

Description

The present invention relates to filter cigarettes and to filters for use in such cigarettes.

Cigarette filters of a "coaxial" type, comprising a rod of filter material having a longitudinally extending inner zone and a peripheral outer zone, are already known. Such a filter in which the peripheral zone has a lower resistance to draw (RTD) than the inner zone is described in DE-A-32 46 898. Among the examples in this specification (Table 1) are filters having core diameters of 4.5 and 4.6mm and a tip circumference of 24.61mm, which correspond to inner zones occupying respectively 33 and 35% of the total cross-sectional area of the tip.

DE-A-37 43 597 describes a coaxial cigarette which includes a coaxial filter in which the peripheral zone has a "degree of reduction" (Reduzierungsgrad) of at least 90% while the filter core has a filter efficiency of at most 40%.

It is an object of this invention to provide a filter and a cigarette incorporating the filter, whereby smokers can derive an enhanced subjective impression from cigarettes of reduced tar delivery.

In accordance with this invention a cigarette filter is characterized in that the inner zone is of 60 to 90% filter efficiency and the peripheral outer zone is of 10 to 40% filter efficiency, and that the inner zone occupies from 30 to 60% of the total cross-sectional area of the filter rod.

Although such filters without provision for the admission of ventilating air are contemplated, the advantageous effect is further enhanced by ventilation. The filter rod may have an impermeable peripheral surface layer or be surrounded by a wrapper, which may be of permeable or impermeable material. Moreover, in use the rod will be surrounded by tipping material which serves to secure the filter to a rod of smoking material such as tobacco. To provide ventilation, the tipping material, as well as the filter wrapper or peripheral surface layer where these are present, should have one or more permeable regions which in normal smoking admit air in an amount corresponding to from 10 to 90% and more especially 20 to 80% ventilation.

The cigarette according to the invention comprises a filter as described abutting coaxially and secured to a rod of smoking material, and has a puff count of not less than 6.

The advantages of the invention are particularly striking when the filter is longer in relation to the rod of smoking material than in conventional cigarettes. It is preferred in this case to employ a relatively slow burning tobacco blend in the cigarette.

The filter preferably occupies from 25 to 50% of the total length of the cigarette. Preferred filters are from 27 to 42 mm long.

The preferred tobacco rod has a length between 40 and 60 mm, and provides a cigarette having a puff count of between 6 and 10.

The invention will be further described, by way of example, with reference to the drawings, in which: Figure 1 shows diagrammatically a cigarette according to a preferred embodiment of the invention; and Figure 2 shows a cross section on line II-II of Figure 1.

The cigarette of Figure 1 comprises a wrapped tobacco rod 10 and a filter 12. The filter 12 is attached in conventional manner to the tobacco rod 10 by tipping 14, which is shown partially removed in the figures.

The filter 12 comprises an inner, longitudinally extending, filter zone 16 of high efficiency filter material and a peripheral filter zone 18 of lower efficiency filter material. Both zones extend from the mouth end to the tobacco rod end of the filter 12. The outer peripheral surface of the filter 12 is rendered impervious to air and smoke by a wrapper 20.

Perforations 22 in the wrapper 20 and corresponding perforations 24 in the tipping 14 are provided for admission of ventilating air to the peripheral filter zone 18 during smoking. The specification of the preferred cigarette shown in the drawings is as follows:

Cigarette length	84 mm
Cigarette diameter	7.9 mm

Filter:	
length	33 mm
pressure drop	100 mm H ₂ O
inner zone diameter	5 mm
inner zone composition	Y-section cellulose acetate tow, 3.0 denier per fibre, 35 000 total denier
peripheral zone composition	Y-section cellulose tow, 5.5 denier per fibre, 22 000 total denier.
ventilation level	45%
overall filtration efficiency	60%

Tobacco rod:	
length	51 mm
tobacco weight	625 mg

This cigarette has the following characteristics:

TPM delivery	7.0 mg
nicotine delivery	0.6 mg
carbon monoxide delivery	8.0 mg
puff count	8

It is found that the cigarette, and other cigarettes according to the invention, provide the smoker with a surprisingly enhanced subjective flavour response compared with conventional cigarettes of comparable deliveries having unitary filters.

Whilst not wishing to be bound by any theoretical explanation, it is postulated that the enhanced flavour effect is achieved because of the combination of high velocity flow through the peripheral filter zone 18, which is enhanced by ventilation of the zone, and low velocity flow through the high efficiency inner filter zone 16.

A high proportion of the TPM aerosol is channeled at relatively high velocity through the peripheral filter zone 18, since the relatively high density and low flow velocity through the inner filter zone 16 prevent a significant proportion passing through the inner zone.

This is in contrast to conventionally filtered smoke, which passes almost wholly through the central zone of the filter, since flow velocity is uniform across the filter, and ventilating air channels the aerosol to the centre.

The high velocity peripheral flow of the smoke through the filters of the invention is believed to leave in the smoke a higher than expected proportion of the components responsible for the flavour of the smoke, as distinct from the less volatile components. Thus, a smoke of enhanced flavour leaves the filter into the smokers's mouth.

Filters and cigarettes according to the invention provide a means whereby smokers can derive an enhanced subjective impression, normally associated with cigarettes of a relatively high TPM delivery, from a cigarette of relatively low TPM delivery.

Claims

1. A cigarette filter (12) comprising a rod of filter material having a longitudinally extending inner zone (16) and a peripheral outer zone (18) having a lower resistance to draw than the inner zone, characterized in that the inner zone has a filter efficiency in respect of total particulate material in the range of 60-90%, the outer zone has a filter efficiency in the range 10-40%, and that the inner zone occupies from 30-60% of the total cross sectional area of the filter rod.
2. A filter according to claim 1 having an overall efficiency of not less than 50%.
3. A filter according to claim 1 or 2 having an inner zone of diameter from 4.5 to 6 mm.



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4. A filter according to claim 1, 2 or 3 having an axial length of 27 to 42 mm.
- 5 5. A filter according to any preceding claim surrounded by a wrapper or tipping having one or more permeable regions adapted to admit ventilating air to the filter rod in an amount corresponding to from 10 to 90% ventilation.
6. A filter cigarette comprising a rod of tobacco or other smoking material and a filter according to any preceding claim coaxially abutting and secured to the rod of smoking material, the cigarette having a puff count of not less than 6.
- 10 7. A cigarette according to claim 6 in which the length of the filter is from 25 to 50% of the overall length of the cigarette.
8. A cigarette according to claims 6 or 7 in which the rod (10) of smoking material has a length between 15 40 and 60mm and the cigarette has a puff count from 6 to 10.

Patentansprüche

- 20 1. Zigarettenfilter (12), welcher einen Stab aus Filtermaterial aufweist, welcher eine in Längsrichtung verlaufende, innere Zone (16) und eine äußere Umfangszone (18) hat, die einen geringeren Zugwiderstand als die innere Zone besitzt, **dadurch gekennzeichnet**, daß die innere Zone einen Filterwirkungsgrad bezüglich des gesamten teilchenförmigen Materials in einem Bereich von 60 bis 90% hat, die äußere Zone einen Filterwirkungsgrad in einem Bereich von 10 bis 40 % hat, und daß die innere Zone 30 bis 60 % der gesamten Querschnittsfläche des Filterstabs einnimmt.
- 25 2. Filter nach Anspruch 1, welcher einen Gesamtwirkungsgrad von nicht weniger als 50 % hat.
3. Filter nach Anspruch 1 oder 2, welcher eine innere Zone mit einem Durchmesser von 4,5 bis 6 mm hat.
- 30 4. Filter nach Anspruch 1, 2 oder 3, welcher eine axiale Länge von 27 bis 42 mm hat.
5. Filter nach einem der vorangehenden Ansprüche, welcher von einer Umhüllung oder einem Mundstückteil umgeben ist, welches eine oder mehrere durchlässige Bereiche hat, welche derart beschaffen und ausgelegt sind, daß Ventilationsluft zu dem Filterstab in einer Menge entsprechend einer Ventilation von 35 10 bis 90 % gelangen kann.
6. Filterzigarette, welche einen Tabakstab oder einen Stab aus einem anderen Rauchermaterial und ein Filter nach einem der vorangehenden Ansprüche aufweist, welcher koaxial an den Stab aus Rauchermaterial angrenzt und an diesem festgelegt ist, wobei die Zigarette eine Zugzahl von nicht weniger als 40 6 hat.
7. Zigarette nach Anspruch 6, bei der die Länge des Filters 25 bis 50 % der Gesamtlänge der Zigarette ausmacht.
- 45 8. Zigarette nach Anspruch 6 oder 7, bei der der Stab (10) aus Rauchermaterial eine Länge zwischen 40 und 60 mm und die Zigarette eine Zugzahl von 6 bis 10 hat.

Revendications

- 50 1. Filtre (12) pour cigarette comportant une tige de matériau filtrant ayant une zone intérieure (16) et une zone périphérique extérieure (18) s'étendant longitudinalement ayant une résistance à l'aspiration plus faible que la zone intérieure, caractérisé en ce que la zone intérieure a un rendement de filtration en ce qui concerne la matière particulaire totale situé dans la plage allant de 60 à 90 %, la zone extérieure a un rendement de filtration dans la plage allant de 10 à 40 % et en ce que la zone intérieure occupe 55 de 30 à 60 % de la surface totale en coupe de la tige formant filtre.
2. Filtre selon la revendication 1, ayant un rendement global qui n'est pas plus petit que 50 %.



3. Filtre selon la revendication 1 ou 2 comportant une zone intérieure ayant un diamètre allant de 4,5 à 6 mm.
4. Filtres selon la revendication 1, 2 ou 3 ayant une longueur axiale de 27 à 42 mm.
5. Filtres selon l'une quelconque des revendications précédentes, entouré par une bande ou liaison ayant une ou plusieurs zones perméables adaptées pour admettre de l'air de ventilation vers la tige formant filtre selon une quantité correspondant à une ventilation de 10 à 90 %.
- 10 6. Cigarette avec filtre comportant une tige de tabac ou d'autre matériau à fumer et un filtre selon l'une quelconque des revendications précédentes, venant en butée coaxialement avec la tige de matériau à fumer et fixé sur celle-ci, la cigarette permettant un nombre de bouffées qui n'est pas plus petit que 6.
- 15 7. Cigarette selon la revendication 6 dans laquelle la longueur du filtre est comprise entre 25 et 50 % de la longueur globale de la cigarette.
- 20 8. Cigarette selon la revendication 6 ou 7, dans laquelle la tige (10) de matériau à fumer a une longueur comprise entre 40 et 60 mm et la cigarette permet un nombre de bouffées allant de 6 à 10.
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