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HH FILTER

After an initial high level of product development and supporting theoretical research, R&D Hamburg stopped work on the HH design of filters in late 1981 because marketing research, with low delivery smokers, showed them to be too strong.

There are three versions of the HH filter. Each have the same basic construction of four grooves that extend the length of the filter, but they differ significantly in design detail and smoking performance:

HH-I : Virtually Non-compensatable  
HH-II : Actron-type inelastic  
HH-III : "Switching-type" - highly elastic

Although HH-III is significantly more elastic (i.e. increased yield with increased puff volume) than Actron, deliberate or fortuitous blocking of the grooves does not give such a pronounced increase in yield as does Actron. It is, in fact, similar in performance to the St Moritz product which uses the Filtrona Astra filter with 22 grooves.

Thus, if the PM/Copeland holder were to be adopted by Government bodies the effect on 1 mg products constructed with the four different filter types would be approximately as follows:

Filter	Tar Delivery in mg.	
	Standard FTC/DIN Holder	PM/Copeland Holder
Actron	1	12
Astra	1	3
HH	1	3
Conventional	1	1

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Smoking Behaviour Trial

In September 1983 a small smoking behaviour trial was undertaken by BATCF with an untrained panel of 32 HB smokers from the Arensberg factory.

The objective was to see if the pattern of smoking changed when smokers switched from a 3 mg conventional ventilated product to a 3 mg HH-III product. The smoking pattern with both products, which had the same blend (30% ET), was also compared with the smoking pattern when smokers used their "own brand" HB.

The broad finding was that when smoking the HH-III filter product there was no significant difference in:

Puff volume	(52 - 56 ml)
Puff duration	(2.1 - 2.2 sec.)
Puff number	( $\approx$ 12)
Whole smoking time	

When questioned as to the smoking sensation of the HH product in comparison with the conventional 3 mg product, the HH was pronounced to be significantly "less mild", "stronger", "sharper" and "more tart".

Higher tartness is thought to be mainly a response to the higher nicotine/tar ratio - which is a common feature of elastic products.

Comparison of HH, Conventional and Actron Filters

In 1982 an internal expert panel was used to compare the filter designs (a) HH-III, (b) Actron, and (c) Conventional when used on each of three blend specifications, two of them being BARCLAY blends and construction:

Blend	Delivery	Ventilation
BARCLAY 85 mm	1 mg	72%
BARCLAY 100 mm	3 mg	65%
CORTINA (early version)	3 mg	62%

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As judged by the panel scores (which I have on file) for:

Draw effort (not thought to be a reliable parameter)  
Mouthful  
Impact  
Irritation  
Flavour amplitude

the overall conclusions were:

- BARCLAY blend 1 mg - HH was somewhat nearer to Actron on impact and irritation, but nearer to the conventional filter in mouthful and flavour.
- BARCLAY blend 3 mg - HH was significantly nearer (75-80%) to the conventional filter on most scores.
- CORTINA blend 3 mg - HH was about mid-way between the Actron and conventional filters.

This trial emphasised the fact that filter designs cannot be judged in isolation from the blend and delivery levels.

#### GR&DC Development

Recently, as part of Project SMITH, a GR&DC version of HH-III was developed and tested. It proved to be the most elastic product yet tested:

<u>Puff Volume</u>	<u>Tar</u>	<u>Nicotine</u>	<u>Puff No.</u>
35 ml	1.4	0.44	9.0
50 ml	7.3	0.87	9.4

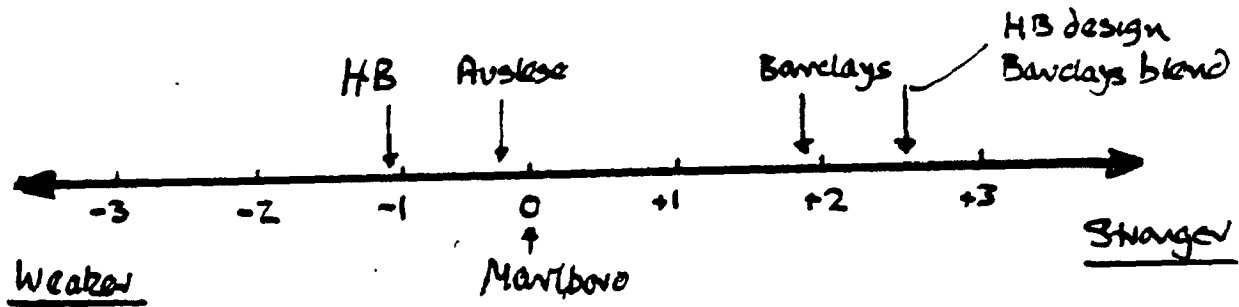
Samples were sent to Hamburg and they have confirmed the performance, but a report has not yet been issued.

#### Comparison of Blends

In September this year 1 mg. BARCLAY-type products were formulated with three tobacco blends - HB, Auslese and BARCLAYS - and compared against Marlboro for mildness/strength by an expert panel. The results, which are given below, again clearly demonstrate the importance of blend:-

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(Interestingly, when the BARCLAYS blend was used in a standard HB construction the product was generally found to be too strong to smoke. The panel score is also indicated in the chart above.)

Conclusion

The 'switching' HH-III version of filter offers a reasonable, but certainly not wholly comparable, alternative to the Actron filter - when judged against overall smoking sensation.

Both filters exhibit a similar degree of swirl and the conclusion, therefore, is that only blend modifications (in particular enhanced nicotine) can hope to help bridge the gap between the best HH product and the current commercial BARCLAY.

It is the current view of BATCF and GR&DC that it is highly unlikely that any radically new design of filter (shaped ends, internal tubes, plastic simulations etc) will be able to match the unique performance of the Actron filter. The subject is, however, being considered this week at a 'Swirl' Conference in Louisville and this view may need to be modified in the light of more recent developments.

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