 to 5:1. Further, it appeared that good results could be obtained when the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton, like especially PEG 200 to PEG 350, like PEG 250 to PEG 300, and/or when the one or more HMW-PEGs have a molecular weight in a range of 30,000 dalton and larger,

especially have a molecular weight in a range of 30,000 to 40,000 dalton. Even more preferred appears a composition wherein the weight ratio of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 3:1 to 5:1, wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton, and wherein the one or more HMW-PEGs have a molecular weight in a range of 30,000 dalton and larger, especially have a molecular weight in a range of 30,000 to 40,000 dalton.

In a further aspect, the invention provides a container comprising (1) a container volume containing the composition according to the invention, and (2) a dispenser configured to dispense the composition from the container volume. The dispenser can for instance be used to dispense the composition on the skin of a user, in or on condoms, for instance during production thereof, and or on the blade(s) (or other contact part(s) of a shaving apparatus (such as a on the blade(s) of a blade shaving apparatus).

The shaving apparatus can be an electric shaving apparatus or a non-electric shaving apparatus. Further, the shaving apparatus can be a shaving apparatus designed for man, or a shaving apparatus designed for woman (ladyshave). It can be a shaving apparatus designed to be used for beard and/or moustache shaving, or a shaving apparatus designed for shaving of arms, for legs, or for bikini-lines. The shaving apparatus can be designed to be used under a shower. The shaving apparatus is especially designed for cutting and/or removing hair on the skin of a human.

In a preferred embodiment (see also above), the weight ratio (in the composition) (in the container, or more precisely in the container volume) of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 2:1 to 8:1, especially 3:1 to 5:1. Especially, the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton, such as PEG 200 to PEG 350, like PEG 200 to PEG 300. Further, especially the one or more HMW-PEGs have a molecular weight in a range of 30,000 to 40,000 dalton. In a preferred embodiment, the weight ratio in the composition (in the container, or more precisely in the container volume) of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 3:1 to 5:1, wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton, especially PEG 200 to PEG 350, such as PEG 200 to PEG 300, and wherein the one or more HMW-PEGs have a molecular weight in a range of 30,000 to 40,000 dalton.

In a further aspect, the invention provides a human hair shaving apparatus comprising a container such as defined above, wherein the apparatus and the dispenser of the container are configured to provide the composition to the skin of a user while shaving with

the human hair shaving apparatus. In a specific embodiment, the human hair shaving apparatus is an electric human hair shaving apparatus, especially an electric blade shaving apparatus. The dispenser may be a manually controlled dispenser, but may also be a controller controlled dispenser. For instance, during shaving, the dispenser may provide a controlled amount of composition per time unit. Alternatively, a sensor may be applied, sensing the presence of the composition on a blade, and in control thereof, the dosage of composition may be controlled by the dispenser to the blade(s) (or alternatively, a sensor may be applied, sensing the presence of the composition on contact part(s), and in control thereof, the dosage of composition may be controlled by the contact part(s)). The phrase "the dosage of composition may be controlled" indicates that the amount (dosage) of composition provide by the dispenser is controlled. Is a (too) low amount of composition sensed, the dosage may be increased (temporarily), and would a (too) high amount of composition be sensed, the dosage may be reduced (temporarily).

The composition of the invention may be used in different applications. In a specific aspect, the composition may be used as shaving lotion, especially as friction reducing shaving lotion. In yet another embodiment, the composition may be used as condom lubricant. In yet another embodiment, the composition may also be used for other applications, such as an erotic gel; see further also above.

Examples

A number of PEG additive combinations ("compositions") were tested on the skin to investigate their frictional properties. The friction was measured using the rotating friction meter form Courage and Khazaka (see for instance, http://www.courage-khazaka.de/, and especially http://www.courage-khazaka.de/download/pdf/studies_frictiometer.pdf, wherein it is amongst others indicated that: "the state and function of human skin can be quantified by numerous non-invasive test methods). There are, however, still no valid methods to measure the tactile properties of the skin surface and thus to quantify the state of the skin on the one hand, and to determine the negative and positive effects of tactile influences on the other hand. The measuring device (Frictiometer) consists of a sensor, a steering unit and a monitor. The torque, the circular friction on the skin surface, is measured via the motor load current and is shown as a voltage drop. The Frictiometer® FR 770 (Product of the month, Frictiometer® FR 770, SÖFW Journal April 2005.) is integrated into the CK Multiprobe Adapter System MPA and supplies another non-invasive test method for the human skin. Measurement of the smoothness condition of the skin." See also H. Tronnier,

M. Wiebusch, U. Heinrich, Frictiometry on human skin, in a poster presentation, DermaDays Universität Witten-Herdecke, April 2005).

Twenty seven different solutions were made (see table below). Sample numbers 11, 12, 21, 20 were especially rather nice and creamy.

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No	Water (gram)	PEG 35,000 (gram)	PEG 6,000 (gram)	PEG 200 (gram)
1	0	0	0	20
2	0	0	2	18
3	0	0	4	16
4	0	2	0	18
5	0	2	2	16
6	0	2	4	14
7	0	4	0	16
8	0	4	2	14
9	0	4	4	12
10	2	0	0	18
11	2	0	2	16
12	2	0	4	14
13	2	2	0	16
14	2	2	2	14
15	2	2	4	12
16	2	4	0	14
17	2	4	2	12
18	2	4	4	10
19	4	0	0	16
20	4	0	2	14
21	4	0	4	12
22	4	2	0	14
23	4	2	2	12
24	4	2	4	10
25	4	4	0	12
26	4	4	2	10
27	4	4	4	8

The samples were tested and it appeared that some of the samples 19 and up were not (very good) pumpable because substantially solid compositions were obtained.

From this it can be concluded that the PEGs are preferably combined to provide a composition that is still flowable. Preferably, the viscosity at room temperature is in the range of about 2 to 5.10^4 mPa.s, even more especially 2 to 5.10^3 mPa.s, like 4 to 1,000 mPa.s, especially 5 to 500 mPa.s (at a shear rate of about 1 to 100 s^{-1}, such as 20 s^{-1}).

The protocol for the friction measurement is as follows: measurement are done on the arm; always at the same location. An amount of about 0.1 ml of water is added to the measurement site and about 0.1 ml of additive is also added. Then, the shaving probe is applied, so that it is perpendicular to the skin.

Different types of additive (i.e. composition) were further tested:

1 PEG 200 (liquid)

2 2 g PEG 6,000 + 18 g PEG 200

3 4 g PEG 6,000 + 16 g PEG 200

4 2 g PEG 35,000 + 18 g PEG 200

5 2 g PEG 35,000 + 2 g PEG 6,000 + 16 g PEG 200

7 4 g PEG 35,000 + 16 g PEG 200

It appears that the friction of those compositions is in the same order of magnitude as those of commercially available compositions, such as HS800 (containing in concentrations < 5 % PEG 45M, C13-16 Isoparaffin, Sodium Acrylates, C10-30 Alkyl Acrylate Crosspolymer). It further appears that adding higher molecular weight PEG to a PEG solution will decrease the value of the friction measured by the friction probe. It seems that the higher the PEG molecular weight the more friction reduction is achieved. The highest drop in friction achieved by adding higher molecular weight PEG is almost 40 %.

It further appears that the volume of the compositions according to the invention is much smaller than the volume of commercially available compositions, such as HS800. In comparison to HS800, 10 to 20 times less volume of liquid composition is needed to get the substantially the same friction. Hence, the compositions according to the invention can advantageously be used in a container of a human hair shaving apparatus.

Such container may be detachably attached to the shaving apparatus. In this way, the container can be refilled or replaced with a filled container after use.

The term “substantially” herein will be understood by the person skilled in the art. In embodiments the adjective substantially may be removed. Where applicable, the term “substantially” may also include embodiments with “entirely”, “completely”, “all”, etc.

Where applicable, the term "substantially" may also relate to 90 % or higher, such as 95 % or higher, especially 99 % or higher, even more especially 99.5 % or higher, including 100 %. The term "comprise" includes also embodiments wherein the term "comprises" means "consists of". Likewise, the term "about" may, where applicable, indicate a deviation of 10% or less, or 5 % or less, or 1 % or less, or 0.5 % or less, or even 0.1 % or less, and also in an embodiment no (measureable) deviation. As will be clear to the person skilled in the art, small deviations from numerical values may, where applicable, in general be allowed. Hence, except for the values in the definition of about above, numerical values may, where applicable deviate a 10 % or less, or 5 % or less, or 1 % or less, or 0.5 % or less, or even 0.1 % or less from the given value. To stress this, herein sometimes the word "about" is used before numerical values.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. Use of the verb "to comprise" and its conjugations does not exclude the presence of elements or steps other than those stated in a claim. The article "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. In the device claim enumerating several means, several of these means may be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

CLAIMS:

1. A composition comprising one or more low molecular weight polyethylene glycols (LMW-PEG) and one or more high molecular weight polyethylene glycols (HMW-PEG), wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 500 dalton, and wherein the one or more HMW-PEGs have a molecular weight in a range of 8,000 to 45,000 dalton.

2. The composition according to claim 1, wherein the weight ratio of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 2:1 to 8:1.

3. The composition according to any one of the preceding claims, wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton.

4. The composition according to any one of the preceding claims, wherein the one or more HMW-PEGs have a molecular weight in a range of 30,000 to 40,000 dalton.

5. The composition according to any one of the preceding claims, wherein the weight ratio of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 3:1 to 5:1, wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton, and wherein the one or more HMW-PEGs have a molecular weight in a range of 30,000 to 40,000 dalton.

6. A container comprising:

- a container volume containing a composition according to claim 1, and
- a dispenser configured to dispense the composition from the container volume.

7. The container according to claim 6, wherein the weight ratio of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 2:1 to 8:1.

8. The container according to any one of the claims 6 to 7, wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton.

9. The container according to any one of the claims 6 to 8, wherein the one or more HMW-PEGs have a molecular weight in a range of 30,000 to 40,000 dalton.

10. The container according to any one of the claims 6 to 9, wherein the weight ratio of the one or more LMW-PEGs to the one or more HMW-PEGs is in the range of 3:1 to 5:1, wherein the one or more LMW-PEGs have a molecular weight in a range of 200 to 400 dalton, and wherein the one or more HMW-PEGs have a molecular weight in a range of 30,000 to 40,000 dalton.

11. A human hair shaving apparatus, comprising:

- a container according to any one of claims 6 to 10,

wherein the apparatus and the dispenser of the container are configured to provide the composition, according to any one of claims 1 to 5, to the skin of a user while shaving with the human hair shaving apparatus.

12. The human hair shaving apparatus, wherein the human hair shaving apparatus is an electric blade shaving apparatus.

13. Use of the composition according to any one of claims 1 to 5 as shaving lotion.

14. Use of the composition according to any one of claims 1 to 5 as friction reducing shaving lotion.

15. Use of the composition according to any one of claims 1 to 5 as condom lubricant.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/055806

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K47/48 C08L63/00 C08L71/02 C08L23/08 A61K8/04
A61Q9/02
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61K C08L A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/161450 A1 (BUDER PHILIP [CA]) 19 August 2004 (2004-08-19) * abstract; claims 1-33 page 4	1
X	WO 2006/015149 A1 (DIAL CORP [US]; DEMSON ROBERT [US]; DALTON JAMES [US]; PATEL JAYESH [U) 9 February 2006 (2006-02-09) * abstract; claims 1-6 paragraph [0004]	1
X	US 5 869 075 A (KRZYSIK DUANE GERARD [US]) 9 February 1999 (1999-02-09) * abstract; claims 1-33 examples 6,7,8,9,10	1-3

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search	Date of mailing of the international search report
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