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(54) **AEROSOL-GENERATING ARTICLE HAVING TWO AEROSOL-GENERATING SEGMENTS**

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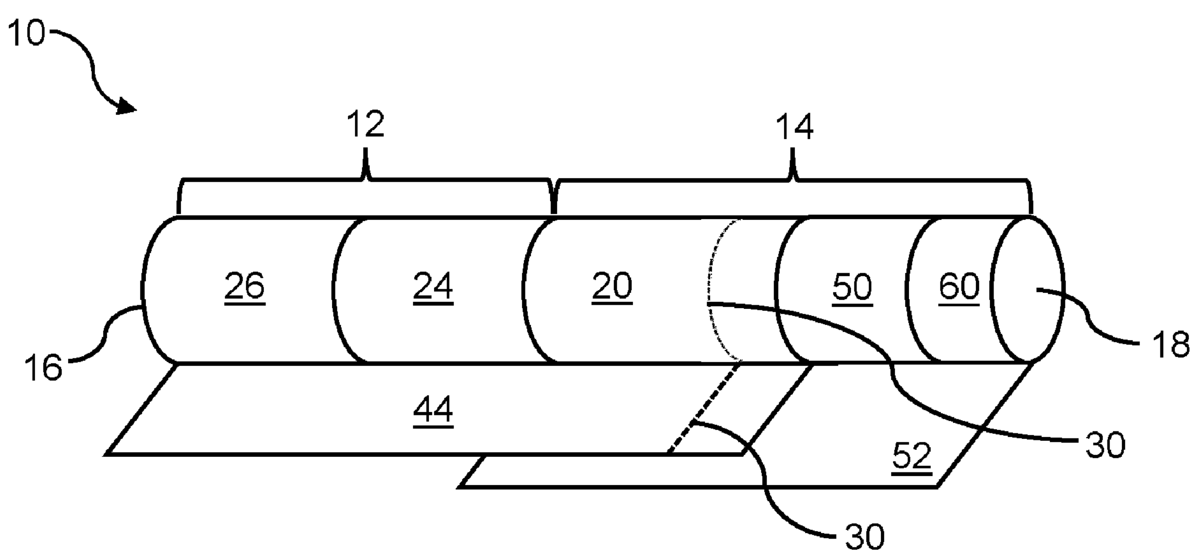
(57) **ABSTRACT**

An aerosol-generating article is provided, including: an aerosol-generating rod configured to produce an inhalable aerosol upon heating; a downstream section provided downstream of the aerosol-generating rod and extending to the downstream end of the aerosol-generating article; and a ventilation zone at a location along the downstream section, the aerosol-generating rod including a first aerosol-generating segment including a first aerosol-generating substrate, and a second aerosol-generating segment located upstream of the first aerosol-generating segment and including a second aerosol-generating substrate, a total combined length of the and the second segments being at least 20 millimetres, a ratio of the total combined length of the first and the second segments to an overall length of the article being less than or equal to 0.6, and the article having a ventilation level of at least 40 percent. An aerosol-generating system including the aerosol-generating article and an aerosol-generating device is also provided.



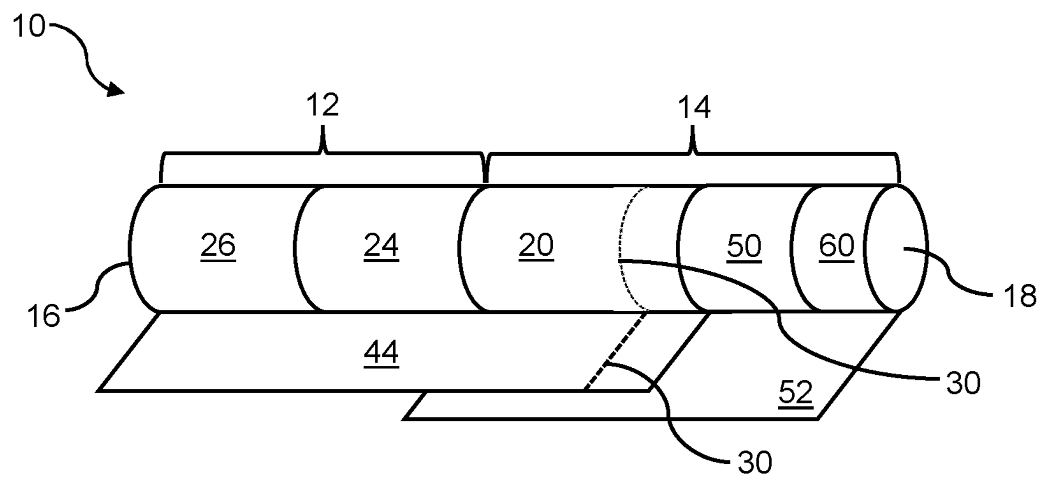


Figure 1

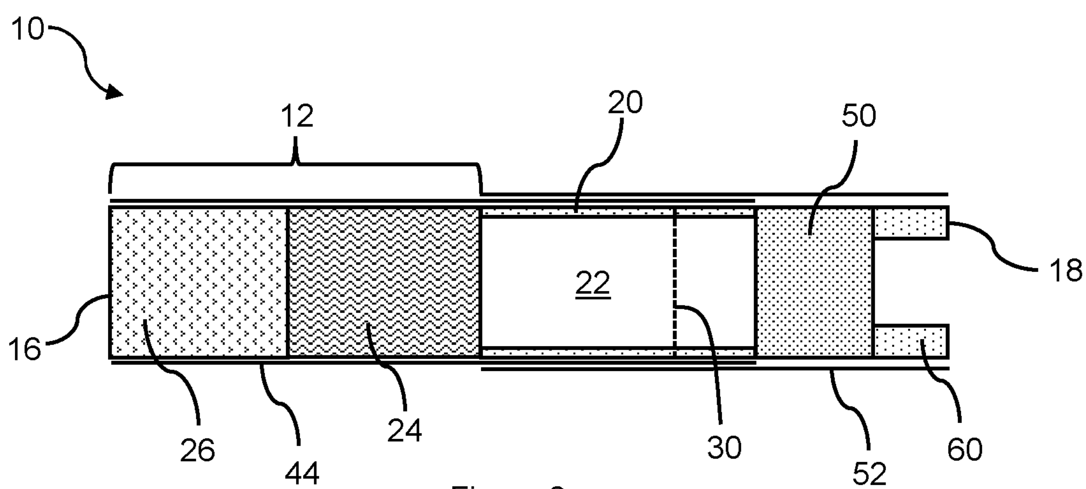


Figure 2

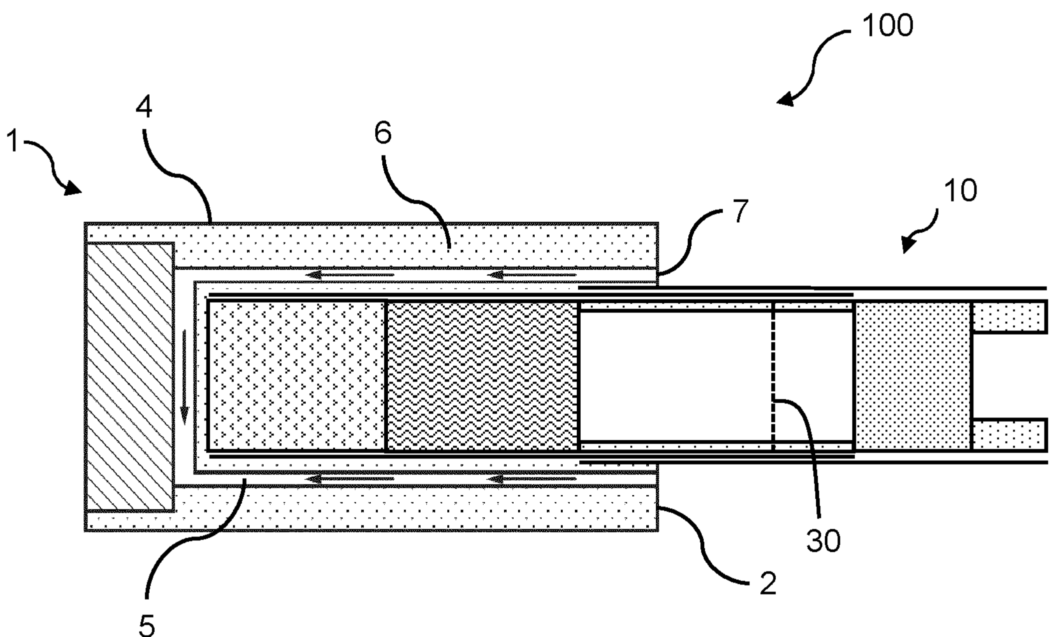


Figure 3

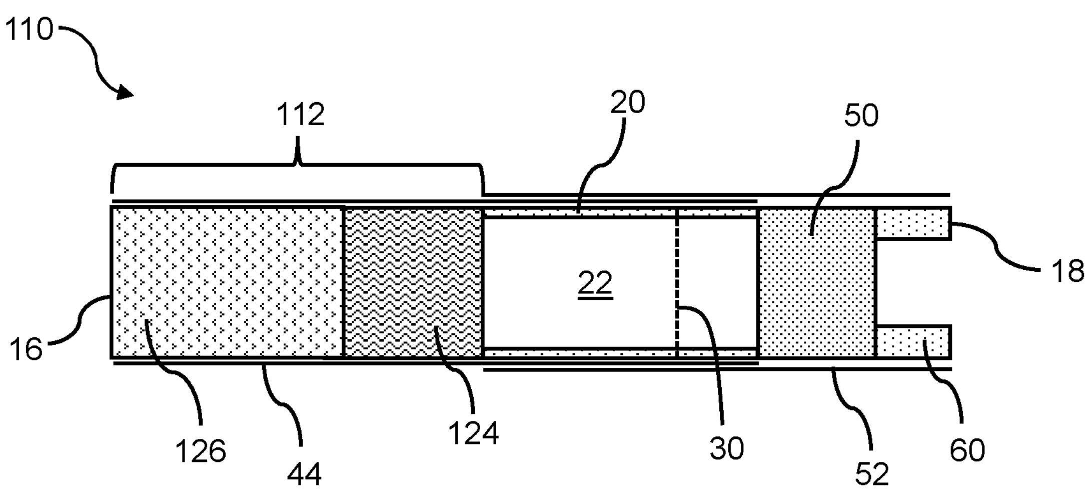


Figure 4

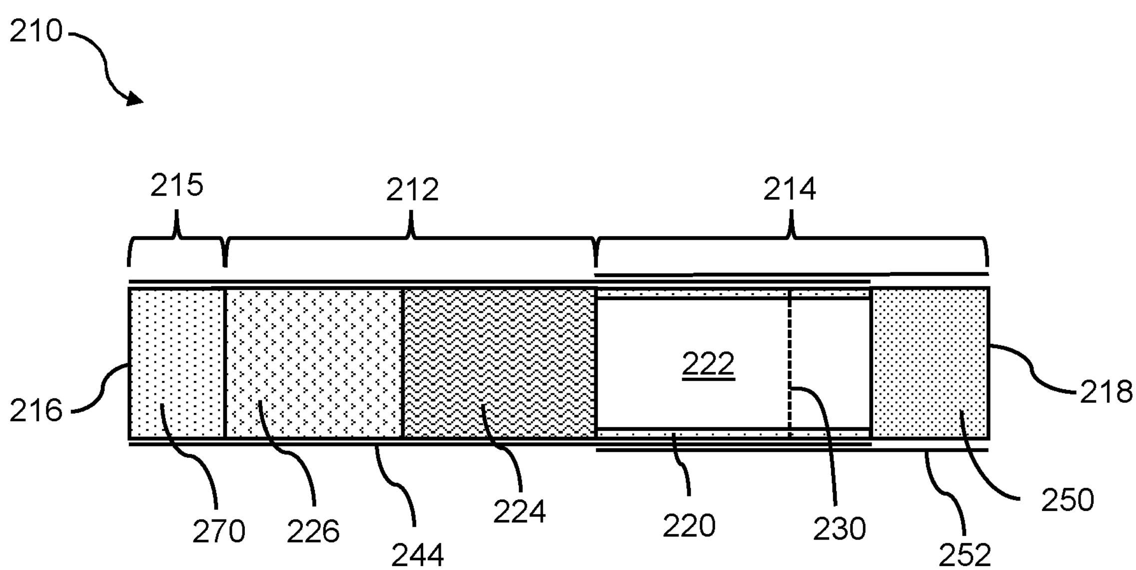


Figure 5

AEROSOL-GENERATING ARTICLE HAVING TWO AEROSOL-GENERATING SEGMENTS

[0001] The present invention relates to an aerosol-generating article comprising an aerosol-generating substrate and adapted to produce an inhalable aerosol upon heating.

[0002] Aerosol-generating articles in which an aerosol-generating substrate, such as a tobacco-containing substrate, is heated rather than combusted, are known in the art. Typically, in such heated smoking articles an aerosol is generated by the transfer of heat from a heat source to a physically separate aerosol-generating substrate or material, which may be located in contact with, within, around, or downstream of the heat source. During use of the aerosol-generating article, volatile compounds are released from the aerosol-generating substrate by heat transfer from the heat source and are entrained in air drawn through the aerosol-generating article. As the released compounds cool, they condense to form an aerosol.

[0003] A number of prior art documents disclose aerosol-generating devices for consuming aerosol-generating articles. Such devices include, for example, electrically heated aerosol-generating devices in which an aerosol is generated by the transfer of heat from one or more electrical heater elements of the aerosol-generating device to the aerosol-generating substrate of a heated aerosol-generating article. For example, electrically heated aerosol-generating devices have been proposed that comprise an internal heater blade which is adapted to be inserted into the aerosol-generating substrate. Use of an aerosol-generating article in combination with an external heating system is also known. For example, WO 2020/115151 describes the provision of one or more heating elements arranged around the periphery of the aerosol-generating article when the aerosol-generating article is received in a cavity of the aerosol-generating device. As an alternative, inductively heatable aerosol-generating articles comprising an aerosol-generating substrate and a susceptor arranged within the aerosol-generating substrate have been proposed by WO 2015/176898.

[0004] Known heated tobacco products typically comprise a single tobacco-containing substrate. A variation in the internal structure of the tobacco-containing substrate may affect the resistance to draw of the tobacco-containing substrate and therefore the resistance to draw (RTD) of the tobacco product. Such variations may be as a result of, for example, manufacturing defects or the presence of contaminants. The tobacco products may therefore suffer from one or more drawbacks, such as inconsistencies in the resistance to draw between one tobacco product and another. Such inconsistencies may be particularly pronounced in tobacco products with a single relatively long tobacco-containing substrate.

[0005] The resistance to draw of the tobacco product may have an impact on the composition and temperature of the aerosol delivered to a user. Inconsistencies in the resistance to draw of the tobacco products may therefore result in variations in the composition and temperature of the aerosol generated by the tobacco products. For example, during manufacturing of the tobacco-containing substrate, gravitational settling of the substrate material may result in the formation of some relatively large channels through the tobacco-containing substrate. Upon heating, the tobacco-containing substrate generates an aerosol which may preferentially flow through such channels. The presence of relatively large channels through the tobacco-containing substrate may thereby affect the composition of the aerosol delivered to a user. The presence of relatively large channels through the tobacco-containing substrate may thereby result in aerosol reaching a user with a temperature that could be uncomfortable

[0006] Tobacco-containing substrates are typically heated to significantly lower temperatures compared with the temperatures reached by the combustion front in a conventional cigarette. This may have an impact on nicotine release from the tobacco-containing substrate and nicotine delivery to the consumer. At the same time, if the heating temperature is increased in an attempt to boost nicotine delivery, then the aerosol generated typically needs to be cooled to a greater extent and more rapidly before it reaches the consumer. Some known heated tobacco products comprise a ventilation zone to cool the aerosol generated before it reaches the consumer. Increasing the ventilation level may increase cooling of the aerosol generated. However, increasing the ventilation level may amplify the effect that the resistance to draw of the tobacco product may have on the composition and temperature of the aerosol delivered to a user.

[0007] Therefore, it would be desirable to provide an aerosol-generating article in which the quality and consistency of aerosol delivered to a user is improved compared to known heated tobacco products.

[0008] The present disclosure relates to an aerosol-generating article comprising an aerosol-generating rod for producing an inhalable aerosol upon heating. The aerosol-generating rod may comprise a first aerosol-generating segment. The first aerosol-generating segment may comprise a first aerosol-generating substrate. The aerosol-generating rod may comprise a second aerosol-generating segment. The second aerosol-generating segment may be located upstream of the first aerosol-generating segment. The second aerosol-generating segment may comprise a second aerosol-generating substrate. The total combined length of the first aerosol-generating segment and the second aerosol-generating segment may be at least 20 millimetres. The aerosol-generating article may have a ventilation level of at least 40 percent.

[0009] According to a first aspect of the present invention, there is provided an aerosol-generating article comprising an aerosol-generating rod for producing an inhalable aerosol upon heating, the aerosol-generating rod comprising: a first aerosol-generating segment comprising a first aerosol-generating substrate; and a second aerosol-generating segment located upstream of the first aerosol-generating segment and comprising a second aerosol-generating substrate, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres, and wherein the aerosol-generating article has a ventilation level of at least 40 percent.

[0010] In a preferred embodiment, there is provided an aerosol-generating article comprising an aerosol-generating rod for producing an inhalable aerosol upon heating, the aerosol-generating rod comprising: a first aerosol-generating segment comprising a first aerosol-generating substrate; and a second aerosol-generating segment located upstream of the first aerosol-generating segment and comprising a second aerosol-generating substrate, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres, wherein the length of the first aerosol-generating segment is approximately equal to the length of the second aerosol-generating segment, and wherein the aerosol-generating article has a ventilation level of at least 40 percent.

[0011] In a preferred embodiment, there is provided an aerosol-generating article comprising an aerosol-generating rod for producing an inhalable aerosol upon heating, the aerosol-generating rod comprising: a first aerosol-generating segment comprising a first aerosol-generating substrate; and a second aerosol-generating segment located upstream of the first aerosol-generating segment and comprising a second aerosol-generating substrate, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres, wherein the composition of the first aerosol-generating segment is substantially the same as the composition of the second aerosol-generating segment, and wherein the aerosol-generating article has a ventilation level of at least 40 percent.

[0012] In a preferred embodiment, there is provided an aerosol-generating article comprising an aerosol-generating rod for producing an inhalable aerosol upon heating, the aerosol-generating rod comprising: a first aerosol-generating segment comprising a first aerosol-generating substrate; and a second aerosol-generating segment located upstream of the first aerosol-generating segment and comprising a second aerosol-generating substrate, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres, wherein the length of the first aerosol-generating segment is approximately equal to the length of the second aerosol-generating segment, wherein the composition of the first aerosol-generating segment is substantially the same as the composition of the second aerosol-generating segment, and wherein the aerosol-generating article has a ventilation level of at least 40 percent.

[0013] The present disclosure also relates to an aerosol-generating system. The aerosol-generating system may comprise an aerosol-generating article as described above. The aerosol-generating system may comprise an aerosol-generating device. The aerosol-generating device may comprise a heating chamber for receiving at least part of the aerosol-generating article. The aerosol-generating device may comprise at a heater. The heater may be for heating the aerosol-generating rod of the aerosol-generating article when the aerosol-generating article is received within the heating chamber.

[0014] According to a second aspect of the present invention, there is provided an aerosol-generating system comprising: an aerosol-generating article according to the first aspect of the invention; and an aerosol-generating device comprising a heating chamber for receiving at least part of the aerosol-generating article and a heater for heating the aerosol-generating rod of the aerosol-generating article when the aerosol-generating article is received within the heating chamber.

[0015] As used herein with reference to the present invention, the term "aerosol-generating article" is used to describe an article comprising an aerosol-generating substrate that is heated to generate an inhalable aerosol for delivery to a user.

[0016] As used herein with reference to the present invention, the term "aerosol-generating substrate" is used to describe a substrate comprising aerosol-generating material that is capable of releasing upon heating volatile compounds that can generate an aerosol.

[0017] As used herein with reference to the present invention, the term "aerosol" is used to describe a dispersion of solid particles, or liquid droplets, or a combination of solid particles and liquid droplets, in a gas. The aerosol may be visible or invisible. The aerosol may include vapours of substances that are ordinarily liquid or solid at room temperature as well as solid particles, or liquid droplets, or a combination of solid particles and liquid droplets.

[0018] As used herein with reference to the present invention, the term "aerosol-generating device" is used to describe a device that interacts with the aerosol-generating substrate of the aerosol-generating article to generate an aerosol.

[0019] As used herein with reference to the present invention, the term "rod" is used to denote a generally cylindrical element of substantially circular, oval or elliptical cross-section.

[0020] Aerosol-generating articles according to the present invention have a proximal end through which, in use, an aerosol exits the aerosol-generating article for delivery to a user. The proximal end of the aerosol-generating article may also be referred to as the downstream end or mouth end of the aerosol-generating article. In use, a user draws directly or indirectly on the proximal end of the aerosol-generating article in order to inhale an aerosol generated by the aerosol-generating article.

[0021] Aerosol-generating articles according to the present invention have a distal end. The distal end is opposite the proximal end. The distal end of the aerosol-generating article may also be referred to as the upstream end of the aerosol-generating article.

[0022] Components of aerosol-generating articles according to the present invention may be described as being upstream or downstream of one another based on their relative positions between the proximal end of the aerosol-generating article and the distal end of the aerosol-generating article.

[0023] As used herein with reference to the present invention, the term "longitudinal" is used to describe the direction between the upstream end and the downstream end of the aerosol-generating article. During use, air is drawn through the aerosol-generating article in the longitudinal direction.

[0024] As used herein with reference to the present invention, the term "length" is used to describe the maximum dimension of the aerosol-generating article or a component of the aerosol-generating article in the longitudinal direction.

[0025] As used herein with reference to the present invention, the term "transverse" is used to describe the direction perpendicular to the longitudinal direction. Unless otherwise stated, references to the "cross-section" of the aerosol-generating article or a component of the aerosol-generating article refer to the transverse cross-section.

[0026] As used herein with reference to the present invention, the term "ventilation level" is used to denote a volume ratio between the airflow admitted into the aerosol-generating article via a ventilation zone (ventilation airflow) and the sum of the aerosol airflow and the ventilation airflow. The greater the ventilation level, the higher the dilution of the aerosol flow delivered to the consumer.

[0027] Aerosol-generating articles according to the first aspect of the invention comprise an aerosol-generating rod for producing an inhalable aerosol upon heating, the aerosol-generating rod comprising: a first aerosol-generating segment comprising a first aerosol-generating substrate; and a second aerosol-generating segment located upstream of the first aerosol-generating segment and comprising a second aerosol-generating substrate, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least about 20 millimetres, and wherein the aerosol-generating article has a ventilation level of at least about 40 percent. Inclusion of these features in aerosol-generating articles according to the first aspect of the invention may advantageously improve the quality and consistency of aerosol generated by one aerosol-generating article to another.

[0028] An aerosol-generating rod comprising a first aerosol-generating segment and a second aerosol-generating segment may minimise or cancel out the effect on the resistance to draw that a variation in the internal structure of one of the aerosol-generating segments may have on the entire aerosol-generating rod and therefore the aerosol-generating article. As discussed above, the effect of a variation in the internal structure of an aerosol-generating segment on the overall resistance to draw of the aerosol-generating article may be particularly pronounced in aerosol-generating articles comprising a single relatively long aerosol-generating segment (for example, at least 20 millimetres). An aerosol-generating rod comprising a first aerosol-generating segment and a second aerosol-generating segment may thereby improve the consistency in the resistance to draw of the aerosol-generating article. This may improve the quality and consistency of aerosol delivered to a user by the aerosol-generating article. This may be particularly advantageous where the aerosol-generating article has a relatively high ventilation level (for example, at least 40 percent).

[0029] The aerosol-generating rod comprises the first aerosol-generating segment and the second aerosol-generating segment. The first aerosol-generating segment is physically distinct from the second aerosol-generating segment.

[0030] Preferably, the second aerosol-generating segment is at the upstream end of the aerosol-generating rod. Preferably, the first aerosol-generating segment is at the downstream end of the aerosol-generating rod.

[0031] Preferably, the first aerosol-generating segment and the second aerosol-generating segment are aligned in an abutting end-to-end relationship. That is, the downstream end of the second aerosol-generating segment preferably abuts the upstream end of the first aerosol-generating segment. Preferably, substantially the whole surface of the downstream end of the second aerosol-generating segment abuts substantially the whole surface of the upstream end of the first aerosol-generating segment.

[0032] Preferably, the aerosol-generating rod consists of the first aerosol-generating segment and the second aerosol-generating segment.

[0033] The total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres. Preferably, the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 25 millimetres. More preferably, the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 30 millimetres

[0034] The total combined length of the first aerosol-generating segment and the second aerosol-generating segment is preferably less than 50 millimetres. Preferably, the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is less than 45 millimetres. More preferably, the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is less than 40 millimetres.

[0035] For example, the total combined length of the first aerosol-generating segment and the second aerosol-generating segment preferably is between 20 millimetres and 50 millimetres, or between 20 millimetres and 45 millimetres, or between 20 millimetres and 40 millimetres, or between 25 millimetres and 50 millimetres, or between 25 millimetres and 45 millimetres, or between 25 millimetres and 40 millimetres, or between 30 millimetres and 50 millimetres, or between 30 millimetres and 45 millimetres, or between 30 millimetres and 40 millimetres.

[0036] In an aerosol-generating rod comprising a single aerosol-generating segment, increasing the length of the single aerosol-generating segment may magnify the effect that a variation in the internal structure of the single aerosol-generating segment may have on the single aerosol-generating segment and thus the aerosol-generating rod. This may increase the level of inconsistencies between aerosol-generating articles comprising the aerosol-generating rod having a single aerosol-generating segment. An aerosol-generating article according to the present invention comprising an aerosol-generating rod having a first aerosol-generating segment and a second aerosol-generating segment may therefore be particularly effective at minimising or cancelling out the effect that a variation in the internal structure of one of the aerosol-generating segments may have on the aerosol-generating rod where the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is relatively high.

[0037] Preferably, the length of the second aerosol-generating segment is approximately equal to the length of the first aerosol-generating segment. This may help to minimise or cancel out the effect that a variation in the internal structure of the other of the aerosol-generating segments may have on the entire aerosol-generating rod. The lengths of the first and second aerosol-generating segments being approximately equal may also simplify manufacturing of the aerosol-generating rod.

[0038] Preferably, the length of the second aerosol-generating segment is within 2 millimetres of the length of the first aerosol-generating segment, or within 1 millimetre of the length of the first aerosol-generating segment.

[0039] Preferably, the length of the second aerosol-generating segment is within 10 percent of the length of the first aerosol-generating segment, or within 5 percent of the length of the first aerosol-generating segment, or within 3 percent of the length of the first aerosol-generating segment.

[0040] The relative lengths of the first aerosol-generating segment and the second aerosol-generating segment may be selected to optimise aerosol delivery.

[0041] In some embodiments the length of the second aerosol-generating segment may be greater than the length of the first aerosol-generating segment. That is, the second aerosol-generating segment may be longer than the first aerosol-generating segment.

[0042] In some embodiments, the length of the second aerosol-generating segment may be at least 3 millimetres greater than the length of the first aerosol-generating segment. For example, the second aerosol-generating segment may be at least 4 millimetres greater, at least 5 millimetres greater, or at least 6 millimetres greater than the length of the first aerosol-generating segment.

[0043] In some embodiments, the length of the second aerosol-generating segment may be no more than 12 millimetres greater than the length of the first aerosol-generating segment. For example, the second aerosol-generating segment may be no more than 10 millimetres greater, no more than 9 millimetres greater, or no more than 8 millimetres greater than the length of the first aerosol-generating segment.

[0044] In some embodiments, the length of the second aerosol-generating segment may be about 7 millimetres greater than the length of the first aerosol-generating segment.

[0045] In some embodiments, the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment may be no more than 1. For example, the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment may be no more than 0.8, no more than 0.6, or no more than 0.5.

[0046] In some embodiments, the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment may be at least 0.1. For example, the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment may be at least 0.2, at least 0.3, or at least 0.4.

[0047] In some embodiments, the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment may be between 0.1 and 1, between 0.2 and 0.8, between 0.3 and 0.6, or between 0.4 and 0.5. For example, the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment may be about 0.4.

[0048] In some embodiments, the length of the first aerosol-generating segment may be greater than the length of the second aerosol-generating segment. That is, the first aerosol-generating segment may be longer than the second aerosol-generating segment.

[0049] In some embodiments, the length of the first aerosol-generating segment may be at least 3 millimetres greater than the length of the second aerosol-generating segment. For example, the first aerosol-generating segment may be at least 4 millimetres greater, at least 5 millimetres greater, or at least 6 millimetres greater than the length of the second aerosol-generating segment.

[0050] In some embodiments, the length of the first aerosol-generating segment may be no more than 12 millimetres greater than the length of the second aerosol-generating segment. For example, the first aerosol-generating segment may be no more than 10 millimetres greater, no more than 9 millimetres greater, or no more than 8 millimetres greater than the length of the second aerosol-generating segment.

[0051] In some embodiments, the length of the first aerosol-generating segment may be about 7 millimetres greater than the length of the second aerosol-generating segment.

[0052] In some embodiments, the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment may be no more than 1. For example, the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment may be no more than 0.8, no more than 0.6, or no more than 0.5.

[0053] In some embodiments, the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment may be at least 0.1. For example, the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment may be at least 0.2, at least 0.3, or at least 0.4.

[0054] In some embodiments, the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment may be between 0.1 and 1, between 0.2 and 0.8, between 0.3 and 0.6, or between 0.4 and 0.5. For example, the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment may be about 0.4.

[0055] Preferably, the first aerosol-generating segment has a length of at least 10 millimetres. More preferably, the length of the first aerosol-generating segment is at least 12.5 millimetres. More preferably, the length of the first aerosol-generating segment is at least 15 millimetres

[0056] The length of the first aerosol-generating segment is preferably less than or equal to 25 millimetres. Preferably, the length of the first aerosol-generating segment is less than or equal to 22.5 millimetres. More preferably, the length of the first aerosol-generating segment is less than 20 millimetres.

[0057] For example, the length of the first aerosol-generating segment preferably is between 10 millimetres and 25 millimetres, or between 10 millimetres and 22.5 millimetres, or between 10 millimetres and 20 millimetres, or between 12.5 millimetres and 25 millimetres, or between 12.5 millimetres and 22.5 millimetres, or between 12.5 millimetres and 20 millimetres, or between 15 millimetres and 25 millimetres, or between 15 millimetres and 22.5 millimetres, or between 15 millimetres and 20 millimetres.

[0058] Preferably, the second aerosol-generating segment has a length of at least 10 millimetres. More preferably, the length of the second aerosol-generating segment is at least 12.5 millimetres. More preferably, the length of the second aerosol-generating segment is at least 15 millimetres

[0059] The length of the second aerosol-generating segment is preferably less than 25 millimetres. Preferably, the length of the second aerosol-generating segment is less than 22.5 millimetres. More preferably, the length of the second aerosol-generating segment is less than 20 millimetres.

[0060] For example, the length of the second aerosol-generating segment preferably is between 10 millimetres and 25 millimetres, or between 10 millimetres and 22.5 millimetres, or between 10 millimetres and 20 millimetres, or between 12.5 millimetres and 25 millimetres, or between 12.5 millimetres and 22.5 millimetres, or between 12.5 millimetres and 20 millimetres, or between 15 millimetres and 25 millimetres, or between 15 millimetres and 22.5 millimetres, or between 15 millimetres and 20 millimetres.

[0061] Where the aerosol-generating rod consists of the first aerosol-generating segment and the second aerosol-generating segment, and the first aerosol-generating segment and the second aerosol-generating segment are aligned in an abutting end-to-end relationship, the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is the same as the length of the aerosol-generating rod.

[0062] The aerosol-generating rod preferably has a length of at least 20 millimetres. Preferably, the aerosol-generating rod has a length of at least 25 millimetres. More preferably, the aerosol-generating rod has a length of at least 30 millimetres

[0063] The aerosol-generating rod preferably has a length of less than or equal to 50 millimetres. Preferably, the aerosol-generating rod has a length of less than or equal to 45 millimetres. More preferably, the aerosol-generating rod has a length of less than or equal to 40 millimetres.

[0064] For example, the aerosol-generating rod preferably has a length of between 20 millimetres and 50 millimetres, or between 20 millimetres and 45 millimetres, or between 20 millimetres and 40 millimetres, or between 25 millimetres and 50 millimetres, or between 25 millimetres and 45 millimetres, or between 25 millimetres and 40 millimetres, or between 30 millimetres and 50 millimetres, or between 30 millimetres and 45 millimetres, or between 30 millimetres and 40 millimetres.

[0065] A ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is preferably at least 0.20. Preferably, a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.25. More preferably, a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.30.

[0066] A ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is preferably less than or equal to 0.60. Preferably, a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.55. More preferably, a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.50.

[0067] In some embodiments, a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is from 0.20 to 0.60, preferably from 0.20 to 0.55, more preferably from 0.20 to 0.50. In other embodiments, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is from 0.25 to 0.60, preferably from 0.25 to 0.55, more preferably from 0.25 to 0.50. In further embodiments, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is from 0.30 to 0.60, preferably from 0.30 to 0.55, more preferably from 0.30 to 0.50.

[0068] A ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is preferably at least 0.10. Preferably, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.12. More preferably, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.15.

[0069] A ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is preferably less than or equal to 0.30. Preferably, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.27. More preferably, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.25.

[0070] In some embodiments, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is from 0.10 to 0.30, preferably from 0.10 to 0.27, more preferably from 0.10 to 0.25. In other embodiments, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is from 0.12 to 0.30, preferably from 0.12 to 0.27, more preferably from 0.12 to 0.25. In further embodiments, a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is from 0.15 to 0.30, preferably from 0.15 to 0.27, more preferably from 0.30 to 0.25.

[0071] A ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is preferably at least 0.10. Preferably, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.12. More preferably, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.15.

[0072] A ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is preferably less than or equal to 0.30. Preferably, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.27. More preferably, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.25.

[0073] In some embodiments, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is from 0.10 to 0.30, preferably from 0.10 to 0.27, more preferably from 0.10 to 0.25. In other embodiments, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is from 0.12 to 0.30, preferably from 0.12 to 0.27, more preferably from 0.12 to 0.25. In further embodiments, a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is from 0.15 to 0.30, preferably from 0.15 to 0.27, more preferably from 0.30 to 0.25.

[0074] A ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is preferably at least 0.20. Preferably, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is at least 0.25. More preferably, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is at least 0.30.

[0075] A ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is preferably less than or equal to 0.60. Preferably, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is less than or equal to 0.55. More preferably, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is less than or equal to 0.50.

[0076] In some embodiments, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is from 0.20 to 0.60, preferably from 0.20 to 0.55, more preferably from 0.20 to 0.50. In other embodiments, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is from 0.25 to 0.60, preferably from 0.25 to 0.55, more preferably from 0.25 to 0.50. In further embodiments, a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is from 0.30 to 0.60, preferably from 0.30 to 0.55, more preferably from 0.30 to 0.50.

[0077] The aerosol-generating rod preferably has an external diameter that is approximately equal to the external diameter of the aerosol-generating article.

[0078] As used herein, the term "external diameter" of a component of the aerosol-generating article may be calculated as the average of a plurality of measurements of the diameter of the component of the aerosol-generating article taken at different locations along the length of the component of the aerosol-generating article.

[0079] Preferably, the aerosol-generating rod has an external diameter of at least about 5 millimetres. More preferably, the aerosol-generating rod has an external diameter of at least 5.25 millimetres. Even more preferably, the aerosol-generating rod has an external diameter of at least 5.5 millimetres.

[0080] The aerosol-generating rod preferably has an external diameter of less than or equal to 8 millimetres. More preferably, the aerosol-generating rod has an external diameter of less than or equal to 7.5 millimetres. Even more preferably, the aerosol-generating rod has an external diameter of less than or equal to 7 millimetres.

[0081] In general, it has been observed that the smaller the diameter of the aerosol-generating rod, the lower the temperature that is required to raise a core temperature of the aerosol-generating rod such that sufficient amounts of vaporizable species are released from the aerosol-generating substrates to form a desired amount of aerosol. At the same time, without wishing to be bound by theory, it is understood that a smaller diameter of the aerosol-generating rod allows for a faster penetration of heat supplied to the aerosol-generating article into the entire volume of the aerosol-generating substrates. Nevertheless, where the diameter of the aerosol-generating rod is too small, a volume-to-surface ratio of one or both of the aerosol-generating substrates becomes less favourable, as the amount of available aerosol-generating substrate diminishes.

[0082] A diameter of the aerosol-generating rod falling within the ranges described herein is particularly advantageous in terms of a balance between energy consumption and aerosol delivery. This advantage is felt in particular when an aerosol-generating article comprising an aerosol-generating rod having a diameter as described herein is used in combination with an external heater arranged around the periphery of the aerosol-generating article. Under such operating conditions, it has been observed that less thermal energy is required to achieve a sufficiently high temperature at the core of the aerosol-generating rod and, in general, at the core of the article. Thus, when operating at lower temperatures, a desired target temperature at the core of the aerosol-generating substrate may be achieved within a desirably reduced time frame and by a lower energy consumption.

[0083] The use of an aerosol-generating rod having a smaller diameter may also advantageously reduce the overall weight of tobacco material that is needed in the aerosol-generating article whilst still being able to produce the desired levels of aerosol. The level of tobacco waste can therefore be reduced.

[0084] Preferably, the aerosol-generating rod has a substantially circular cross-section. Preferably, the aerosol-generating rod has a substantially uniform cross-section along the entire length of the aerosol-generating rod.

[0085] Preferably, one or both of the first aerosol-generating segment and the second aerosol-generating segment has a substantially circular cross-section. For example, one or both of the first aerosol-generating segment and the second aerosol-generating segment preferably is substantially cylindrical.

[0086] Preferably, the external diameter of the first aerosol-generating segment is approximately equal to the external diameter of the second aerosol-generating segment.

[0087] Preferably, the external diameter of one or both of the first aerosol-generating segment is approximately equal to the external diameter of the aerosol-generating rod.

[0088] Preferably, the external diameter of one or both of the first aerosol-generating segment is approximately equal to the external diameter of the aerosol-generating article.

[0089] Preferably, the external diameter of the first aerosol-generating segment is between 5 millimetres and 8 millimetres, more preferably between 5.25 millimetres and 7.5 millimetres, more preferably between 5.5 millimetres and 7 millimetres.

[0090] Preferably, the external diameter of the second aerosol-generating segment is between 5 millimetres and 8 millimetres, more preferably between 5.25 millimetres and 7.5 millimetres, more preferably between 5.5 millimetres and 7 millimetres.

[0091] The average cross-sectional area of the first aerosol-generating segment is preferably at least 50 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 80 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 90 percent of the average cross-sectional area of the aerosol-generating article.

[0092] The cross-sectional area of the first aerosol-generating segment at the upstream end thereof is preferably at least 50 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 80 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 90 percent of the average cross-sectional area of the aerosol-generating article.

[0093] The average cross-sectional area of the second aerosol-generating segment is preferably at least 50 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 80 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 90 percent of the average cross-sectional area of the aerosol-generating article.

[0094] The cross-sectional area of the second aerosol-generating segment at the downstream end thereof is preferably at least 50 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 80 percent of the average cross-sectional area of the aerosol-generating article, more preferably at least 90 percent of the average cross-sectional area of the aerosol-generating article.

[0095] Preferably, the shape and size of the first aerosol-generating segment is the same as the shape and size of the second aerosol-generating segment. This may simplify manufacturing of the aerosol-generating rod.

[0096] Preferably, the density of the second aerosol-generating substrate is approximately equal to the density of the first aerosol-generating substrate. This may advantageously simplifying manufacturing of the aerosol-generating rod.

[0097] The term "density" as used herein in relation to the aerosol-generating substrates refers to the bulk density of the aerosol-generating substrate. This can be calculated by measuring the total weight of the aerosol-generating substrate and dividing this by the volume of the segment of aerosol-generating substrate (excluding any wrapper).

[0098] Preferably, the density of the second aerosol-generating substrate is within 50 mg per cubic centimetre of the density of the first aerosol-generating substrate, or within 30 mg per cubic centimetre of the density of the first aerosol-generating substrate, or within 10 mg per cubic centimetre of the density of the first aerosol-generating substrate.

[0099] Preferably, the density of the second aerosol-generating substrate is within 10 percent of the density of the first aerosol-generating substrate, or within 5 percent of the density of the first aerosol-generating substrate, or within 3 percent of the density of the first aerosol-generating substrate.

[0100] The relative densities of the first aerosol-generating substrate and the second aerosol-generating substrate may be selected to optimise aerosol delivery.

[0101] In some embodiments, the density of the second aerosol-generating substrate may be greater than the density of the first aerosol-generating substrate.

[0102] In some embodiments, the density of the second aerosol-generating substrate may be at least 100 mg per cubic centimetre higher than the density of the first aerosol-generating substrate, or at least 150 mg per cubic centimetre higher than the density of the first aerosol-generating substrate, or at least 200 mg per cubic centimetre higher than the density of the first aerosol-generating substrate. The density of the second aerosol-generating substrate may be up to 500 mg per cubic centimetre higher than the density of the first aerosol-generating substrate.

[0103] In some embodiments, the density of the second aerosol-generating substrate may be at least 1.2 times the density of the first aerosol-generating substrate, or at least 1.5 times the density of the first aerosol-generating substrate, or at least twice the density of the first aerosol-generating substrate. The density of the second aerosol-generating substrate may be up to 4 times the density of the first aerosol-generating substrate

[0104] In some embodiments, the density of the second aerosol-generating substrate may be greater than the density of the first aerosol-generating substrate.

[0105] In some embodiments, the density of the first aerosol-generating substrate may be at least 100 mg per cubic centimetre higher than the density of the second aerosol-generating substrate, or at least 150 mg per cubic centimetre higher than the density of the second aerosol-generating substrate, or at least 200 mg per cubic centimetre higher than the density of the second aerosol-generating substrate. The density of the first aerosol-generating substrate may be up to 500 mg per cubic centimetre higher than the density of the second aerosol-generating substrate.

[0106] In some embodiments, the density of the first aerosol-generating substrate may be at least 1.2 times the density of the second aerosol-generating substrate, or at least 1.5 times the density of the second aerosol-generating substrate, or at least twice the density of the second aerosol-generating substrate. The density of the first aerosol-generating substrate may be up to 4 times the density of the second aerosol-generating substrate.

[0107] Preferably, the density of the first aerosol-generating substrate is at least 100 mg per cubic centimetre. More preferably, the density of the first aerosol-generating substrate is at least 150 mg per cubic centimetre. More preferably, the density of the first aerosol-generating substrate is at least 200 mg per cubic centimetre.

[0108] Preferably, the density of the first aerosol-generating substrate is less than or equal to 500 mg per cubic centimetre. More preferably, the density of the first aerosol-generating substrate is less than or equal to 450 mg per cubic centimetre. More preferably, the density of the first aerosol-generating substrate is less than or equal to 400 mg per cubic centimetre.

[0109] For example, the density of the first aerosol-generating substrate preferably is between 100 mg per cubic centimetre and 500 mg per cubic centimetre, or between 100 mg per cubic centimetre and 450 mg per cubic centimetre, or between 100 mg per cubic centimetre and 400 mg per cubic centimetre, or between 150 mg per cubic centimetre and 500 mg per cubic centimetre, or between 150 mg per cubic centimetre and 450 mg per cubic centimetre, or between 150 mg per cubic centimetre and 400 mg per cubic centimetre, or between 200 mg per cubic centimetre and 500 mg per cubic centimetre, or between 200 mg per cubic centimetre and 450 mg per cubic centimetre, or between 200 mg per cubic centimetre and 400 mg per cubic centimetre.

[0110] Preferably, the density of the second aerosol-generating substrate is at least 100 mg per cubic centimetre. More preferably, the density of the second aerosol-generating substrate is at least 150 mg per cubic centimetre. More preferably, the density of the second aerosol-generating substrate is at least 200 mg per cubic centimetre.

[0111] Preferably, the density of the second aerosol-generating substrate is less than or equal to 500 mg per cubic centimetre. More preferably, the density of the second aerosol-generating substrate is less than or equal to 450 mg per cubic centimetre. More preferably, the density of the second aerosol-generating substrate is less than or equal to 400 mg per cubic centimetre.

[0112] For example, the density of the second aerosol-generating substrate preferably is between 100 mg per cubic centimetre and 500 mg per cubic centimetre, or between 100 mg per cubic centimetre and 450 mg per cubic centimetre, or between 100 mg per cubic centimetre and 400 mg per cubic centimetre, or between 150 mg per cubic centimetre and 500 mg per cubic centimetre, or between 150 mg per cubic centimetre and 450 mg per cubic centimetre, or between 150 mg per cubic centimetre and 400 mg per cubic centimetre, or between 200 mg per cubic centimetre and 500 mg per cubic centimetre, or between 200 mg per cubic centimetre and 450 mg per cubic centimetre, or between 200 mg per cubic centimetre and 400 mg per cubic centimetre.

[0113] Preferably, the first aerosol-generating substrate is a solid aerosol-generating substrate. Preferably, the second aerosol-generating substrate is a solid aerosol-generating substrate.

[0114] Preferably, the first aerosol-generating substrate has substantially the same composition as the second aerosol-generating substrate. This may simplify manufacturing of the aerosol-generating rod.

[0115] The first aerosol-generating substrate preferably comprises one or more aerosol formers. The second aerosol-generating substrate preferably comprises one or more aerosol formers.

[0116] The aerosol former may be any suitable known compound or mixture of compounds that, in use, facilitates formation of a dense and stable aerosol. The aerosol former may be facilitating that the aerosol is substantially resistant to thermal degradation at temperatures typically applied during use of the aerosol-generating article. Suitable aerosol formers are for example: polyhydric alcohols such as, for example, triethylene glycol, 1,3-butanediol, propylene glycol and glycerine; esters of polyhydric alcohols such as, for example, glycerol mono-, di- or triacetate; aliphatic esters of mono-, di- or polycarboxylic acids such as, for example, dimethyl dodecanedioate and dimethyl tetradecanedioate; and combinations thereof.

[0117] Preferably, the one or more aerosol formers comprise one or both of glycerol and propylene glycol. The one or more aerosol formers may consist of one or both of glycerol and propylene glycol.

[0118] Preferably, one or both of the first aerosol-generating substrate and the second aerosol-generating substrate comprises glycerol.

[0119] The first aerosol-generating substrate and the second aerosol-generating substrate may comprise the same aerosol former (or aerosol formers) as each other, or different aerosol formers may be used.

[0120] Preferably, the aerosol former content of the first aerosol-generating substrate is approximately equal to the aerosol former content of the second aerosol-generating substrate, on a dry weight basis. This may advantageously simplify manufacturing of the aerosol-generating rod.

[0121] Preferably, the aerosol former content of the second aerosol-generating substrate is within 5 percentage points of the aerosol former content of the first aerosol-generating substrate. For example, where the first aerosol-generating substrate has an aerosol former content of 20 percent by weight on a dry weight basis, and the aerosol former content of the second aerosol-generating substrate is within 5 percentage points of the aerosol former content of the first aerosol-generating substrate, the second aerosol-generating substrate has an aerosol former content of between 15 percent by weight and 25 percent by weight on a dry weight basis.

[0122] Preferably, the aerosol former content of the second aerosol-generating substrate is within 3 percentage points of the aerosol former content of the first aerosol-generating substrate, or within 1 percentage point of the aerosol former content of the first aerosol-generating substrate.

[0123] Preferably, the aerosol former content of the second aerosol-generating substrate is within 10 percent of the aerosol former content of the first aerosol-generating substrate. For example, where the first aerosol-generating substrate has an aerosol former content of 20 percent by weight on a dry weight basis, and the aerosol former content of the second aerosol-generating substrate is within 10 percent of the aerosol former content of the first aerosol-generating substrate, the second aerosol-generating substrate has an aerosol former content of between 18 percent by weight and 22 percent by weight on a dry weight basis.

[0124] Preferably, the aerosol former content of the second aerosol-generating substrate is within 5 percent of the aerosol former content of the first aerosol-generating substrate, or within 3 percent of the aerosol former content of the first aerosol-generating substrate.

[0125] Preferably, the glycerol content of the first aerosol-generating substrate is approximately equal to the glycerol content of the second aerosol-generating substrate, on a dry weight basis. This may advantageously simplify manufacturing of the aerosol-generating rod.

[0126] Preferably, the glycerol content of the second aerosol-generating substrate is within 5 percentage points of the glycerol content of the first aerosol-generating substrate, or within 3 percentage points of the glycerol content of the first aerosol-generating substrate, or within 1 percentage point of the glycerol content of the first aerosol-generating substrate.

[0127] Preferably, the glycerol content of the second aerosol-generating substrate is within 10 percent of the glycerol content of the first aerosol-generating substrate, or within 5 percent of the glycerol content of the first aerosol-generating substrate, or within 3 percent of the glycerol content of the first aerosol-generating substrate.

[0128] The relative aerosol former contents of the first aerosol-generating substrate and the second aerosol-generating substrate may be selected to optimise aerosol delivery.

[0129] In some embodiments, the aerosol former content of the second aerosol-generating substrate may be greater than the aerosol former content of the first aerosol-generating substrate, on a dry weight basis.

[0130] In some embodiments, the aerosol former content of the second aerosol-generating substrate may be at least 15 percentage points higher than the aerosol former content of the first aerosol-generating substrate. For example, where the first aerosol-generating substrate comprises 20 percent by weight of aerosol former on a dry weight basis, and the aerosol former content of the second aerosol-generating substrate is at least 15 percentage points higher than the aerosol former content of the first aerosol-generating substrate, the second aerosol-generating substrate comprises at least 35 percent by weight of aerosol former on a dry weight basis.

[0131] The aerosol former content of the second aerosol-generating substrate may be at least 20 percentage points higher than the aerosol former content of the first aerosol-generating substrate, or at least 25 percentage points higher than the aerosol former content of the first aerosol-generating substrate, on a dry weight basis. The aerosol former content of the second aerosol-generating substrate may be up to 60 percentage points higher than the aerosol former content of the first aerosol-generating substrate.

[0132] In some embodiments, the aerosol former content of the second aerosol-generating substrate may be at least 1.2 times the aerosol former content of the first aerosol-generating substrate, or at least 1.5 times the aerosol former content of the first aerosol-generating substrate, or at least twice the aerosol former content of the first aerosol-generating substrate, on a dry weight basis. The aerosol former content of the second aerosol-generating substrate may be up to 4 times the aerosol former content of the first aerosol-generating substrate.

[0133] In some embodiments the aerosol former content of the first aerosol-generating substrate may be greater than the aerosol former content of the second aerosol-generating substrate, on a dry weight basis.

[0134] In some embodiments, the aerosol former content of the first aerosol-generating substrate may be at least 15 percentage points higher than the aerosol former content of the second aerosol-generating substrate, or at least 20 percentage points higher than the aerosol former content of the second aerosol-generating substrate, or at least 25 percentage points higher than the aerosol former content of the second aerosol-generating substrate, on a dry weight basis. The aerosol former content of the first aerosol-generating substrate may be up to 60 percentage points higher than the aerosol former content of the second aerosol-generating substrate.

[0135] In some embodiments, the aerosol former content of the first aerosol-generating substrate may be at least 1.2 times the aerosol former content of the second aerosol-generating substrate, or at least 1.5 times the aerosol former content of the second aerosol-generating substrate, or at least twice the aerosol former content of the first aerosol-generating substrate, on a dry weight basis. The aerosol former content of the first aerosol-generating substrate may be up to 4 times the aerosol former content of the second aerosol-generating substrate.

[0136] Preferably, the first aerosol-generating substrate comprises at least 5 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate, more preferably at least 7 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate, at least 10 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate.

[0137] Preferably, the first aerosol-generating substrate comprises less than or equal to 80 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate. More preferably, the first aerosol-generating substrate comprises less than or equal to 60 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate. More preferably, the first aerosol-generating substrate comprises less than or equal to 40 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate. In some embodiments, the first aerosol-generating substrate may comprise less than or equal to 20 percent by weight, or less than or equal to 15 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate.

[0138] For example, the first aerosol-generating substrate may comprise between 5 percent and 80 percent, or between 5 percent and 60 percent, or between 5 percent and 40 percent, or between 5 percent and 20 percent, or between 5 percent and 15 percent, or between 7 percent and 80 percent, or between 7 percent and 60 percent, or between 7 percent and 40 percent, or between 7 percent and 20 percent, or between 7 percent and 15 percent, or between 10 percent and 80 percent, or between 10 percent and 60 percent, or between 10 percent and 40 percent, or between 10 percent and 20 percent, or between 10 percent and 15 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate.

[0139] Preferably, the second aerosol-generating substrate comprises at least 5 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate, more preferably at least 7 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate, at least 10 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate.

[0140] Preferably, the second aerosol-generating substrate comprises less than or equal to 80 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate. More preferably, the second aerosol-generating substrate comprises less than or equal to 60 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate. More preferably, the second aerosol-generating substrate comprises less than or equal to 40 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate. In some preferred embodiments, the second aerosol-generating substrate may comprise less than or equal to 20 percent by weight, or less than or equal to 15 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate.

[0141] For example, the second aerosol-generating substrate may comprise between 5 percent and 80 percent, or between 5 percent and 60 percent, or between 5 percent and 40 percent, or between 5 percent and 20 percent, or between 5 percent and 15 percent, or between 7 percent and 80 percent, or between 7 percent and 60 percent, or between 7 percent and 40 percent, or between 7 percent and 20 percent, or between 7 percent and 20 percent, or between 10 percent and 80 percent, or between 10 percent and 60 percent, or between 10 percent and 40 percent, or between 10 percent and 20 percent, or between 10 percent and 15 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate.

[0142] Preferably, the first aerosol-generating substrate and the second aerosol-generating substrate are formed of the same type of substrate material as each other. Suitable types of materials for use in the aerosol-generating article of the present invention are described below and include, for example, tobacco cut filler, homogenised tobacco material such as cast leaf, aerosol-generating films and gel compositions. The first aerosol-generating substrate and the second aerosol-generating substrate may be formed of different types of material to each other.

[0143] Preferably, the first aerosol-generating substrate comprises tobacco material. In certain preferred embodiments, the first aerosol-generating substrate comprises shredded tobacco material. For example, the shredded tobacco material may be in the form of cut filler, as described in more detail below. Alternatively, the shredded tobacco material may be in the form of a shredded sheet of homogenised tobacco material. Suitable homogenised tobacco materials for use in the present invention are described below.

[0144] Within the context of the present specification, the term "cut filler" is used to describe to a blend of shredded plant material, such as tobacco plant material, including, in particular, one or more of leaf lamina, processed stems and ribs, and homogenised plant material.

[0145] The cut filler may also comprise other after-cut, filler tobacco or casing.

[0146] Preferably, the cut filler comprises at least 25 percent of plant leaf lamina, more preferably, at least 50 percent of plant leaf lamina, still more preferably at least 75 percent of plant leaf lamina and most preferably at least 90 percent of plant leaf lamina. Preferably, the plant material is one of tobacco, mint, tea and cloves. Most preferably, the plant material is tobacco. However, the invention is equally applicable to other plant material that has the ability to release substances upon the application of heat that can subsequently form an aerosol.

[0147] Preferably, the cut filler comprises tobacco plant material comprising lamina of one or more of bright tobacco, dark tobacco, aromatic tobacco and filler tobacco. With reference to the present invention, the term "tobacco" describes any plant member of the genus *Nicotiana*.

[0148] The cut filler suitable to be used with the present invention generally may resemble cut filler used for conventional smoking articles. The cut width of the cut filler preferably may be between 0.3 millimetres and 2.0 millimetres, or between 0.5 millimetres and 1.2 millimetres, or between 0.6 millimetres and 0.9 millimetres.

[0149] Preferably, the strands have a length of between about 10 millimetres and about 40 millimetres before the strands are collated to form the aerosol-generating rod.

[0150] In preferred embodiments, the weight of the cut filler is between 80 milligrams and 400 milligrams, preferably between 120 milligrams and 250 milligrams, more preferably between 150 milligrams and 200 milligrams. This amount of cut filler typically allows for sufficient material for the formation of an aerosol.

[0151] Preferably, the cut filler is soaked with the aerosol former. Soaking the cut filler can be done by spraying or by other suitable application methods. The aerosol former may be applied to the blend during preparation of the cut filler. For example, the aerosol former may be applied to the blend in the direct conditioning casing cylinder (DCCC). Conventional machinery can be used for applying an aerosol former to the cut filler. Suitable aerosol formers are set out above.

[0152] Preferably, the aerosol former in the cut filler comprises one or both of glycerol and propylene glycol. The aerosol former may consist of glycerol or propylene glycol or of a combination of glycerol and propylene glycol.

[0153] In other preferred embodiments, the first aerosol-generating substrate comprises homogenised plant material, preferably a homogenised tobacco material.

[0154] As used herein, the term "homogenised plant material" encompasses any plant material formed by the agglomeration of particles of plant. For example, sheets or webs of homogenised plant material for the aerosol-generating substrates of the present invention may be formed by agglomerating particles of plant material obtained by pulverising, grinding or comminuting plant material. The homogenised plant material may be produced by casting, extrusion, paper making processes or other any other suitable processes known in the art.

[0155] The homogenised plant material can be provided in any suitable form.

[0156] In some embodiments, the homogenised plant material may be in the form of one or more sheets. As used herein with reference to the invention, the term "sheet" describes a laminar element having a width and length substantially greater than the thickness thereof.

[0157] The homogenised plant material may be in the form of a plurality of pellets or granules.

[0158] The homogenised plant material may be in the form of a plurality of strands, strips or shreds. As used herein, the term "strand" describes an elongate element of material having a length that is substantially greater than the width and thickness thereof. The term "strand" should be considered to encompass strips, shreds and any other homogenised plant material having a similar form. The strands of homogenised plant material may be formed from a sheet of homogenised plant material, for example by cutting or shredding, or by other methods, for example, by an extrusion method.

[0159] Where the homogenised plant material is in the form of one or more sheets, as described above, the sheets may be produced by a casting process. Alternatively, sheets of homogenised plant material may be produced by a paper-making process.

[0160] The one or more sheets as described herein may each individually have a thickness of between 100 micrometres and 600 micrometres, preferably between 150 micrometres and 300 micrometres, and most preferably between 200 micrometres and 250 micrometres. Individual thickness refers to the thickness of the individual sheet, whereas combined thickness refers to the total thickness of all sheets that make up the aerosol-generating substrate.

[0161] The one or more sheets as described herein may each individually have a grammage of between 100 grams per square metre and 600 grams per square metre.

[0162] The one or more sheets as described herein may each individually have a density of from 0.3 grams per cubic centimetre to 1.3 grams per cubic centimetre, and preferably from 0.7 grams per cubic centimetre to 1.0 gram per cubic centimetre.

[0163] The one or more sheets as described herein may have been one or more of crimped, folded, gathered and pleated.

[0164] The one or more sheets of homogenised plant material may be cut into strands as referred to above. In such embodiments, the first aerosol-generating substrate comprises a plurality of strands of the homogenised plant material. The strands may be used to form a plug. Typically, the width of such strands is about 5 millimetres, or about 4 millimetres, or about 3 millimetres, or about 2 millimetres or less. The length of the strands may be greater than about 5 millimetres, between about 5 millimetres to about 15 millimetres, about 8 millimetres to about 12 millimetres, or about 12 millimetres. Preferably, the strands have substantially the same length as each other.

[0165] The homogenised plant material may comprise between 2.5 percent and 95 percent by weight of plant particles, or between 5 percent and 90 percent by weight of plant particles, or between 10 percent and 80 percent by weight of plant particles, or between 15 percent and 70 percent by weight of plant particles, or between 20 percent and 60 percent by weight of plant particles, or between 30 percent and 50 percent by weight of plant particles, on a dry weight basis.

[0166] In certain embodiments of the invention, the homogenised plant material is a homogenised tobacco material comprising tobacco particles. Sheets of homogenised tobacco material for use in such embodiments of the invention may have a tobacco content of at least about 40 percent by weight on a dry weight basis, more preferably of at least about 50 percent by weight on a dry weight basis more preferably at least about 70 percent by weight on a dry weight basis and most preferably at least about 90 percent by weight on a dry weight basis.

[0167] With reference to the present invention, the term "tobacco particles" describes particles of any plant member of the genus *Nicotiana*. The term "tobacco particles" encompasses ground or powdered tobacco leaf lamina, ground or powdered tobacco leaf stems, tobacco dust, tobacco fines, and other particulate tobacco by-products formed during the treating, handling and shipping of tobacco. In a preferred embodiment, the tobacco particles are substantially all derived from tobacco leaf lamina. By contrast, isolated nicotine and nicotine salts are compounds derived from tobacco but are not considered tobacco particles for purposes of the invention and are not included in the percentage of particulate plant material.

[0168] In preferred embodiments, the first aerosol-generating substrate comprises strands of homogenised tobacco material, wherein the weight of the strands of homogenised tobacco material is between 80 milligrams and 400 milligrams, preferably between 120 milligrams and 250 milligrams, more preferably between 150 milligrams and 200 milligrams. This amount of strands of homogenised tobacco material typically allows for sufficient material for the formation of an aerosol.

[0169] In preferred embodiments, the second aerosol-generating substrate comprises strands of homogenised tobacco material, wherein the weight of the strands of homogenised tobacco material is between 80 milligrams and 400 milligrams, preferably between 120 milligrams and 250 milligrams, more preferably between 150 milligrams and 200 milligrams.

[0170] In some embodiments, the first aerosol-generating substrate may be in the form of an aerosol-generating film comprising a cellulosic based film forming agent, nicotine and one or more aerosol formers. The aerosol-generating film may further comprise a cellulose based strengthening agent. The aerosol-generating film may further comprise water, preferably 30 percent by weight of less of water.

[0171] As used herein, the term "film" is used to describe a solid laminar element having a thickness that is less than the width or length thereof. The film may be self-supporting. In other words, a film may have cohesion and mechanical properties such that the film, even if obtained by casting a film-forming formulation on a support surface, can be separated from the support surface. Alternatively, the film may be disposed on a support or sandwiched between other materials. This may enhance the mechanical stability of the film.

[0172] The aerosol former content of the aerosol-generating film may be within the ranges defined above for the first aerosol-generating substrate.

[0173] In the context of the present invention the term "cellulose based film-forming agent" is used to describe a cellulosic polymer capable, by itself or in the presence of an auxiliary thickening agent, of forming a continuous film.

[0174] Preferably, the cellulose based film-forming agent is selected from the group consisting of hydroxypropyl methylcellulose (HPMC), methylcellulose (MC), ethylcellulose (EC), hydroxyethyl methyl cellulose (HEMC), hydroxyethyl cellulose (HEC), hydroxypropyl cellulose (HPC), and combinations thereof.

[0175] More preferably, the cellulose based film-forming agent is selected from the group consisting of hydroxypropyl methylcellulose (HPMC), methylcellulose (MC), ethylcellulose (EC), and combinations thereof.

[0176] In particularly preferred embodiments, the cellulose based film-forming agent is HPMC.

[0177] As used herein with reference to the invention, the term "nicotine" is used to describe nicotine, a nicotine base or a nicotine salt. In embodiments in which the aerosol-generating film comprises a nicotine base or a nicotine salt, the amounts of nicotine recited herein are the amount of free base nicotine or amount of protonated nicotine, respectively.

[0178] In alternative embodiments of the invention, the first aerosol-generating substrate may comprise a gel composition that includes nicotine, at least one gelling agent and the aerosol former. The gel composition is preferably substantially tobacco free.

[0179] The gel composition preferably includes at least one gelling agent. Preferably, the gel composition includes a total amount of gelling agents in a range from about 0.4 percent by weight to about 10 percent by weight, or from about 0.5 percent by weight to about 8 percent by weight, or from about 1 percent by weight to about 6 percent by weight, or from about 2 percent by weight to about 4 percent by weight, or from about 2 percent by weight to about 3 percent by weight.

[0180] The term "gelling agent" refers to a compound that homogeneously, when added to a 50 percent by weight water/50 percent by weight glycerol mixture, in an amount of about 0.3 percent by weight, forms a solid medium or support matrix leading to a gel. Gelling agents include, but are not limited to, hydrogen-bond crosslinking gelling agents, and ionic crosslinking gelling agents.

[0181] The term "hydrogen-bond crosslinking gelling agent" refers to a gelling agent that forms non-covalent crosslinking bonds or physical crosslinking bonds via hydrogen bonding.

[0182] The hydrogen-bond crosslinking gelling agent may include one or more of a galactomannan, gelatin, agarose, or konjac gum, or agar. The hydrogen-bond crosslinking gelling agent may preferably include agar.

[0183] The term "ionic crosslinking gelling agent" refers to a gelling agent that forms non-covalent crosslinking bonds or physical crosslinking bonds via ionic bonding.

[0184] The ionic crosslinking gelling agent may include low acyl gellan, pectin, kappa carrageenan, iota carrageenan or alginate. The ionic crosslinking gelling agent may preferably include low acyl gellan.

[0185] The gelling agent may include one or more biopolymers. The biopolymers may be formed of polysaccharides.

[0186] Biopolymers include, for example, gellan gums (native, low acyl gellan gum, high acyl gellan gums with low acyl gellan gum being preferred), xanthan gum, alginates (alginic acid), agar, guar gum, and the like. The composition may preferably include xanthan gum. The composition may include two biopolymers. The composition may include three biopolymers. The composition may include the two biopolymers in substantially equal weights. The composition may include the three biopolymers in substantially equal weights.

[0187] The second aerosol-generating substrate may be in the form of cut filler, or a homogenised tobacco material such as cast leaf, or an aerosol-generating film, or a gel composition as described above.

[0188] Preferably, the second aerosol-generating substrate comprises tobacco material. In certain preferred embodiments, the second aerosol-generating substrate comprises shredded tobacco material. For example, the shredded tobacco material may be in the form of cut filler, as described above. As another example, the shredded tobacco material may be in the form of a shredded sheet of homogenised tobacco material, as described above.

[0189] In certain embodiments of the invention, the aerosol-generating article further comprises one or more elongate susceptor elements within the aerosol-generating rod. For example, one or more elongate susceptor elements may be arranged substantially longitudinally within the aerosol-generating rod and in thermal contact with the aerosol-generating substrate. Where the aerosol-generating rod comprises one or more elongate susceptor elements, one or both of the first and second aerosol-generating segments may include a susceptor element extending longitudinally within that element. With such an arrangement, separate susceptor elements may be provided in the first and second aerosol-generating segments.

[0190] As used herein with reference to the present invention, the term "susceptor element" refers to a material that can convert electromagnetic energy into heat. When located within a fluctuating electromagnetic field, eddy currents induced in the susceptor element cause heating of the susceptor element. As the susceptor element is located in thermal contact with the aerosol-generating substrate, the aerosol-generating substrate is heated by the susceptor element.

[0191] When used for describing the susceptor element, the term "elongate" means that the susceptor element has a length dimension that is greater than its width dimension or its thickness dimension, for example greater than twice its width dimension or its thickness dimension.

[0192] The susceptor element may be arranged substantially longitudinally within the rod or segment. This means that the length dimension of the elongate susceptor element may be arranged to be approximately parallel to the longitudinal direction of the rod, for example within plus or minus 10 degrees of parallel to the longitudinal direction of the rod. In preferred embodiments, the elongate susceptor element may be positioned in a radially central position within the rod or segment, and extends along the longitudinal axis of the rod or segment.

[0193] The susceptor element is preferably in the form of a pin, rod, strip or blade.

[0194] The susceptor element preferably has a width from 1 millimetre to 5 millimetres.

[0195] The susceptor element may generally have a thickness from 0.01 millimetres to 2 millimetres, for example from 0.5 millimetres to 2 millimetres. In some embodiments, the susceptor element preferably has a thickness from 10 micrometres to 500 micrometres, more preferably from 10 micrometres to 100 micrometres.

[0196] Preferably, the elongate susceptor element has a length which is the same or shorter than the length of the aerosol-generating segment in which it is incorporated. Preferably, the elongate susceptor element has a same length as the aerosol-generating segment in which it is incorporated.

[0197] The susceptor element may be formed from any material that can be inductively heated to a temperature sufficient to generate an aerosol from the aerosol-generating substrate. Preferred susceptor elements comprise a metal or carbon.

[0198] A preferred susceptor element may comprise or consist of a ferromagnetic material, for example a ferromagnetic alloy, ferritic iron, or a ferromagnetic steel or stainless steel. A suitable susceptor element may be, or comprise, aluminium.

[0199] Suitable susceptor elements may comprise a non-metallic core with a metal layer disposed on the non-metallic core, for example metallic tracks formed on a surface of a ceramic core. A susceptor element may have a protective external layer, for example a protective ceramic layer or protective glass layer encapsulating the susceptor element. The susceptor element may comprise a protective coating formed by a glass, a ceramic, or an inert metal, formed over a core of susceptor element material.

[0200] The susceptor element is arranged in thermal contact with the aerosol-generating substrate of the aerosol-generating segment in which the susceptor element is incorporated. Thus, when the susceptor element heats up the aerosol-generating substrate is heated up and an aerosol is formed. Preferably the susceptor element is arranged in direct physical contact with the aerosol-generating substrate, for example within the aerosol-generating substrate.

[0201] Preferably, the first aerosol-generating substrate is circumscribed by a first wrapper. Preferably, the second aerosol-generating substrate is circumscribed by a second wrapper.

[0202] Where the first aerosol-generating substrate is circumscribed by a first wrapper and the second aerosol-generating substrate is circumscribed by a second wrapper, preferably the second wrapper is separate from the first wrapper. Each of the aerosol-generating segments therefore may have its own distinct plug wrapper around the respective aerosol-generating substrate.

[0203] The aerosol-generating rod, including the first and second aerosol-generating segments may be circumscribed by a further wrapper, which may combine the aerosol-generating segments and retain them in position relative to each other.

[0204] The wrapper circumscribing the aerosol-generating rod may be a paper wrapper or a non-paper wrapper. Suitable paper wrappers for use in specific embodiments of the invention are known in the art and include, but are not limited to: cigarette papers; and filter plug wraps. Suitable non-paper wrappers for use in specific embodiments of the invention are known in the art and include, but are not limited to sheets of homogenised tobacco materials.

[0205] The paper wrapper may have a grammage from 15 gsm to 35 gsm, preferably from 20 gsm to 30 gsm.

[0206] The paper wrapper may have a thickness from 25 micrometres to 55 micrometres, preferably from 30 micrometres to 50 micrometres, more preferably from 35 micrometres to 45 micrometres.

[0207] In certain preferred embodiments, the wrapper may be formed of a laminate material comprising a plurality of layers. Preferably, the wrapper is formed of an aluminium co-laminated sheet.

[0208] The paper layer of the co-laminated sheet may have a grammage from 35 gsm to 55 gsm, preferably from 40 gsm to 50 gsm.

[0209] The paper layer of the co-laminated sheet may have a thickness from 50 micrometres to 80 micrometres, preferably from 55 micrometres to 75 micrometres, more preferably from 60 micrometres to 70 micrometres.

[0210] The metallic layer of the co-laminated sheet may have a grammage from 12 gsm to 25 gsm, preferably from 15 gsm to 20 gsm.

[0211] The metallic layer of the co-laminated sheet may have a thickness from 2 micrometres to 15 micrometres, preferably from 3 micrometres to 12 micrometres, more preferably from 5 micrometres to 10 micrometres.

[0212] The wrapper circumscribing the aerosol-generating rod may be a paper wrapper comprising PVOH (polyvinyl alcohol) or silicone (or polysiloxane) (or polysiloxane). Addition of PVOH (polyvinyl alcohol) or silicone (or polysiloxane) may improve the grease barrier properties of the wrapper.

[0213] The paper wrapper comprising PVOH or silicone (or polysiloxane) may have a grammage from 20 gsm to 50 gsm, preferably from 25 gsm to 45 gsm, more preferably from 30 gsm to 40 gsm.

[0214] The paper wrapper comprising PVOH or silicone (or polysiloxane) may have a thickness from 25 micrometres to 50 micrometres, preferably from 30 micrometres to 45 micrometres, more preferably from 35 micrometres to 40 micrometres.

[0215] The wrapper circumscribing the aerosol-generating rod may comprise a flame retardant composition comprising one or more flame retardant compounds. The term "flame retardant compounds" is used herein to describe chemical compounds that, when added to or otherwise incorporated into a carrier substrate, such as paper or plastic compounds, provide the carrier substrate with varying degrees of flammability protection.

[0216] A number of suitable flame retardant compounds are known to the skilled person. In particular, several flame retardant compounds and formulations suitable for treating cellulosic materials are known and have been disclosed and may find use in the manufacture of wrappers for aerosol-generating articles in accordance with the present invention.

[0217] The wrapper comprising a flame retardant composition may have a grammage from 20 gsm to 45 gsm, preferably from 25 gsm to 40 gsm, more preferably from 30 gsm to 35 gsm.

[0218] The wrapper comprising a flame retardant composition may have a thickness of at least 25 micrometres, preferably at least 30 micrometres, even more preferably at least 35 micrometres. The wrapper comprising a flame retardant composition may have a thickness of less than or equal to 50 micrometres, preferably less than or equal to 45 micrometres, even more preferably less than or equal to 40 micrometres.

[0219] Aerosol-generating articles according to the present invention preferably further comprise a downstream section located downstream of the aerosol-generating rod. The downstream section is preferably located immediately downstream of the aerosol-generating rod. The downstream section of the aerosol-generating article preferably extends between the aerosol-generating rod and the downstream end of the aerosol-generating article. The downstream section may comprise one or more elements, each of which will be described in more detail within the present disclosure.

[0220] A length of the downstream section may be at least 20 millimetres, or at least 25 millimetres, or at least 30 millimetres.

[0221] A length of the downstream section may be less than 70 millimetres, or less than 60 millimetres, or less than 50 millimetres.

[0222] For example, a length of the downstream section may be between 20 millimetres and 70 millimetres, or between 25 millimetres and 60 millimetres, or between 30 millimetres and 50 millimetres.

[0223] The downstream section of an aerosol-generating article according to the present invention preferably comprises a hollow tubular cooling element provided downstream of the aerosol-generating rod. The hollow tubular cooling element may advantageously provide an aerosol-cooling element for the aerosol-generating article.

[0224] The hollow tubular cooling element may be provided immediately downstream of the aerosol-generating rod. In other words, the hollow tubular cooling element may abut a downstream end of the aerosol-generating rod. The hollow tubular cooling element may define an upstream end of the downstream section of the aerosol-generating article. The downstream end of the aerosol-generating article may coincide with the downstream end of the downstream section. In some embodiments, the downstream section of the aerosol-generating article comprises a single hollow tubular element. In other words, the downstream section of the aerosol-generating article may comprise only one hollow tubular element. In other embodiments, the downstream section comprises two or more hollow tubular elements, as described below.

[0225] As used throughout the present disclosure, the term "hollow tubular element" denotes a generally elongate element defining a lumen or airflow passage along a longitudinal axis thereof. In particular, the term "tubular" will be used in the following with reference to a tubular element having a substantially cylindrical cross-section and defining at least one airflow conduit establishing an uninterrupted fluid communication between an upstream end of the tubular element and a downstream end of the tubular element. However, it will be understood that alternative geometries (for example, alternative cross-sectional shapes) of the tubular element may be possible. The hollow tubular cooling element may be an individual, discrete element of the aerosol-generating article which has a defined length and thickness.

[0226] In the context of the present invention, a hollow tubular cooling element provides an unrestricted flow channel. This means that the hollow tubular cooling element provides a negligible level of resistance to draw (RTD). The term "negligible level of RTD" is used to describe an RTD of less than 1 millimetres H_2O per 10 millimetres of length of the hollow tubular cooling element, preferably less than 0.4 millimetres H_2O per 10 millimetres of length of the hollow tubular cooling element, more preferably less than 0.1 millimetres H_2O per 10 millimetres of length of the hollow tubular cooling element.

[0227] The RTD of a hollow tubular cooling element is preferably less than or equal to 10 millimetres H_2O, or less than or equal to 5 millimetres H_2O, or less than or equal to 2.5 millimetres H_2O, or less than or equal to 2 millimetres H_2O, or less than or equal to 1 millimetre H_2O.

[0228] The RTD of a hollow tubular cooling element may be at least 0 millimetres H_2O, or at least 0.25 millimetres H_2O or at least 0.5 millimetres H_2O or at least 1 millimetre H_2O.

[0229] In aerosol-generating articles in accordance with the present invention the overall RTD of the article depends essentially on the RTD of the rod and optionally on the RTD of the downstream and/or upstream elements. This is because the hollow tubular cooling element is substantially empty and, as such, substantially only marginally contribute to the overall RTD of the aerosol-generating article.

[0230] The flow channel should therefore be free from any components that would obstruct the flow of air in a longitudinal direction. Preferably, the flow channel is substantially empty and particularly preferably the flow channel is empty.

[0231] As will be described in greater detail within the present disclosure, the aerosol-generating article may comprise a ventilation zone at a location along the downstream section. In some embodiments, the aerosol-generating article may comprise a ventilation zone at a location along the hollow tubular cooling element. Such, or any, ventilation zone may extend through the peripheral wall of the hollow tubular cooling element. As such, fluid communication is established between the flow channel internally defined by the hollow tubular cooling element and the outer environment. The ventilation zone is further described within the present disclosure.

[0232] The length of the hollow tubular cooling element may be at least 15 millimetres, or at least 20 millimetres, or at least 25 millimetres.

[0233] The length of the hollow tubular cooling element may be less than 50 millimetres, or less than 45 millimetres, or less than 40 millimetres.

[0234] For example, the length of the hollow tubular cooling element may be between 15 millimetres and 50 millimetres, or between 20 millimetres and 45 millimetres, or between 20 millimetres and 40 millimetres, or between 20 millimetres and 30 millimetres, or between 25 millimetres and 40 millimetres.

[0235] A relatively long hollow tubular cooling element provides and defines a relatively long internal cavity within the aerosol-generating article and downstream of the aerosol-generating rod. Providing an empty cavity downstream (preferably, immediately downstream) of the aerosol-generating substrate enhances the nucleation of aerosol particles generated by the substrate. Providing a relatively long cavity maximises such nucleation benefits, thereby improving aerosol formation and cooling.

[0236] The wall thickness of the hollow tubular cooling element may between 100 micrometres and 2 millimetres, or between 150 micrometres and 1.5 millimetres, or between 200 micrometres and 1.25 millimetres.

[0237] The hollow tubular cooling element preferably has an external diameter that is approximately equal to the external diameter of the aerosol-generating rod and to the external diameter of the aerosol-generating article.

[0238] The hollow tubular cooling element may have an external diameter of between 5 millimetres and 10 millimetres, for example of between 5.5 millimetres and 9 millimetres or of between 6 millimetres and 8 millimetres. In certain embodiments, the hollow tubular cooling element has an external diameter of less than 7 millimetres.

[0239] The hollow tubular cooling element may have an internal diameter. Preferably, the hollow tubular cooling element has a constant internal diameter along a length of the hollow tubular cooling element. However, the internal diameter of the hollow tubular cooling element may vary along the length of the hollow tubular cooling element.

[0240] The hollow tubular cooling element may have an internal diameter of at least 2 millimetres. For example, the hollow tubular cooling element may have an internal diameter of at least 3 millimetres, at least 4 millimetres, or at least 5 millimetres.

[0241] The provision of a hollow tubular cooling element having an internal diameter as set out above may advantageously provide sufficient rigidity and strength to the hollow tubular cooling element.

[0242] The hollow tubular cooling element may have an internal diameter of no more than 10 millimetres. For example, the hollow tubular cooling element may have an internal diameter of no more than 9 millimetres, no more than 8 millimetres, or no more than 7 millimetres.

[0243] The provision of a hollow tubular cooling element having an internal diameter as set out above may advantageously reduce the resistance to draw of the hollow tubular cooling element.

[0244] The hollow tubular cooling element may have an internal diameter of between 2 millimetres and 10 millimetres, between 3 millimetres and 9 millimetres, between 4 millimetres and 8 millimetres, or between 5 millimetres and 7 millimetres.

[0245] The lumen or cavity of the hollow tubular cooling element may have any cross sectional shape. The lumen of the hollow tubular cooling element may have a circular cross sectional shape.

[0246] The hollow tubular cooling element may comprise a paper-based material. The hollow tubular cooling element may comprise at least one layer of paper. The paper may be very rigid paper. The paper may be crimped paper, such as crimped heat resistant paper or crimped parchment paper.

[0247] Preferably, the hollow tubular cooling element may comprise cardboard. The hollow tubular cooling element may be a cardboard tube. The hollow tubular cooling element may be formed from cardboard. Advantageously, cardboard is a cost-effective material that provides a balance between being deformable in order to provide ease of insertion of the article into an aerosol-generating device and being sufficiently stiff to provide suitable engagement of the article with the interior of the device. A cardboard tube may therefore provide suitable resistance to deformation or compression during use.

[0248] The hollow tubular cooling element may be a paper tube. The hollow tubular cooling element may be a tube formed from spirally wound paper. The hollow tubular cooling element may be formed from a plurality of layers of the paper. The paper may have a basis weight of at least 50 grams per square meter, at least 60 grams per square meter, at least 70 grams per square meter, or at least 90 grams per square meter.

[0249] The hollow tubular cooling element may comprise a polymeric material. For example, the hollow tubular cooling element may comprise a polymeric film. The polymeric film may comprise a cellulosic film. The hollow tubular cooling element may comprise low density polyethylene (LDPE) or polyhydroxyalkanoate (PHA) fibres. The hollow tube may comprise cellulose acetate tow.

[0250] Where the hollow tubular cooling element comprises cellulose acetate tow, the cellulose acetate tow may have a denier per filament of between 2 and 4 and a total denier of between 25 and 40.

[0251] Preferably, the aerosol-generating article according to the present invention comprises a ventilation zone at a location along the downstream section. In more detail, in those embodiments wherein the downstream section comprises a hollow tubular cooling element, the ventilation zone may be provided at a location along the hollow tubular cooling element. Alternatively or in addition, in those embodiments where the downstream section comprises a downstream hollow tubular element, as described below, the ventilation zone may be provided at a location along the downstream hollow tubular element.

[0252] As such, a ventilated cavity is provided downstream of the aerosol-generating rod. This provides several potential technical benefits. First of all, the inventors have found that one such ventilated hollow tubular cooling element provides a particularly efficient cooling of the aerosol. Secondly, the inventors have surprisingly found that such rapid cooling of the volatile species released upon heating the aerosol-generating substrate enhances nucleation of aerosol particles.

[0253] The ventilation zone may typically comprise a plurality of perforations through the peripheral wall of the hollow tubular cooling element. Preferably, the ventilation zone comprises at least one circumferential row of perforations. In some embodiments, the ventilation zone may comprise two circumferential rows of perforations. For example, the perforations may be formed online during manufacturing of the aerosol-generating article. Preferably, each circumferential row of perforations comprises from 8 to 30 perforations.

[0254] An aerosol-generating article in accordance with the present invention has a ventilation level of at least 40 percent. Increasing the ventilation level may increase the level of aerosol cooling. However, increasing the ventilation level may mean that less air is admitted into the aerosol-generating article via the upstream end of the aerosol-generating article which then flows through the aerosol-generating rod. The ventilation level may thereby be selected based on a desired temperature and composition of the aerosol delivered to a user.

[0255] The aerosol-generating article preferably has a ventilation level of at least 45 percent, more preferably at least 50 percent, more preferably at least 60 percent, more preferably at least 70 percent.

[0256] An aerosol-generating article in accordance with the present invention may have a ventilation level of less than or equal to 90 percent, more preferably less than or equal to 85 percent, more preferably less than or equal to 80 percent.

[0257] Thus, an aerosol-generating article in accordance with the present invention may have a ventilation level from 45 percent to 90 percent, more preferably from 45 percent to 85 percent, even more preferably from 45 percent to 80 percent. The aerosol-generating article in accordance with the present invention may have a ventilation level from 50 percent to 90 percent, preferably from 50 percent to 85 percent, more preferably from 50 percent to 80 percent. The aerosol-generating article in accordance with the present invention may have a ventilation level from 60 percent to 90 percent, preferably from 60 percent to 85 percent, more preferably from 60 percent to 80 percent. The aerosol-generating article in accordance with the present invention may have a ventilation level from 70 percent to 90 percent, preferably from 70 percent to 85 percent, more preferably from 70 percent to 80 percent.

[0258] For example, the aerosol-generating article may have a ventilation level of about 75 percent.

[0259] As discussed in the present disclosure, the downstream section may comprise a downstream filter segment. The downstream filter segment may extend to a downstream end of the downstream section. The downstream filter segment may be located at the downstream end of the aerosol-generating article. The downstream end of the downstream filter segment may define the downstream end of the aerosol-generating article.

[0260] The downstream filter segment may be located downstream of a hollow tubular cooling element, which is described above. The downstream filter segment may extend between the hollow tubular cooling element and the downstream end of the aerosol-generating article.

[0261] The downstream filter segment is preferably a solid plug, which may also be described as a 'plain' plug and is non-tubular. The filter segment therefore preferably has a substantially uniform transverse cross section.

[0262] The downstream filter segment is preferably formed of a fibrous filtration material. The fibrous filtration material may be for filtering the aerosol that is generated from the aerosol-generating substrate. Suitable fibrous filtration materials would be known to the skilled person. Particularly preferably, the at least one downstream filter segment comprises a cellulose acetate filter segment formed of cellulose acetate tow.

[0263] In certain preferred embodiments, the downstream section includes a single downstream filter segment. In alternative embodiments, the downstream section includes two or more downstream filter segments axially aligned in an abutting end to end relationship with each other.

[0264] The downstream filter segment may optionally comprise a flavourant, which may be provided in any suitable form. For example, the downstream filter segment may comprise one or more capsules, beads or granules of a flavourant, or one or more flavour loaded threads or filaments.

[0265] Preferably, the downstream filter segment has a low particulate filtration efficiency.

[0266] Preferably, the downstream filter segment is circumscribed by a plug wrap. Preferably, the downstream filter segment is unventilated such that air does not enter the aerosol-generating article along the downstream filter segment.

[0267] The downstream filter segment is preferably connected to one or more of the adjacent upstream components of the aerosol-generating article by means of a tipping wrapper.

[0268] The downstream filter segment preferably has an external diameter that is approximately equal to the external diameter of the aerosol-generating article. The external diameter of a downstream filter segment may be substantially the same as the external diameter of the hollow tubular cooling element.

[0269] The external diameter of the downstream filter segment may be between 5 millimetres and 10 millimetres, or between 5.5 millimetres and 9 millimetres, or between 6 millimetres and 8 millimetres. In certain embodiments, the external of the downstream filter segment is less than 7 millimetres.

[0270] Unless otherwise specified, the resistance to draw (RTD) of a component or the aerosol-generating article is measured in accordance with ISO 6565-2015. The RTD refers the pressure required to force air through the full length of a component. The terms "pressure drop" or "draw resistance" of a component or article may also refer to the "resistance to draw". Such terms generally refer to the measurements in accordance with ISO 6565-2015 normally carried out at a volumetric flow rate of 17.5 millilitres per second at the output or downstream end of the measured component at a temperature of 22 degrees Celsius, a pressure of 101 kPa (about 760 Torr) and a relative humidity of 60%. Conditions for smoking and smoking machine specifications are set out in ISO Standard 3308 (ISO 3308:2000).

Atmosphere for conditioning and testing are set out in ISO Standard 3402 (ISO 3402:1999).

[0271] The resistance to draw (RTD) of the downstream section may be at least 0 millimetres H_2O. The RTD of the downstream section may be at least 3 millimetres H_2O. The RTD of the downstream section may be at least 6 millimetres H_2O.

[0272] The RTD of the downstream section may be no greater than 12 millimetres H_2O. The RTD of the downstream section may be no greater than 11 millimetres H_2O. The RTD of the downstream section may be no greater than 10 millimetres H_2O.

[0273] The resistance to draw (RTD) characteristics of the downstream section may be wholly or mostly attributed to the RTD characteristics of the downstream filter segment of the downstream section. In other words, the RTD of the downstream filter segment of the downstream section may wholly define the RTD of the downstream section.

[0274] The resistance to draw (RTD) of the downstream filter segment may be at least 0 millimetres H_2O, or at least 3 millimetres H_2O, or at least 6 millimetres H_2O.

[0275] The RTD of the downstream filter segment may be no greater than 12 millimetres H_2O, or no greater than 11 millimetres H_2O, or no greater than 10 millimetres H_2O.

[0276] As mentioned above, the downstream filter segment may be formed of a fibrous filtration material. The downstream filter segment may be formed of a porous material. The downstream filter segment may be formed of a biodegradable material. The downstream filter segment may be formed of a cellulose material, such as cellulose acetate. For example, a downstream filter segment may be formed from a bundle of cellulose acetate fibres having a denier per filament between 10 and 15. For example, a downstream filter segment formed from relatively low density cellulose acetate tow, such as cellulose acetate tow comprising fibres of 12 denier per filament.

[0277] The downstream filter segment may be formed of a polylactic acid based material. The downstream filter segment may be formed of a bioplastic material, preferably a starch-based bioplastic material. The downstream filter segment may be made by injection moulding or by extrusion. Bioplastic-based materials are advantageous because they are able to provide downstream filter segment structures which are simple and cheap to manufacture with a particular and complex cross-sectional profile, which may comprise a plurality of relatively large air flow channels extending through the downstream filter segment material, that provides suitable RTD characteristics.

[0278] The length of the downstream filter segment may be at least 5 millimetres, or at least 10 millimetres. The length of the downstream filter segment may be less than 25 millimetres, or less than 20 millimetres. For example, the length of the downstream filter segment may be between 5 millimetres and 25 millimetres, or between 10 millimetres and 25 millimetres, or between 5 millimetres and 20 millimetres, or between 10 millimetres and 20 millimetres.

[0279] The downstream section may further comprise one or more additional hollow tubular elements.

[0280] In certain embodiments, the downstream section may comprise a hollow tubular support element upstream of the hollow tubular cooling element described above. Preferably, the hollow tubular support element abuts the downstream end of the aerosol-generating rod. Preferably, the hollow tubular support element abuts the upstream end of the hollow tubular cooling element. Preferably, the hollow tubular support element and the hollow tubular cooling element are adjacent to each other and together provide a hollow tubular section within the downstream section.

[0281] The hollow tubular support element may be formed from any suitable material or combination of materials. For example, the support element may be formed from one or more materials selected from the group consisting of: cellulose acetate; cardboard; crimped paper, such as crimped heat resistant paper or crimped parchment paper; and polymeric materials, such as low density polyethylene (LDPE). In a preferred embodiment, the support element is formed from cellulose acetate. Other suitable materials include polyhydroxyalkanoate (PHA) fibres. In a preferred embodiment, the hollow tubular support element comprises a hollow acetate tube.

[0282] The hollow tubular support element preferably has an external diameter that is approximately equal to the external diameter of the aerosol-generating rod and to the external diameter of the aerosol-generating article.

[0283] The hollow tubular support element may have an external diameter of between 5 millimetres and 10 millimetres, for example of between 5.5 millimetres and 9 millimetres or of between 6 millimetres and 8 millimetres. In a preferred embodiment, the hollow tubular support element has an external diameter of less than 7 millimetres.

[0284] The hollow tubular support element may have a wall thickness of at least 1 millimetre, preferably at least 1.5 millimetres, more preferably at least 2 millimetres.

[0285] The hollow tubular support element may have a length of at least 5 millimetres. Preferably, the support element has a length of at least 6 millimetres, more preferably at least 7 millimetres.

[0286] The hollow tubular support element may have a length of less than 15 millimetres. Preferably, the hollow tubular support element has a length of less than 12 millimetres, more preferably less than 10 millimetres.

[0287] In some embodiments, the hollow tubular support element has a length from 5 millimetres to 15 millimetres, preferably from 6 millimetres to 15 millimetres, more preferably from 7 millimetres to 15 millimetres. In other embodiments, the hollow tubular support element has a length from 5 millimetres to 12 millimetres, preferably from 6 millimetres to 12 millimetres, more preferably from 7 millimetres to 12 millimetres. In further embodiments, the support element has a length from 5 millimetres to 10 millimetres, preferably from 6 millimetres to 10 millimetres, more preferably from 7 millimetres to 10 millimetres.

[0288] Alternatively or in addition to the hollow tubular support element, the downstream section may further comprise a downstream hollow tubular element downstream of the hollow tubular cooling element. The downstream hollow tubular element may be provided immediately adjacent to the hollow tubular cooling element. Alternatively and preferably, the downstream hollow tubular element is separated from the hollow tubular cooling element by at least one other component. For example, the downstream section may comprise a downstream filter segment between the hollow tubular cooling element and the downstream hollow tubular element.

[0289] The downstream hollow tubular element preferably extends to the downstream end of the downstream section. The downstream hollow tubular element therefore preferably extends to the downstream end of the aerosol-generating article. Where the downstream hollow tubular element extends to the downstream end of the aerosol-generating article, the downstream hollow tubular element may define a mouth end cavity of the aerosol-generating article.

[0290] In certain embodiments, an additional downstream hollow tubular element may be provided, so that the downstream section comprises two adjacent downstream hollow tubular elements, downstream of the downstream filter segment.

[0291] The RTD of the downstream hollow tubular element may be less than or equal to 10 millimetres H_2O, or less than or equal to 5 millimetres H_2O, or less than or equal to 2.5 millimetres H_2O, or less than or equal to 2 millimetres H_2O. Preferably, the RTD of the downstream hollow tubular element is less than or equal to 1 millimetre H_2O.

[0292] The RTD of the downstream hollow tubular element may be at least 0 millimetres H_2O, or at least 0.25 millimetres H_2O or at least 0.5 millimetres H_2O or at least 1 millimetre H_2O.

[0293] The flow channel of the downstream hollow tubular element should therefore be free from any components that would obstruct the flow of air in a longitudinal direction. Preferably, the flow channel is substantially empty and particularly preferably the flow channel is empty.

[0294] Preferably, the length of the downstream hollow tubular element is at least 3 millimetres, more preferably at least 4 millimetres, more preferably at least 5 millimetres, more preferably at least 6 millimetres.

[0295] The length of the downstream hollow tubular element is preferably less than 20 millimetres, more preferably less than 15 millimetres, more preferably less than 12 millimetres and more preferably less than 10 millimetres.

[0296] The lumen or cavity of the downstream hollow tubular element may have any cross sectional shape. The lumen of the downstream hollow tubular element may have a circular cross sectional shape.

[0297] The downstream hollow tubular element may comprise a paper-based material. The downstream hollow tubular element may comprise at least one layer of paper. The paper may be very rigid paper. The paper may be crimped paper, such as crimped heat resistant paper or crimped parchment paper.

[0298] The downstream hollow tubular element may comprise cardboard. The downstream hollow tubular element may be a cardboard tube.

[0299] The downstream hollow tubular element may be a paper tube. The downstream hollow tubular element may be a tube formed from spirally wound paper. The downstream hollow tubular element may be formed from a plurality of layers of the paper. The paper may have a basis weight of at least 50 grams per square meter, at least 60 grams per square meter, at least 70 grams per square meter, or at least 90 grams per square meter.

[0300] The downstream hollow tubular element may comprise a polymeric material. For example, the downstream hollow tubular element may comprise a polymeric film. The polymeric film may comprise a cellulosic film. The downstream hollow tubular element may comprise low density polyethylene (LDPE) or polyhydroxyalkanoate (PHA) fibres. Preferably, the downstream hollow tubular element comprises cellulose acetate tow. For example, in preferred embodiments, the downstream hollow tubular element comprises a hollow acetate tube.

[0301] Where the downstream hollow tubular element comprises cellulose acetate tow, the cellulose acetate tow may have a denier per filament of between 2 and 4 and a total denier of between 25 and 40.

[0302] Where the downstream section further comprises an additional downstream hollow tubular element, as described above, the additional downstream hollow tubular element may be formed of the same material as the downstream hollow tubular element, or a different material.

[0303] In certain preferred embodiments, the downstream section may comprise a ventilation zone at a location on the downstream hollow tubular element. In one example, this ventilation zone at a location on the downstream hollow tubular element may be provided instead of a ventilation zone at a location on the hollow tubular cooling element. In another example, the ventilation zone at a location on the downstream hollow tubular element may be provided in addition to the ventilation zone provided at a location on the hollow tubular cooling element.

[0304] The ventilation zone at a location along the downstream hollow tubular element may comprise a plurality of perforations through the peripheral wall of the downstream hollow tubular element. Preferably, the ventilation zone at a location along the downstream hollow tubular element comprises at least one circumferential row of perforations. In some embodiments, the ventilation zone may comprise two circumferential rows of perforations. For example, the perforations may be formed online during manufacturing of the aerosol-generating article. Preferably, each circumferential row of perforations comprises from 8 to 30 perforations.

[0305] Aerosol-generating articles according to the present disclosure may further comprise an upstream section located upstream of the aerosol-generating rod. The upstream section is preferably located immediately upstream of the aerosol-generating rod. The upstream section preferably extends between the upstream end of the aerosol-generating article and the aerosol-generating rod. The upstream section may comprise one or more upstream elements located upstream of the aerosol-generating rod.

[0306] The aerosol-generating articles of the present invention preferably comprise an upstream element located upstream of and adjacent to the aerosol-generating rod. The upstream element advantageously prevents direct physical contact with the upstream end of the aerosol-generating rod. Furthermore, the presence of an upstream element helps to prevent any loss of the substrate, which may be advantageous, for example, if the substrate contains particulate plant material.

[0307] Where the upstream segment of the aerosol-generating rod comprises shredded tobacco, such as tobacco cut filler, the upstream section or element thereof may additionally help to prevent the loss of loose particles of tobacco from the upstream end of the article. This may be particularly important when the shredded tobacco has a relatively low density, for example.

[0308] An upstream element may be a porous plug element. Preferably, an upstream element has a porosity of at least 50 percent in the longitudinal direction of the aerosol-generating article. More preferably, an upstream element has a porosity of between 50 percent and 90 percent in the longitudinal direction. The porosity of an upstream element in the longitudinal direction is defined by the ratio of the cross-sectional area of material forming the upstream element and the internal cross-sectional area of the aerosol-generating article at the position of the upstream element.

[0309] An upstream element may be made of a porous material or may comprise a plurality of openings. This may, for example, be achieved through laser perforation. Preferably, the plurality of openings is distributed homogeneously over the cross-section of the upstream element.

[0310] The porosity or permeability of an upstream element may advantageously be designed in order to provide an aerosol-generating article with a particular overall resistance to draw (RTD) without substantially impacting the filtration provided by other portions of the article.

[0311] An upstream element may be formed from a material that is impermeable to air. In such embodiments, the aerosol-generating article may be configured such that air flows into the aerosol-generating rod through suitable ventilation means provided in a wrapper.

[0312] In certain preferred embodiments of the invention, it may be desirable to minimise the RTD of an upstream element. For example, this may be the case for articles that are intended to be inserted the cavity of an aerosol-generating device such that the aerosol-generating substrate is externally heated, as described herein. For such articles, it is desirable to provide the article with as low an RTD as possible, so that the majority of the RTD experience by the consumer is provided by the aerosol-generating device and not the article.

[0313] The RTD of an upstream element may be less than 30 millimetres H_2O, or less than 20 millimetres H_2O, or less than 10 millimetres H_2O, or less than 5 millimetres H_2O, or less than 2 millimetres H_2O.

[0314] The RTD of an upstream element may be at least 0.1 millimetres H_2O, or at least 0.25 millimetres H_2O or at least 0.5 millimetres H_2O.

[0315] Preferably, an upstream element has an RTD of less than 2 millimetres H_2O per millimetre of length, more preferably less than 1.5 millimetres H_2O per millimetre of length, more preferably less than 1 millimetre H_2O per millimetre of length, more preferably less than 0.5 millimetres H_2O per millimetre of length, more preferably less than 0.3 millimetres H_2O per millimetre of length, more preferably less than 0.2 millimetres H_2O per millimetre of length.

[0316] Preferably, the combined RTD of the upstream section, or upstream element thereof, and the aerosol-generating rod is less than 15 millimetres H_2O, more preferably less than 12 millimetres H_2O, more preferably less than 10 millimetres H_2O.

[0317] In certain preferred embodiments, an upstream element is formed of a solid cylindrical plug element having a filled cross-section. Such a plug element may be referred to as a 'plain' element.

[0318] The solid plug element may be porous, as described above, but does not have a tubular form and therefore does not provide a longitudinal flow channel. The solid plug element preferably has a substantially uniform transverse cross section.

[0319] In other preferred embodiments, an upstream element is formed of a hollow tubular segment defining a longitudinal cavity providing an unrestricted flow channel. In such embodiments, an upstream element can provide protection for the aerosol-generating substrate, as described above, whilst having a minimal effect on the overall resistance to draw (RTD) and filtration properties of the article.

[0320] Preferably, the diameter of the longitudinal cavity of the hollow tubular segment forming an upstream element is at least 3 millimetres, more preferably at least 3.5 millimetres, more preferably at least 4 millimetres and more preferably at least 4.5 millimetres. Preferably, the diameter of the longitudinal cavity is maximised in order to minimise the RTD of the upstream section, or upstream element thereof.

[0321] Preferably, the wall thickness of the hollow tubular segment is less than 2 millimetres, more preferably less than 1.5 millimetres and more preferably less than 1 millimetre.

[0322] An upstream element of the upstream section may be made of any material suitable for use in an aerosol-generating article. The upstream element may, for example, be made of a same material as used for one of the other components of the aerosol-generating article, such as the downstream filter segment or the hollow tubular cooling element. Suitable materials for forming the upstream element include filter materials, ceramic, polymer material, cellulose acetate, cardboard, zeolite or aerosol-generating substrate. The upstream element may comprise a plug of cellulose acetate. The upstream element may comprise a hollow acetate tube, or a cardboard tube.

[0323] Preferably, an upstream element is formed of a heat resistant material. For example, preferably an upstream element is formed of a material that resists temperatures of up to 350 degrees Celsius. This ensures that an upstream element is not adversely affected by the heating means for heating the aerosol-generating substrate.

[0324] Preferably, the upstream section, or an upstream element thereof, has an external diameter that is approximately equal to the external diameter of the aerosol-generating article. Preferably, the external diameter of the upstream section, or an upstream element thereof, is between 5 millimetres and 8 millimetres, more preferably between 5.25 millimetres and 7.5 millimetres, more preferably between 5.5 millimetres and 7 millimetres.

[0325] Preferably, the upstream section or an upstream element has a length of between 2 millimetres and 10 millimetres, more preferably between 3 millimetres and 8 millimetres, more preferably between 2 millimetres and 6 millimetres. In a particularly preferred embodiment, the upstream section or an upstream element has a length of 5 millimetres.

[0326] The upstream section is preferably circumscribed by a wrapper, such as a plug wrap. The wrapper circumscribing the upstream section is preferably a stiff plug wrap, for example, a plug wrap having a basis weight of at least 80 grams per square metre (gsm), or at least 100 gsm, or at least 110 gsm. This provides structural rigidity to the upstream section.

[0327] The upstream section is preferably connected to the aerosol-generating rod and optionally at least a part of the downstream section by means of an outer wrapper.

[0328] The aerosol-generating article in accordance with the invention may have an overall length of at least 40 millimetres, or at least 50 millimetres, or at least 60 millimetres.

[0329] An overall length of an aerosol-generating article in accordance with the invention may be less than or equal to 90 millimetres, or less than or equal to 85 millimetres, or less than or equal to 80 millimetres.

[0330] In some embodiments, an overall length of the aerosol-generating article is preferably from 50 millimetres to 90 millimetres, more preferably from 60 millimetres to 90 millimetres, even more preferably from 70 millimetres to 90 millimetres. In other embodiments, an overall length of the aerosol-generating article is preferably from 50 millimetres to 85 millimetres, more preferably from 60 millimetres to 85 millimetres, even more preferably from 70 millimetres to 85 millimetres. In further embodiments, an overall length of the aerosol-generating article is preferably from 50 millimetres to 80 millimetres, more preferably from 60 millimetres to 80 millimetres, even more preferably from 70 millimetres to 80 millimetres. In an exemplary embodiment, an overall length of the aerosol-generating article is 75 millimetres.

[0331] In some embodiments, an overall length of the aerosol-generating article is preferably from 40 millimetres to 70 millimetres, more preferably from 45 millimetres to 70 millimetres. In other embodiments, an overall length of the aerosol-generating article is preferably from 40 millimetres to 60 millimetres, more preferably from about 45 millimetres to about 60 millimetres. In further embodiments, an overall length of the aerosol-generating article is preferably from 40 millimetres to 50 millimetres, more preferably from 45 millimetres to 50 millimetres. In an exemplary embodiment, an overall length of the aerosol-generating article is about 45 millimetres.

[0332] Preferably, the aerosol-generating article has an external diameter of at least about 5 millimetres. More preferably, the aerosol-generating article has an external diameter of at least 5.25 millimetres. Even more preferably, the aerosol-generating article has an external diameter of at least 5.5 millimetres.

[0333] The aerosol-generating article preferably has an external diameter of less than or equal to 8 millimetres. More preferably, the aerosol-generating article has an external diameter of less than or equal to 7.5 millimetres. Even more preferably, the aerosol-generating article has an external diameter of less than or equal to 7 millimetres.

[0334] The aerosol-generating article may have an external diameter of between 5 millimetres and 8 millimetres, or between 5 millimetres and 7.5 millimetres, or between 5 millimetres and 7 millimetres, or between 5.25 millimetres and 8 millimetres, or between 5.25 millimetres and 7.5 millimetres, or between 5.25 millimetres and 7 millimetres, or between 5.5 millimetres and 8 millimetres, or between 5.5 millimetres and 7.5 millimetres, or between 5.5 millimetres and 7 millimetres.

[0335] The external diameter of the aerosol-generating article may be substantially constant over the whole length of the article. As an alternative, different portions of the aerosol-generating article may have different external diameters.

[0336] Preferably, the overall RTD of the aerosol-generating article is at least 10 millimetres H_2O. For example, the overall RTD of the aerosol-generating article may be at least 20 millimetres H_2O, at least 30 millimetres H_2O, at least 35 millimetres H_2O, or at least 40 millimetres H_2O.

[0337] The overall RTD of the aerosol-generating article may be no more than 70 millimetres H_2O. For example, the overall RTD of the aerosol-generating article may be no more than 65 millimetres H_2O, no more than 60 millimetres H_2O, or no more than 55 millimetres H_2O, or no more than 50 millimetres H_2O.

[0338] The overall RTD of the aerosol-generating article may be between 10 millimetres H_2O and 70 millimetres H_2O. For example, the overall RTD of the aerosol-generating article may be between 20 millimetres H_2O and 65 millimetres H_2O, between 30 millimetres H_2O and 60 millimetres H_2O, between 35 millimetres H_2O and 55 millimetres H_2O, or between 40 millimetres H_2O and 50 millimetres H_2O.

[0339] In particularly preferred embodiments, one or more of the components of the aerosol-generating article are individually circumscribed by their own wrapper.

[0340] In an embodiment, the aerosol-generating rod and the mouthpiece element are individually wrapped. The upstream element, the aerosol-generating rod and the hollow tubular element are then combined together with an outer wrapper. Subsequently, they are combined with the downstream filter element—which has its own wrapper—by means of tipping paper.

[0341] Preferably, at least one of the components of the aerosol-generating article is wrapped in a hydrophobic wrapper.

[0342] The term "hydrophobic" refers to a surface exhibiting water repelling properties. One useful way to determine this is to measure the water contact angle. The "water contact angle" is the angle, conventionally measured through the liquid, where a liquid/vapour interface meets a solid surface. It quantifies the wettability of a solid surface by a liquid via the Young equation. Hydrophobicity or water contact angle may be determined by utilizing TAPPI T558 test method and the result is presented as an interfacial contact angle and reported in "degrees" and can range from near zero to near 180 degrees.

[0343] In preferred embodiments, the hydrophobic wrapper is one including a paper layer having a water contact angle of about 30 degrees or greater, and preferably about 35 degrees or greater, or about 40 degrees or greater, or about 45 degrees or greater.

[0344] By way of example, the paper layer may comprise PVOH (polyvinyl alcohol) or silicon. The PVOH may be applied to the paper layer as a surface coating, or the paper layer may comprise a surface treatment comprising PVOH or silicon.

[0345] According to the second aspect of the present invention, there is provided an aerosol-generating system comprising: an aerosol-generating article according to the first aspect of the invention; and an aerosol-generating device comprising a heating chamber for receiving at least part of the aerosol-generating article and a heater for heating the aerosol-generating rod of the aerosol-generating article when the aerosol-generating article is received within the heating chamber.

[0346] The aerosol-generating device has a distal end and a mouth end. The aerosol-generating device may comprise a body or housing. The body or housing of the aerosol-generating device may define a device cavity for removably receiving the aerosol-generating article at the mouth end of the device.

[0347] The device cavity may be referred to as the heating chamber of the aerosol-generating device. The device cavity may extend between a distal end and a mouth, or proximal, end. The distal end of the device cavity may be a closed end and the mouth, or proximal, end of the device cavity may be an open end. An aerosol-generating article may be inserted into the device cavity, or heating chamber, via the open end of the device cavity. The device cavity may be cylindrical in shape so as to conform to the same shape of an aerosol-generating article.

[0348] The expression "received within" may refer to the fact that a component or element is fully or partially received within another component or element. For example, the expression "aerosol-generating article is received within the device cavity" refers to the aerosol-generating article being fully or partially received within the device cavity of the aerosol-generating article. When the aerosol-generating article is received within the device cavity, the aerosol-generating article may abut the distal end of the device cavity. When the aerosol-generating article is received within the device cavity, the aerosol-generating article may be in substantial proximity to the distal end of the device cavity. The distal end of the device cavity may be defined by an end-wall.

[0349] The length of the device cavity may be between 15 millimetres and 80 millimetres, or between 20 millimetres and 70 millimetres, or between 25 millimetres and 60 millimetres, or between 25 millimetres and 50 millimetres.

[0350] The length of the device cavity (or heating chamber) may be the same as or greater than the length of the aerosol-generating rod. The length of the device cavity may be the same as or greater than the combined length of the upstream section or element and aerosol-generating rod. Preferably, the length of the device cavity is such that at least 75 percent of the length of the aerosol-generating rod is inserted or received within the device cavity, when the aerosol-generating article is received with the aerosol-generating device. More preferably, the length of the device cavity is such that at least 80 percent of the length of the aerosol-generating rod is inserted or received within the device cavity, when the aerosol-generating article is received with the aerosol-generating device. More preferably, the length of the device cavity is such that at least 90 percent of the length of the aerosol-generating rod is inserted or received within the device cavity, when the aerosol-generating article is received with the aerosol-generating device. This maximises the length of the aerosol-generating rod along which the aerosol-generating substrate can be heated during use, thereby optimising the generation of aerosol from the aerosol-generating substrate and reducing tobacco waste.

[0351] The length of the device cavity may be such that the downstream section or a portion thereof is configured to protrude from the device cavity, when the aerosol-generating article received within the device cavity. The length of the device cavity may be such that a portion of the downstream section (such as the hollow tubular cooling element or downstream filter segment) is configured to protrude from the device cavity, when the aerosol-generating article received within the device cavity. The length of the device cavity may be such that a portion of the downstream section (such as the hollow tubular cooling element or downstream filter segment) is configured to be received within the device cavity, when the aerosol-generating article received within the device cavity.

[0352] At least 25 percent of the length of the downstream section may be inserted or received within the device cavity, when the aerosol-generating article is received within the device. At least 30 percent of the length of the downstream section may be inserted or received within the device cavity, when the aerosol-generating article is received within the device.

[0353] A diameter of the device cavity may be between 4 millimetres and 10 millimetres. A diameter of the device cavity may be between 5 millimetres and 9 millimetres. A diameter of the device cavity may be between 6 millimetres and 8 millimetres. A diameter of the device cavity may be between 6 millimetres and 7 millimetres.

[0354] A diameter of the device cavity may be substantially the same as or greater than a diameter of the aerosol-generating article. A diameter of the device cavity may be the same as a diameter of the aerosol-generating article in order to establish a tight fit with the aerosol-generating article.

[0355] The device cavity may be configured to establish a tight fit with an aerosol-generating article received within the device cavity. Tight fit may refer to a snug fit. The aerosol-generating device may comprise a peripheral wall. Such a peripheral wall may define the device cavity, or heating chamber. The peripheral wall defining the device cavity may be configured to engage with an aerosol-generating article received within the device cavity in a tight fit manner, so that there is substantially no gap or empty space between the peripheral wall defining the device cavity and the aerosol-generating article when received within the device.

[0356] Such a tight fit may establish an airtight fit or configuration between the device cavity and an aerosol-generating article received therein.

[0357] With such an airtight configuration, there would be substantially no gap or empty space between the peripheral wall defining the device cavity and the aerosol-generating article for air to flow through.

[0358] The tight fit with an aerosol-generating article may be established along the entire length of the device cavity or along a portion of the length of the device cavity.

[0359] The aerosol-generating device may comprise an air-flow channel extending between a channel inlet and a channel outlet. The air-flow channel may be configured to establish a fluid communication between the interior of the device cavity and the exterior of the aerosol-generating device. The air-flow channel of the aerosol-generating device may be defined within the housing of the aerosol-generating device to enable fluid communication between the interior of the device cavity and the exterior of the aerosol-generating device. When an aerosol-generating article is received within the device cavity, the air-flow channel may be configured to provide air flow into the article in order to deliver generated aerosol to a user drawing from the mouth end of the article.

[0360] The air-flow channel of the aerosol-generating device may be defined within, or by, the peripheral wall of the housing of the aerosol-generating device. In other words, the air-flow channel of the aerosol-generating device may be defined within the thickness of the peripheral wall or by the inner surface of the peripheral wall, or a combination of both. The air-flow channel may partially be defined by the inner surface of the peripheral wall and may be partially defined within the thickness of the peripheral wall. The inner surface of the peripheral wall defines a peripheral boundary of the device cavity.

[0361] The air-flow channel of the aerosol-generating device may extend from an inlet located at the mouth end, or proximal end, of the aerosol-generating device to an outlet located away from mouth end of the device. The air-flow channel may extend along a direction parallel to the longitudinal axis of the aerosol-generating device.

[0362] The heater may be any suitable type of heater. Preferably, in the present invention, the heater is an external heater.

[0363] Preferably, the heater is located at or about the periphery of the heating chamber.

[0364] Preferably, the heater externally heats the aerosol-generating rod when the aerosol-generating article is received within the aerosol-generating device. Preferably, the heater externally heats one or both of the first aerosol-generating segment and the second aerosol-generating segment. Such an external heater may circumscribe the aerosol-generating article when inserted in or received within the aerosol-generating device.

[0365] In some embodiments, the heater is arranged to heat the outer surface of the aerosol-generating rod.

[0366] In some embodiments, the heater is arranged for insertion into an aerosol-generating substrate when the aerosol-generating substrate is received within the cavity.

[0367] The heater may be positioned within the device cavity, or heating chamber.

[0368] The heater may comprise at least one heating element. The at least one heating element may be any suitable type of heating element. In some embodiments, the device comprises only one heating element. In some embodiments, the device comprises a plurality of heating elements.

[0369] Suitable materials for forming the at least one resistive heating element include but are not limited to: semiconductors such as doped ceramics, electrically 'conductive' ceramics (such as, for example, molybdenum disilicide), carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable metal alloys include stainless steel, nickel-, cobalt-, chromium-, aluminium-titanium-zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal® and iron-manganese-aluminium based alloys.

[0370] In some embodiments, the at least one resistive heating element comprises one or more stamped portions of electrically resistive material, such as stainless steel. Alternatively, the at least one resistive heating element may comprise a heating wire or filament, for example a Ni—Cr (Nickel-Chromium), platinum, tungsten or alloy wire.

[0371] In some embodiments, the at least one heating element comprises an electrically insulating substrate, wherein the at least one resistive heating element is provided on the electrically insulating substrate.

[0372] The electrically insulating substrate may comprise any suitable material. For example, the electrically insulating substrate may comprise one or more of: paper, glass, ceramic, anodized metal, coated metal, and Polyimide. The ceramic may comprise mica, Alumina (Al_2O_3) or Zirconia (ZrO_2). Preferably, the electrically insulating substrate has a thermal conductivity of less than or equal to about 40 Watts per metre Kelvin, preferably less than or equal to about 20 Watts per metre Kelvin and ideally less than or equal to about 2 Watts per metre Kelvin.

[0373] The heater may comprise a heating element comprising a rigid electrically insulating substrate with one or more electrically conductive tracks or wire disposed on its surface. The size and shape of the electrically insulating substrate may allow it to be inserted directly into an aerosol-generating substrate. If the electrically insulating substrate is not sufficiently rigid, the heating element may comprise a further reinforcement means. A current may be passed through the one or more electrically conductive tracks to heat the heating element and the aerosol-generating substrate.

[0374] In some embodiments, the heater comprises an inductive heating arrangement. The inductive heating arrangement may comprise an inductor coil and a power supply configured to provide high frequency oscillating current to the inductor coil. As used herein, a high frequency oscillating current means an oscillating current having a frequency of between about 500 KHz and about 30 MHz. The heater may advantageously comprise a DC/AC inverter for converting a DC current supplied by a DC power supply to the alternating current. The inductor coil may be arranged to generate a high frequency oscillating electromagnetic field on receiving a high frequency oscillating current from the power supply. The inductor coil may be arranged to generate a high frequency oscillating electromagnetic field in the device cavity. In some embodiments, the inductor coil may substantially circumscribe the device cavity. The inductor coil may extend at least partially along the length of the device cavity.

[0375] The heater may comprise an inductive heating element. The inductive heating element may be a susceptor element. A susceptor element may be arranged such that, when the aerosol-generating article is received in the cavity of the aerosol-generating device, the oscillating electromagnetic field generated by the inductor coil induces a current in the susceptor element, causing the susceptor element to heat up. In these embodiments, the aerosol-generating device is preferably capable of generating a fluctuating electromagnetic field having a magnetic field strength (H-field strength) of between 1 and 5 kilo amperes per metre (kA m), preferably between 2 and 3 kA/m, for example about 2.5 kA/m. The electrically-operated aerosol-generating device is preferably capable of generating a fluctuating electromagnetic field having a frequency of between 1 and 30 MHz, for example between 1 and 10 MHz, for example between 5 and 7 MHz.

[0376] In these embodiments, the susceptor element is preferably located in contact with the aerosol-generating substrate. In some embodiments, a susceptor element is located in the aerosol-generating device. In these embodiments, the susceptor element may be located in the cavity. The aerosol-generating device may comprise only one susceptor element. The aerosol-generating device may comprise a plurality of susceptor elements. In some embodiments, the susceptor element is preferably arranged to heat the outer surface of the aerosol-generating substrate.

[0377] The susceptor element may comprise any suitable material, as described above in relation to a susceptor element incorporated within the aerosol-generating rod.

[0378] In some embodiments the aerosol-generating device may comprise at least one resistive heating element and at least one inductive heating element. In some embodiments the aerosol-generating device may comprise a combination of resistive heating elements and inductive heating elements.

[0379] During use, the heater may be controlled to operate within a defined operating temperature range, below a maximum operating temperature. An operating temperature range between about 150 degrees Celsius and about 300 degrees Celsius in the heating chamber (or device cavity) is preferable. The operating temperature range of the heater may be between about 150 degrees Celsius and about 250 degrees Celsius.

[0380] The aerosol-generating device may comprise a power supply. The power supply may be a DC power supply. In some embodiments, the power supply is a battery. The power supply may be a nickel-metal hydride battery, a nickel cadmium battery, or a lithium based battery, for example a lithium-cobalt, a lithium-iron-phosphate or a lithium-polymer battery. However, in some embodiments the power supply may be another form of charge storage device, such as a capacitor. The power supply may require recharging and may have a capacity that allows for the storage of enough energy for one or more user operations, for example one or more aerosol-generating experiences.

[0381] Below there is provided a non-exhaustive list of non-limiting examples. Any one or more of the features of these examples may be combined with any one or more features of another example, embodiment, or aspect described herein.

[0382] EX1. An aerosol-generating article comprising: an aerosol-generating rod for producing an inhalable aerosol upon heating, the aerosol-generating rod comprising: a first aerosol-generating segment comprising a first aerosol-generating substrate and a second aerosol-generating segment comprising a second aerosol-generating substrate.

[0383] EX2. An aerosol-generating article according to EX1, wherein the second aerosol-generating segment is located upstream of the first aerosol-generating segment.

[0384] EX3. An aerosol-generating article according to EX1 or EX2, wherein the first aerosol-generating substrate and the second aerosol-generating substrate are aligned in an butting end-to-end relationship.

[0385] EX4. An aerosol-generating article according to any one of EX1 to EX3, wherein the aerosol-generating article has a ventilation level of at least 40 percent.

[0386] EX5. An aerosol-generating article according to any one of EX1 to EX4, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres.

[0387] EX6. An aerosol-generating article according to any one of EX1 to EX5, wherein the total combined length of the first aerosol-generating segment and the second aerosol-generating segment is less than 50 millimetres.

[0388] EX7. An aerosol-generating article according to any one of EX1 to EX6, wherein the length of the second aerosol-generating segment is within 2 millimetres of the length of the first aerosol-generating segment.

[0389] EX8. An aerosol-generating article according to any one of EX1 to EX7, wherein the length of the second aerosol-generating segment is within 10 percent of the length of the first aerosol-generating segment.

[0390] EX9. An aerosol-generating article according to any one of EX1 to EX8, wherein the length of the second aerosol-generating segment is approximately equal to the length of the first aerosol-generating segment.

[0391] EX10. An aerosol-generating article according to any one of EX1 to EX8, wherein the length of the second aerosol-generating segment is greater than the length of the first aerosol-generating segment.

[0392] EX11. An aerosol-generating article according to any one of EX1 to EX6 and EX10, wherein the length of the second aerosol-generating segment is at least 3 millimetres greater than the length of the first aerosol-generating segment.

[0393] EX12. An aerosol-generating article according to any one of EX1 to EX6 and EX10 to EX11, wherein the ratio of the length of the first aerosol-generating segment to the length of the second aerosol-generating segment is no more than 1.

[0394] EX13. An aerosol-generating article according to any one of EX1 to EX8, wherein the length of the first aerosol-generating segment is greater than the length of the second aerosol-generating segment.

[0395] EX14. An aerosol-generating article according to any one of EX1 to EX6 and EX13, wherein the length of the first aerosol-generating segment is at least 3 millimetres greater than the length of the second aerosol-generating segment.

[0396] EX15. An aerosol-generating article according to any one of EX1 to EX6 and EX13 to EX14, wherein the ratio of the length of the second aerosol-generating segment to the length of the first aerosol-generating segment is no more than 1.

[0397] EX16. An aerosol-generating article according to any one of EX1 to EX15 wherein the first aerosol-generating segment has a length of at least 10 millimetres.

[0398] EX17. An aerosol-generating article according to any one of EX1 to EX16 wherein the first aerosol-generating segment has a length of less than or equal to 25 millimetres.

[0399] EX18. An aerosol-generating article according to any one of EX1 to EX17 wherein the second aerosol-generating segment has a length of at least 10 millimetres.

[0400] EX19. An aerosol-generating article according to any one of EX1 to EX18 wherein the second aerosol-generating segment has a length of less than or equal to 25 millimetres.

[0401] EX20. An aerosol-generating article according to any one of EX1 to EX19, wherein the aerosol-generating rod has a length of at least 20 millimetres.

[0402] EX21. An aerosol-generating article according to any one of EX1 to EX20, wherein the aerosol-generating rod has a length of less than or equal to 50 millimetres.

[0403] EX22. An aerosol-generating article according to any one of EX1 to EX21, wherein a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.20.

[0404] EX23. An aerosol-generating article according to any one of EX1 to EX22, wherein a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.60.

[0405] EX24. An aerosol-generating article according to any one of EX1 to EX23, wherein a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.10.

[0406] EX25. An aerosol-generating article according to any one of EX1 to EX24, wherein a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.30.

[0407] EX26. An aerosol-generating article according to any one of EX1 to EX25, wherein a ratio of the length of the second aerosol-generating segment to the overall length of the aerosol-generating article is at least 0.10.

[0408] EX27. An aerosol-generating article according to any one of EX1 to EX26, wherein a ratio of the length of the first aerosol-generating segment to the overall length of the aerosol-generating article is less than or equal to 0.30.

[0409] EX28. An aerosol-generating article according to any one of EX1 to EX27, wherein a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is at least 0.20.

[0410] EX29. An aerosol-generating article according to any one of EX1 to EX28, wherein a ratio between the length of the aerosol-generating rod and an overall length of the aerosol-generating article is less than or equal to 0.6.

[0411] EX30. An aerosol-generating article according to any one of EX1 to EX29, wherein the density of the second aerosol-generating substrate is within 50 mg per cubic centimetre of the density of the first aerosol-generating substrate.

[0412] EX31. An aerosol-generating article according to any one of EX1 to EX30, wherein the density of the second aerosol-generating substrate is within 10 percent of the density of the first aerosol-generating substrate.

[0413] EX32. An aerosol-generating article according to any one of EX1 to EX31, wherein the density of the second aerosol-generating substrate is approximately equal to the density of the first aerosol-generating substrate.

[0414] EX33. An aerosol-generating article according to any one of EX1 to EX31, wherein the density of the second aerosol-generating substrate is greater than the density of the first aerosol-generating substrate.

[0415] EX34. An aerosol-generating article according to any one of EX1 to EX28 and EX33, wherein the density of the second aerosol-generating substrate is at least 100 mg per cubic centimetre higher than the density of the first aerosol-generating substrate.

[0416] EX35. An aerosol-generating article according to any one of EX1 to EX28 and EX33 to EX34, wherein the density of the second aerosol-generating substrate is at least 1.2 times the density of the first aerosol-generating substrate.

[0417] EX36. An aerosol-generating article according to any one of EX1 to EX31, wherein the density of the first aerosol-generating substrate is greater than the density of the second aerosol-generating substrate.

[0418] EX37. An aerosol-generating article according to any one of EX1 to EX28 and EX36, wherein the density of the first aerosol-generating substrate is at least 100 mg per cubic centimetre higher than the density of the second aerosol-generating substrate.

[0419] EX38. An aerosol-generating article according to any one of EX1 to EX28 and EX36 to EX37, wherein the density of the first aerosol-generating substrate is at least 1.2 times the density of the second aerosol-generating substrate.

[0420] EX39. An aerosol-generating article according to any one of EX1 to EX38, wherein the density of the first aerosol-generating substrate is at least 100 mg per cubic centimetre.

[0421] EX40. An aerosol-generating article according to any one of EX1 to EX39, wherein the density of the first aerosol-generating substrate is less than or equal to 500 mg per cubic centimetre.

[0422] EX41. An aerosol-generating article according to any one of EX1 to EX40, wherein the density of the second aerosol-generating substrate is at least 100 mg per cubic centimetre.

[0423] EX42. An aerosol-generating article according to any one of EX1 to EX41, wherein the density of the second aerosol-generating substrate is less than or equal to 500 mg per cubic centimetre.

[0424] EX43. An aerosol-generating article according to any one of EX1 to EX42, wherein the first aerosol-generating substrate has substantially the same composition as the second aerosol-generating substrate.

[0425] EX44. An aerosol-generating article according to any one of EX1 to EX43, wherein the first aerosol-generating substrate comprises one or more aerosol formers.

[0426] EX45. An aerosol-generating article according to any one of EX1 to EX44, wherein the second aerosol-generating substrate comprises one or more aerosol formers.

[0427] EX46. An aerosol-generating article according to any one of EX1 to EX45, wherein the aerosol former content of the second aerosol-generating substrate is within 3 percentage points of the aerosol former content of the first aerosol-generating substrate.

[0428] EX47. An aerosol-generating article according to any one of EX1 to EX46, wherein the aerosol former content of the second aerosol-generating substrate is within 10 percent of the aerosol former content of the first aerosol-generating substrate.

[0429] EX48. An aerosol-generating article according to any one of EX1 to EX47, wherein the aerosol former content of the first aerosol-generating substrate is approximately equal to the aerosol former content of the second aerosol-generating substrate.

[0430] EX49. An aerosol-generating article according to any one of EX1 to EX47, wherein the aerosol former content of the second aerosol-generating substrate is greater than the aerosol former content of the first aerosol-generating substrate, on a dry weight basis.

[0431] EX50. An aerosol-generating article according to any one of EX1 to EX45 and EX49, wherein the aerosol former content of the second aerosol-generating substrate is at least 15 percentage points higher than the aerosol former content of the first aerosol-generating substrate.

[0432] EX51. An aerosol-generating article according to any one of EX1 to EX45 and EX49 to EX50, wherein the aerosol former content of the second aerosol-generating substrate is at least 1.2 times the aerosol former content of the first aerosol-generating substrate.

[0433] EX52. An aerosol-generating article according to any one of EX1 to EX47, wherein the aerosol former content of the first aerosol-generating substrate is greater than the aerosol former content of the second aerosol-generating substrate, on a dry weight basis.

[0434] EX53. An aerosol-generating article according to any one of EX1 to EX47 and EX52, wherein the aerosol former content of the first aerosol-generating substrate is at least 15 percentage points higher than the aerosol former content of the second aerosol-generating substrate.

[0435] EX54. An aerosol-generating article according to any one of EX1 to EX47 and EX52 to EX53, wherein the aerosol former content of the first aerosol-generating substrate is at least 1.2 times the aerosol former content of the second aerosol-generating substrate.

[0436] EX55. An aerosol-generating article according to any one of EX1 to EX54, wherein the first aerosol-generating substrate comprises at least 5 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate.

[0437] EX56. An aerosol-generating article according to any one of EX1 to EX55, wherein the first aerosol-generating substrate comprises less than or equal to 80 percent by weight of aerosol former on a dry weight basis of the first aerosol-generating substrate.

[0438] EX57. An aerosol-generating article according to any one of EX1 to EX56, wherein the second aerosol-generating substrate comprises at least 5 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate.

[0439] EX58. An aerosol-generating article according to any one of EX1 to EX57, wherein the second aerosol-generating substrate comprises less than or equal to 80 percent by weight of aerosol former on a dry weight basis of the second aerosol-generating substrate.

[0440] EX59. An aerosol-generating article according to any one of EX1 to EX58, wherein one or both of the first aerosol-generating substrate and the second aerosol-generating substrate comprises shredded tobacco material.

[0441] EX60. An aerosol-generating article according to any one of EX1 to EX59, wherein one or both of the first aerosol-generating substrate and the second aerosol-generating substrate comprises tobacco cut filler.

[0442] EX61. An aerosol-generating article according to any one of EX1 to EX60, wherein one or both of the first aerosol-generating substrate and the second aerosol-generating substrate comprises a shredded sheet of homogenised tobacco material.

[0443] EX62. An aerosol-generating article according to any one of EX1 to EX61, wherein the first aerosol-generating substrate and the second aerosol-generating substrate are formed of the same type of material.

[0444] EX63. An aerosol-generating article according to any one of EX1 to EX62, further comprising one or more elongate susceptor elements within the aerosol-generating rod.

[0445] EX64. An aerosol-generating article according to any one of EX1 to EX65, wherein the first aerosol-generating substrate is circumscribed by a first wrapper and wherein the second aerosol-generating substrate is circumscribed by a second wrapper, separate from the first wrapper.

[0446] EX65. An aerosol-generating article according to any one of EX1 to EX64, further comprising a downstream section located downstream of the aerosol-generating rod.

[0447] EX66. An aerosol-generating article according EX65, wherein the downstream section extends to the downstream end of the aerosol-generating article.

[0448] EX67. An aerosol-generating article according EX65 or EX66, wherein the downstream section comprises a hollow tubular cooling element.

[0449] EX68. An aerosol-generating article according to EX67, wherein the hollow tubular cooling element has a length of at least 15 millimetres.

[0450] EX69. An aerosol-generating article according to any one of EX65 to EX68, wherein the downstream section comprises a ventilation zone.

[0451] EX70. An aerosol-generating article according to any one of EX67 to EX69, wherein the ventilation zone is at a location along the hollow tubular cooling element.

[0452] EX71. An aerosol-generating article according to any one of EX1 to EX70, wherein the aerosol-generating article has a ventilation level of less than or equal to 90 percent.

[0453] EX72. An aerosol-generating article according to any one of EX66 to EX71, wherein the downstream section comprises a downstream filter segment.

[0454] EX73. An aerosol-generating article according to EX72, wherein the downstream filter segment is a solid plug.

[0455] EX74. An aerosol-generating article according to EX72 or EX73, wherein the downstream filter segment has a length of at least 5 millimetres.

[0456] EX75. An aerosol-generating article according to any of one of EX66 to EX74, wherein the downstream section further comprises a hollow tubular support element upstream of a hollow tubular cooling element.

[0457] EX76. An aerosol-generating article according to any one of EX66 to EX75, wherein the aerosol-generating article comprises a mouth end cavity.

[0458] EX76. An aerosol-generating article according to any one of EX66 to EX75, wherein the downstream section further comprises a downstream hollow tubular element downstream of a hollow tubular cooling element.

[0459] EX77. An aerosol-generating article according to any one of EX1 to EX76, further comprising an upstream element provided upstream of the aerosol-generating rod.

[0460] EX78. An aerosol-generating article according to any one of EX1 to EX77, wherein the aerosol-generating article has an overall length of between 70 millimetres and 80 millimetres.

[0461] EX79. An aerosol-generating article according to any of examples EX1 to EX **77**, wherein the aerosol-generating article has an overall length of between 40 millimetres and 50 millimetres.

[0462] EX80. An aerosol-generating system comprising an aerosol-generating article according to any one of EX1 to EX79 and an aerosol-generating device comprising a heating chamber for receiving at least part of the aerosol-generating article and a heater for heating the aerosol-generating rod of the aerosol-generating article when the aerosol-generating article is received within the heating chamber.

[0463] In the following, the invention will be further described with reference to the drawings of the accompanying Figures, wherein:

[0464] FIG. **1** shows a schematic side perspective view of an aerosol-generating article in accordance with a first embodiment of the first aspect of the invention;

[0465] FIG. **2** shows a schematic side sectional view of the aerosol-generating article of FIG. **1**;

[0466] FIG. **3** shows a schematic side sectional view of an aerosol-generating system in accordance with a first embodiment of the second aspect of the invention comprising the aerosol-generating article shown in FIGS. **1** and **2** and an aerosol-generating device;

[0467] FIG. **4** shows a schematic side sectional view of an aerosol-generating article in accordance with a second embodiment of the first aspect of the invention; and

[0468] FIG. **5** shows a schematic side sectional view of an aerosol-generating article in accordance with a third embodiment of the first aspect of the invention.

[0469] The aerosol-generating article **10** shown in FIG. **1** comprises an aerosol-generating rod **12** and a downstream section **14** at a location downstream of the rod **12**. Thus, the aerosol-generating article **10** extends from an upstream or distal end **16**—which substantially coincides with an upstream end of the rod **12**—to a downstream or mouth end **18**, which coincides with a downstream end of the downstream section **14**. The downstream section **14** comprises a hollow tubular cooling element **20**, a downstream filter segment **50** and a downstream hollow tubular element **260**.

[0470] The aerosol-generating article **10** has an overall length of about 75 millimetres and an external diameter of about 6.7 mm.

[0471] The aerosol-generating rod **12** comprises a first aerosol-generating segment **24** and a second aerosol-generating segment **26**, coaxially aligned with each other. The second aerosol-generating article **26** is provided upstream of the first aerosol-generating segment **24**, abutting the upstream end of the first aerosol-generating segment **24**.

[0472] The first aerosol-generating segment **24** has a length of about 17 millimetres and comprises a first aerosol-generating substrate formed of shredded tobacco material comprising about 15 percent by weight of glycerol. The density of the first aerosol-generating substrate **24** is about 290 mg per cubic centimetre. The first aerosol-generating segment **24** is individually wrapped by a plug wrap (not shown).

[0473] The second aerosol-generating segment **26** has substantially the same dimensions and composition as the first aerosol-generating segment **24**. The second aerosol-generating segment **26** has a length of about 17 millimetres and comprises a second aerosol-generating substrate formed of shredded tobacco material comprising about 15 percent by weight of glycerol. The density of the second aerosol-generating substrate **26** is about 290 mg per cubic centimetre. The second aerosol-generating segment **26** is individually wrapped by a plug wrap (not shown).

[0474] The overall length of the aerosol-generating rod **12** is about 34 millimetres. The overall length of the downstream section **14** is about 41 millimetres.

[0475] The hollow tubular cooling element **20** of the downstream section **14** is located immediately downstream of the aerosol-generating rod **12**, the hollow tubular cooling element **20** being in longitudinal alignment with the rod **12**. The upstream end of the hollow tubular cooling element **20** abuts the downstream end of the rod **12**.

[0476] The hollow tubular cooling element **20** defines a hollow section of the aerosol-generating article **10**. The hollow tubular cooling element **20** does not substantially contribute to the overall RTD of the aerosol-generating article. In more detail, an RTD of the hollow tubular cooling element **20** is about 0 mm H_2O.

[0477] As shown in FIG. **2**, the hollow tubular cooling element **20** is provided in the form of a hollow cylindrical tube made of cardboard. The hollow tubular cooling element **20** defines an internal cavity **22** that extends all the way from an upstream end of the hollow tubular cooling element **20** to a downstream end of the hollow tubular cooling element **20**. The internal cavity **22** is substantially empty, and so substantially unrestricted airflow is enabled along the internal cavity **22**.

[0478] The hollow tubular cooling element **20** has a length of about 25 millimetres, an external diameter of about 6.7 millimetres.

[0479] The aerosol-generating article **10** comprises a ventilation zone **30** provided at a location along the hollow tubular cooling element **20**. The ventilation zone **30** comprises a circumferential row of openings or perforations circumscribing the hollow tubular cooling element **20**. The perforations of the ventilation zone **30** extend through the wall of the hollow tubular cooling element **20**, in order to allow fluid ingress into the internal cavity **22** from the exterior of the article **10**. A ventilation level of the aerosol-generating article **10** is about 75 percent.

[0480] The downstream filter segment **50** is located immediate downstream of the hollow tubular cooling element **20**, the downstream filter segment **50** being in longitudinal alignment with the hollow tubular cooling element **20**. The upstream end of the downstream filter segment **50** abuts the downstream end of the hollow tubular cooling element **20**.

[0481] The downstream filter segment **50** comprises a cylindrical plug of cellulose acetate tow. The length of the downstream filter segment **50** is about 10 millimetres.

[0482] The downstream hollow tubular element **60** is provided in the form of a hollow cylindrical tube made of cellulose acetate. The downstream hollow tubular element **60** defines an internal cavity that extends all the way from an upstream end of the downstream hollow tubular cooling element **20** to a downstream end of the downstream hollow tubular element **60** and thus the downstream end of the aerosol-generating article **10**. The internal cavity of the downstream hollow tubular element **60** may also be referred to as the mouth end cavity. The internal cavity is substantially empty, and so substantially unrestricted airflow is enabled along the internal cavity. The downstream hollow tubular element **260** does not substantially contribute to the overall RTD of the aerosol-generating article **10**. The length of the downstream hollow tubular element **60** is about 6 millimetres.

[0483] As shown in FIGS. **1** & **2**, the article **10** comprises an upstream wrapper **44** circumscribing the aerosol-generating rod **12** and the hollow tubular cooling element **20**. The ventilation zone **30** may also comprise a circumferential row of perforations provided on the upstream wrapper **44**. The perforations of the upstream wrapper **44** overlap the perforations provided on the hollow tubular cooling element **20**. Accordingly, the upstream wrapper **44** overlies the perforations of the ventilation zone **30** provided on the hollow tubular cooling element **20**.

[0484] The article **10** also comprises a tipping wrapper **52** circumscribing the hollow tubular cooling element **20**, the mouthpiece element **50** and the downstream hollow tubular element **60**. The tipping wrapper **52** overlies the portion of the upstream wrapper **44** that overlies the hollow tubular cooling element **20**. This way the tipping wrapper **52** effectively joins the mouthpiece element **50** and the downstream hollow tubular element **60** to the rest of the components of the article **10**. Additionally, the ventilation zone **30** may comprise a circumferential row of perforations provided on the tipping wrapper **52**. The perforations of the tipping wrapper **52** may overlap the perforations provided on the hollow tubular cooling element **20** and the upstream wrapper **44**. Accordingly, the tipping wrapper **52** may overlie the perforations of the ventilation zone **30** provided on the hollow tubular cooling element **20** and the upstream wrapper **44**.

[0485] FIG. **3** shows an aerosol-generating system **100** comprising an exemplary aerosol-generating device **1** and the aerosol-generating article **10** shown in FIGS. **1** and **2**.

[0486] FIG. **3** illustrates a downstream, mouth end portion of the aerosol-generating device **1** where the device cavity is defined and the aerosol-generating article **10** can be received. The aerosol-generating device **1** comprises a housing (or body) **4**, extending between a mouth end **2** and a distal end (not shown). The housing **4** comprises a peripheral wall **6**. The peripheral wall **6** defines a device cavity for receiving an aerosol-generating article **10**. The device cavity is defined by a closed, distal end and an open, mouth end. The mouth end of the device cavity is located at the mouth end of the aerosol-generating device **1**. The aerosol-generating article **10** is configured to be received through the mouth end of the device cavity and is configured to abut a closed end of the device cavity.

[0487] A device air flow channel **5** is defined within the peripheral wall **6**. The air-flow channel **5** extends between an inlet **7** located at the mouth end of the aerosol-generating device **1** and the closed end of the device cavity. Air may enter the aerosol-generating rod **12** of the aerosol-generating article **10** via an aperture (not shown) provided at the closed end of the device cavity, ensuring fluid communication between the air flow channel **5** and the aerosol-generating rod **12**.

[0488] The aerosol-generating device **1** further comprises a heater (not shown) and a power source (not shown) for supplying power to the heater. A controller (not shown) is also provided to control such supply of power to the heater. The heater is configured to controllably heat the aerosol-generating article **10** during use, when the aerosol-generating article **1** is received within the device **1**. The heater is preferably arranged to externally heat the aerosol-generating rod **12** for optimal aerosol generation. The ventilation zone **30** is arranged to be exposed when the aerosol-generating article **10** is received within the aerosol-generating device **1**.

[0489] In the embodiment shown in FIG. **3**, the device cavity defined by the peripheral wall **6** is about 40 millimetres in length. When the article **10** is received within the device cavity, the aerosol-generating rod **12** and an upstream portion of the hollow tubular cooling element **20** are received within the device cavity. Such an upstream portion of the hollow tubular cooling element **20** is 6 millimetres in length. Accordingly, about 40 millimetres of the article **10** is received within the device **1** and about 35 millimetres of the article **10** is located outside of the device **1**. In other words, about 35 millimetres of the article **10** protrudes from the device **1** when the article **10** is received therein. Such a length of the article **10** protruding from the device **1** is shown in FIG. **3**.

[0490] FIG. **4** shows a second embodiment of the first aspect of the present invention. The aerosol-generating article **110** shown in FIG. **4** has a similar structure to the aerosol-generating article **10** shown in FIGS. **1** and **2** and differs only in the lengths of the second aerosol-generating substrate **126** and the first aerosol-generating substrate **124**.

[0491] The second aerosol-generating substrate **126** is longer than the second aerosol-generating substrate **124**. The second aerosol-generating substrate **126** has a length of about 22 millimetres The first aerosol-generating substrate has a length of about 12 millimetres

[0492] The overall length of the aerosol-generating rod **112** of the aerosol-generating article **110** shown in FIG. **4** is the same as the overall length of the aerosol-generating rod **12** of the aerosol-generating article **10** shown in FIGS. **1** and **2**.

[0493] FIG. **5** shows a third embodiment of the first aspect of the present invention. The aerosol-generating article **210** shown in FIG. **5** comprises an aerosol-generating rod **212**, a downstream section **214** at a location downstream of the aerosol-generating rod **212**, and an upstream section **215** at a location upstream of the aerosol-generating rod **212**. Thus, the aerosol-generating article **210** extends from an upstream or distal end **216**—which substantially coincides with an upstream end of the upstream section **215**—to a downstream or mouth end **218**, which coincides with a downstream end of the downstream section **214**. The downstream section **214** comprises a hollow tubular cooling element **220** and a downstream filter segment **250**.

[0494] The aerosol-generating article **210** has an overall length of about 45 millimetres and an external diameter of about 7.2 mm.

[0495] The aerosol-generating rod **212** comprises a first aerosol-generating segment **24** and a second aerosol-generating segment **226**, coaxially aligned with each other. The second aerosol-generating article **226** is provided upstream of the first aerosol-generating segment **224**, abutting the upstream end of the first aerosol-generating segment **224**.

[0496] The first aerosol-generating segment **24** has a length of about 10 millimetres and comprises a first aerosol-generating substrate formed of shredded tobacco material comprising between 10 percent by weight and 20 percent by weight of glycerol. The density of the first aerosol-generating substrate **224** is about 300 mg per cubic centimetre. The first aerosol-generating segment **224** is individually wrapped by a plug wrap (not shown).

[0497] The second aerosol-generating segment **226** has substantially the same dimensions and composition as the first aerosol-generating segment **224**. The second aerosol-generating segment **26** has a length of about 10 millimetres and comprises a second aerosol-generating substrate formed of shredded tobacco material comprising between 10 percent by weight and 20 percent by weight of glycerol. The density of the second aerosol-generating substrate **26** is about 300 mg per cubic centimetre. The second aerosol-generating segment **26** is individually wrapped by a plug wrap (not shown).

[0498] The overall length of the aerosol-generating rod **212** is about 20 millimetres. The overall length of the downstream section **214** is about 20 millimetres. The overall length of the upstream section **215** is about 5 millimetres.

[0499] The hollow tubular cooling element **220** of the downstream section **14** is located immediately downstream of the aerosol-generating rod **12**, the hollow tubular cooling element **220** being in longitudinal alignment with the rod **212**. The upstream end of the hollow tubular cooling element **20** abuts the downstream end of the rod **212**.

[0500] The hollow tubular cooling element **220** defines a hollow section of the aerosol-generating article **210**. The hollow tubular cooling element **220** does not substantially contribute to the overall RTD of the aerosol-generating article. In more detail, an RTD of the hollow tubular cooling element **220** is about 0 mm H_2O.

[0501] As shown in FIG. **5**, the hollow tubular cooling element **220** is provided in the form of a hollow cylindrical tube made of cardboard. The hollow tubular cooling element **220** defines an internal cavity **222** that extends all the way from an upstream end of the hollow tubular cooling element **20** to a downstream end of the hollow tubular cooling element **220**. The internal cavity **222** is substantially empty, and so substantially unrestricted airflow is enabled along the internal cavity **222**.

[0502] The hollow tubular cooling element **220** has a length of about 13 millimetres, an external diameter of about 7.2 millimetres, and an internal diameter of about 6.7 millimetres. Thus a thickness of a peripheral wall of the hollow tubular element **220** is about 0.25 millimetres.

[0503] The aerosol-generating article **210** comprises a ventilation zone **230** provided at a location along the hollow tubular cooling element **220**. The ventilation zone **230** comprises a circumferential row of openings or perforations circumscribing the hollow tubular cooling element **220**. The perforations of the ventilation zone **230** extend through the wall of the hollow tubular cooling element **220**, in order to allow fluid ingress into the internal cavity **222** from the exterior of the article **210**. A ventilation level of the aerosol-generating article **210** is about 40 percent.

[0504] The downstream filter segment **250** is located immediate downstream of the hollow tubular cooling element **220**, the downstream filter segment **250** being in longitudinal alignment with the hollow tubular cooling element **220**. The upstream end of the downstream filter segment **250** abuts the downstream end of the hollow tubular cooling element **20**. The downstream end **218** of the aerosol-generating article **210** coincides with a downstream end of the downstream filter segment **250**.

[0505] The downstream filter segment **250** comprises a cylindrical plug of cellulose acetate tow. The length of the downstream filter segment **250** is about 7 millimetres.

[0506] The upstream section **215** comprises an upstream element **270** located immediately upstream of the aerosol-generating rod **212**, the upstream element **270** being in longitudinal alignment with the rod **212**. The downstream end the upstream element **242** abuts the upstream end of the aerosol-generating rod **212**. The upstream end **216** of the aerosol-generating article **210** coincides with an upstream end of the upstream element **270**. The upstream element **270** may be provided in the form of a cylindrical plug of cellulose acetate tow or in the form of a hollow cylindrical plug of cellulose acetate tow having a wall thickness of about 1 millimetre. The upstream element **270** has a length of about 5 millimetres.

[0507] As shown in FIG. **5**, the article **210** comprises an upstream wrapper **244** circumscribing the upstream element **270**, the aerosol-generating rod **212** and the hollow tubular cooling element **220**. The ventilation zone **230** may also comprise a circumferential row of perforations provided on the upstream wrapper **244**. The perforations of the upstream wrapper **244** overlap the perforations provided on the hollow tubular cooling element **220**. Accordingly, the upstream wrapper **244** overlies the perforations of the ventilation zone **230** provided on the hollow tubular cooling element **220**.

[0508] The article **210** also comprises a tipping wrapper **252** circumscribing the hollow tubular cooling element **220** and the mouthpiece element **250**. The tipping wrapper **252** overlies the portion of the upstream wrapper **244** that overlies the hollow tubular cooling element **220**. This way the tipping wrapper **252** effectively joins the mouthpiece element **250** to the rest of the components of the article **210**. Additionally, the ventilation zone **230** may comprise a circumferential row of perforations provided on the tipping wrapper **252**. The perforations of the tipping wrapper **252** may overlap the perforations provided on the hollow tubular cooling element **220** and the upstream wrapper **244**. Accordingly, the tipping wrapper **252** may overlie the perforations of the ventilation zone **230** provided on the hollow tubular cooling element **220** and the upstream wrapper **44**.

[0509] The specific embodiments and examples described above illustrate, but do not limit, the invention. It is to be understood that other embodiments of the invention may be made and the specific embodiments and examples described herein are not exhaustive.

1.-**15**. (canceled)

16. An aerosol-generating article, comprising:

an aerosol-generating rod configured to produce an inhalable aerosol upon heating;

a downstream section provided downstream of the aerosol-generating rod and extending to the downstream end of the aerosol-generating article; and

a ventilation zone at a location along the downstream section,

wherein the aerosol-generating rod comprises:

a first aerosol-generating segment comprising a first aerosol-generating substrate, and

a second aerosol-generating segment located upstream of the first aerosol-generating segment and comprising a second aerosol-generating substrate,

wherein a total combined length of the first aerosol-generating segment and the second aerosol-generating segment is at least 20 millimetres,

wherein a ratio of the total combined length of the first aerosol-generating segment and the second aerosol-generating segment to an overall length of the aerosol-generating article is less than or equal to 0.6, and

wherein the aerosol-generating article has a ventilation level of at least 40 percent.

17. The aerosol-generating article according to claim **16**,

wherein the first aerosol-generating substrate comprises one or more aerosol formers and the second aerosol-generating substrate comprises one or more aerosol formers, and

wherein an aerosol former content of the second aerosol-generating substrate is within percent of an aerosol former content of the first aerosol-generating substrate.

18. The aerosol-generating article according to claim **16**, wherein a density of the second aerosol-generating substrate is within 10 percent of a density of the first aerosol-generating substrate.

19. The aerosol-generating article according to claim **16**, wherein a length of the second aerosol-generating segment is within 10 percent of a length of the first aerosol-generating segment.

20. The aerosol-generating article according to claim **16**, wherein the downstream section comprises a hollow tubular cooling element.

21. The aerosol-generating article according to claim **20**, wherein the ventilation zone comprises a plurality of perforations through a peripheral wall of the hollow tubular cooling element.

22. The aerosol-generating article according to claim **20**, wherein the hollow tubular cooling element has a length of at least 15 millimetres.

23. The aerosol-generating article according to claim **20**,

wherein the downstream section comprises a downstream filter segment located downstream of the hollow tubular element, and

wherein the downstream filter segment is a solid plug.

24. The aerosol-generating article according to claim **16**, wherein the aerosol-generating article has a ventilation level of at least 60 percent.

25. The aerosol-generating article according to claim **16**, wherein the aerosol-generating article has an overall length of at least 60 millimetres.

26. The aerosol-generating article according to claim **16**, wherein one or both of the first aerosol-generating substrate and the second aerosol-generating substrate comprises a shredded tobacco material.

27. The aerosol-generating article according to claim **16**, wherein one or both of the first aerosol-generating substrate and the second aerosol-generating substrate has a density of less than 400 milligrams per cubic centimetre.

28. The aerosol-generating article according to claim **16**, wherein each of the first aerosol-generating substrate and the second aerosol-generating substrate comprises at least 5 percent by weight of aerosol former, on a dry weight basis.

29. The aerosol-generating article according to claim **16**,

wherein the first aerosol-generating substrate is circumscribed by a first wrapper, and

wherein the second aerosol-generating substrate is circumscribed by a second wrapper, separate from the first wrapper.

30. An aerosol-generating system, comprising:

an aerosol-generating article according to claim **16**; and

an aerosol-generating device comprising a heating chamber configured to receive at least part of the aerosol-generating article and a heater configured to heat the aerosol-generating rod of the aerosol-generating article when the aerosol-generating article is received within the heating chamber.

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