



## A comparison between contact forte (BHM) and adhear (MED-EL)

Measured and reported by:  
B.A. Bsc. Sourena Mosleh / Research and development

## Report

From: B.A. Bsc. S.Mosleh / Research & Development  
Subject: A comparison between contact forte (BHM) and adhear (MED-EL)  
Place and date: Grafenschachen, am 25.02.2022





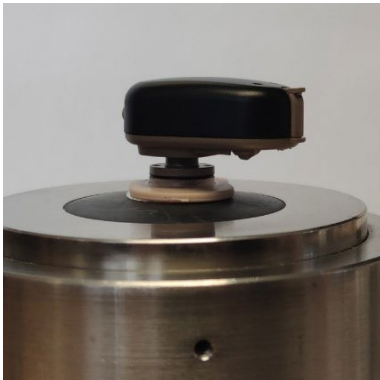
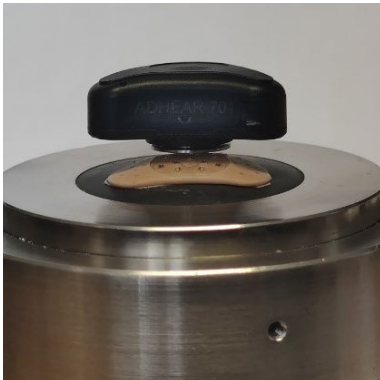
## Introduction

In this report the hearing system contact forte manufactured by BHM has been compared to adhear of MED-EL. As criteria for the measurements counts the standard EN IEC 60118-9:2021 for bone conduction hearing aid devices. All measurements have been performed on artificial mastoid regarding their connection either to headband or adhesive pad. Furthermore, the test results for sweat persistence has been revealed subsequently.

Following table clarifies the variety of wearing possibilities for contact forte in comparison to adhear:

Wearing possibility	contact forte	adhear
Headband	✓	✓
Adhesive pad	✓	✓
Softband	✓	
Hairband	✓	
Eyeglass adapter	✓	
Cap	✓	

Devices on artificial mastoid:

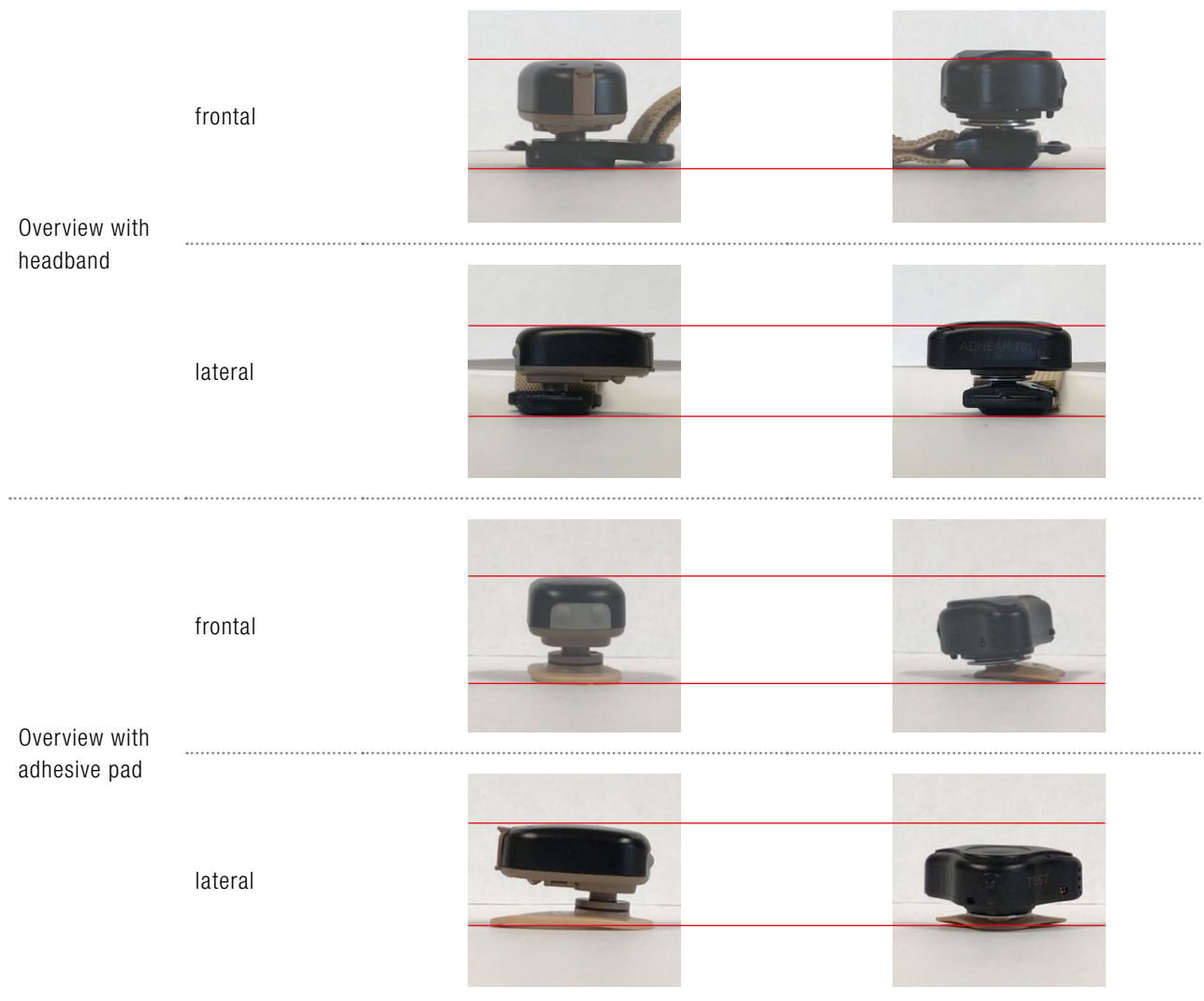
Device	contact forte	adhear
Headband		
Adhesive pad		

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In the following table these two hearing instruments have been confronted to each other with their measured dimensions.

Category	contact forte	adhear
Dimensions [mm]	length: 33.1	length: 34.7
	width: 20.8	width: 22.96
	height without coupling: 17	height without coupling: 14.4
	height with headband: 21.06	height with headband: 22.62
Weight (without any battery) [g]	height with adhesive pad: 20.94	height with adhesive pad: 16.91
	without coupling: 11.4	without coupling: 12.78
	with headband: 16.81	with headband: 18.94
	with adhesive pad: 13.32	with adhesive pad: 12.81



Both devices are symmetric and can be worn on both ears.

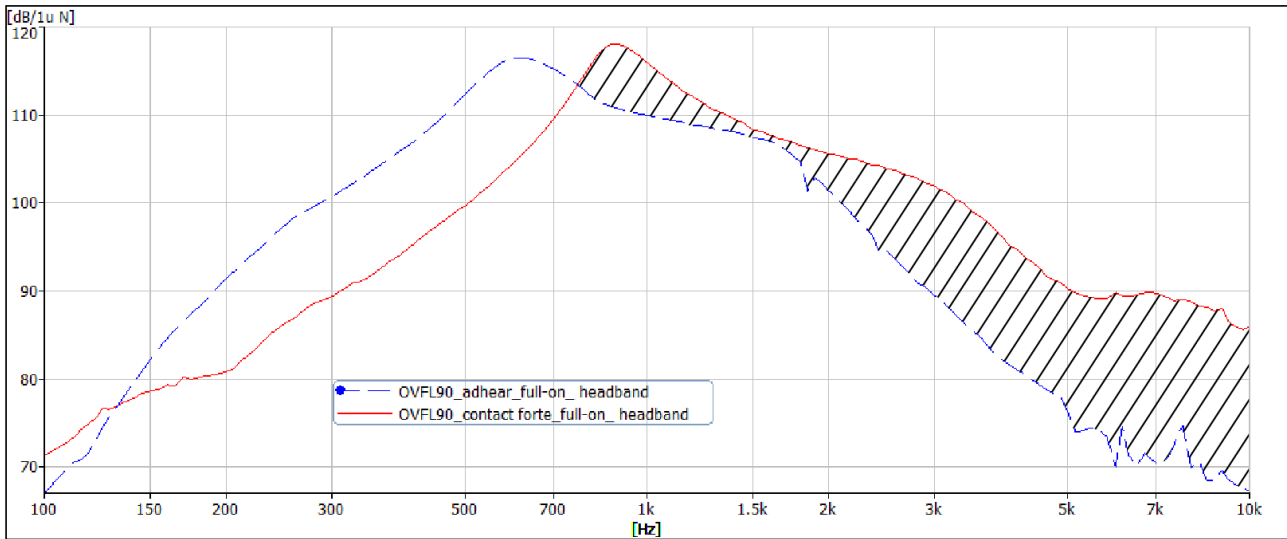
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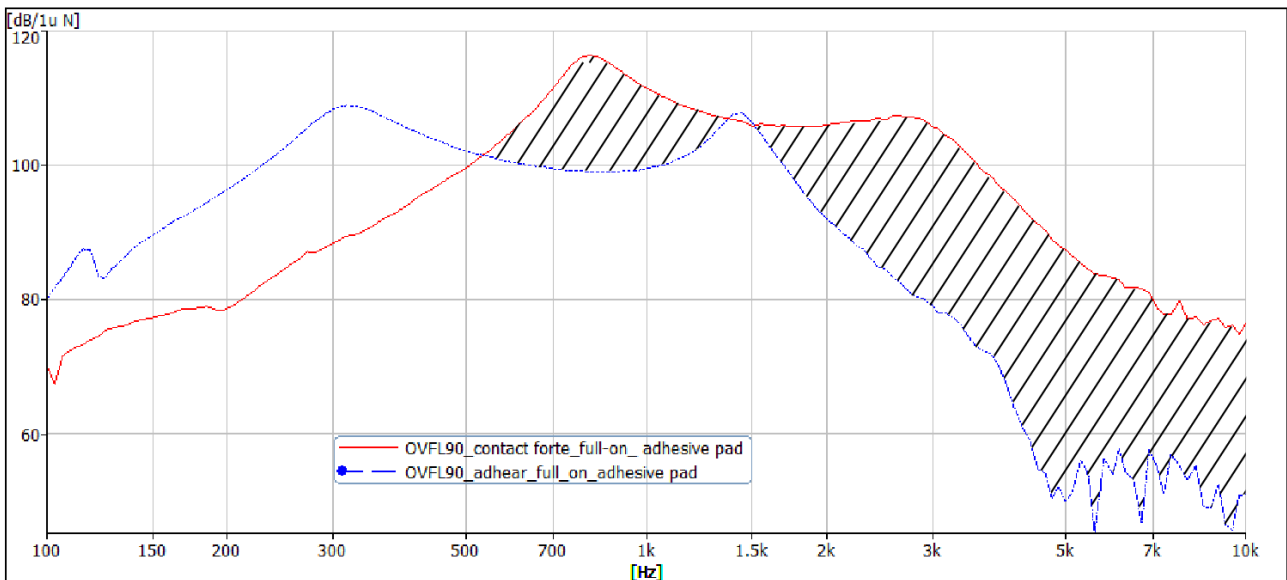


Measurements according to EN IEC 60118-9:2021

Output vibratory force level (OVFL) setting @ 90 dB SPL input



Measurement results with headband



Measurement results with adhesive pad

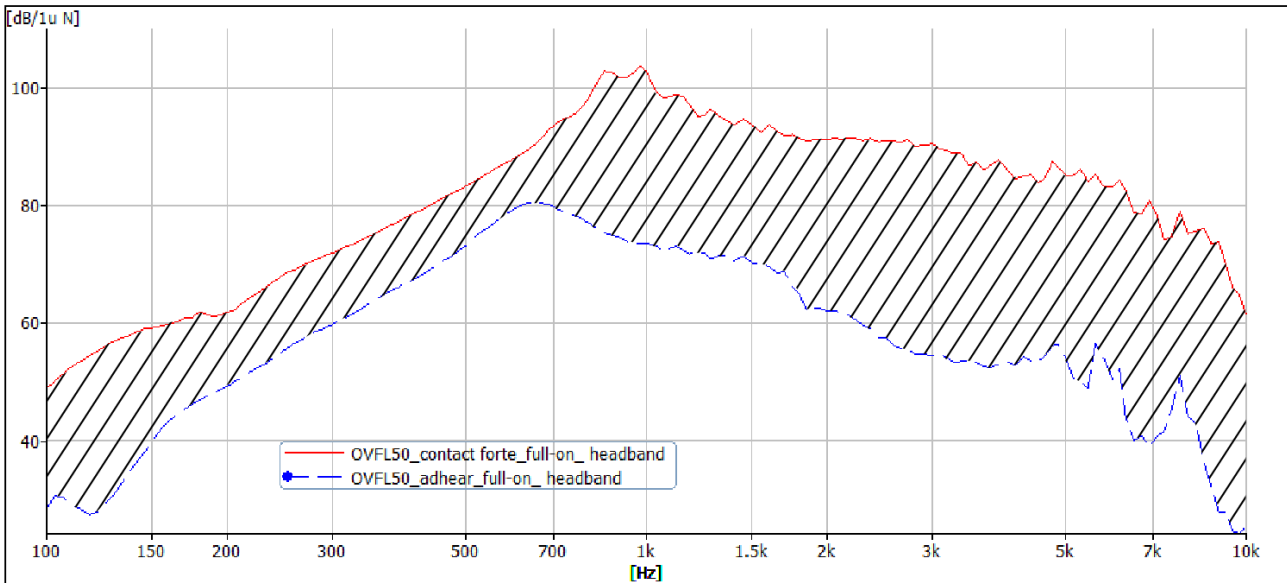
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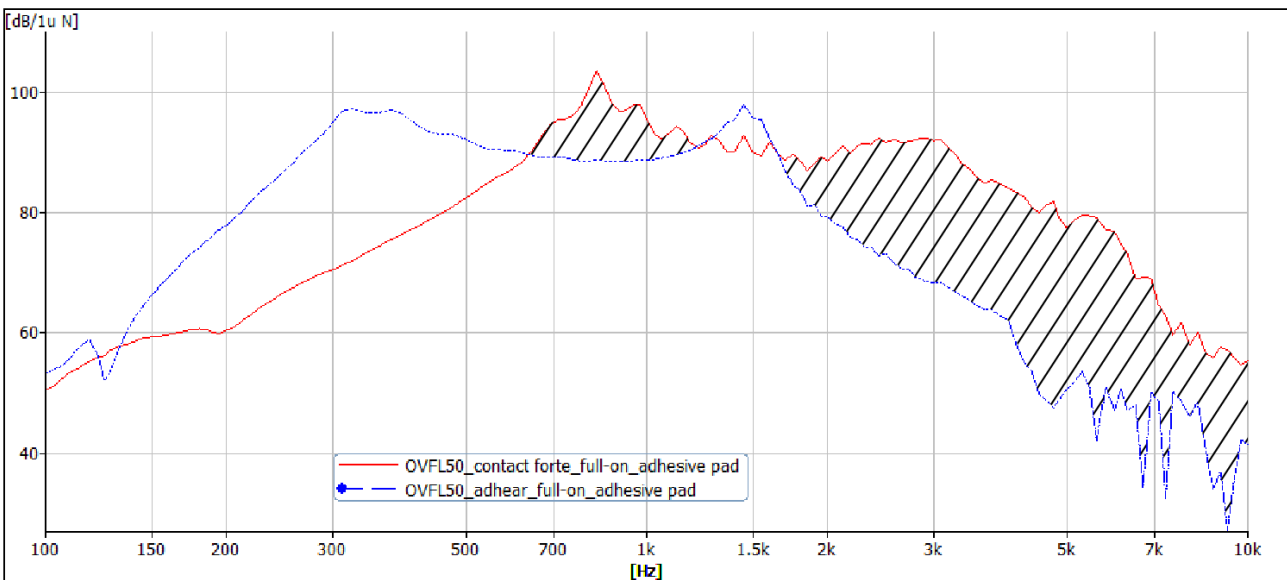


Measurements according to EN IEC 60118-9:2021

Acousto-mechanical sensitivity level (AMSL) setting @ 50 dB SPL input



Measurement results with headband



Measurement results with adhesive pad

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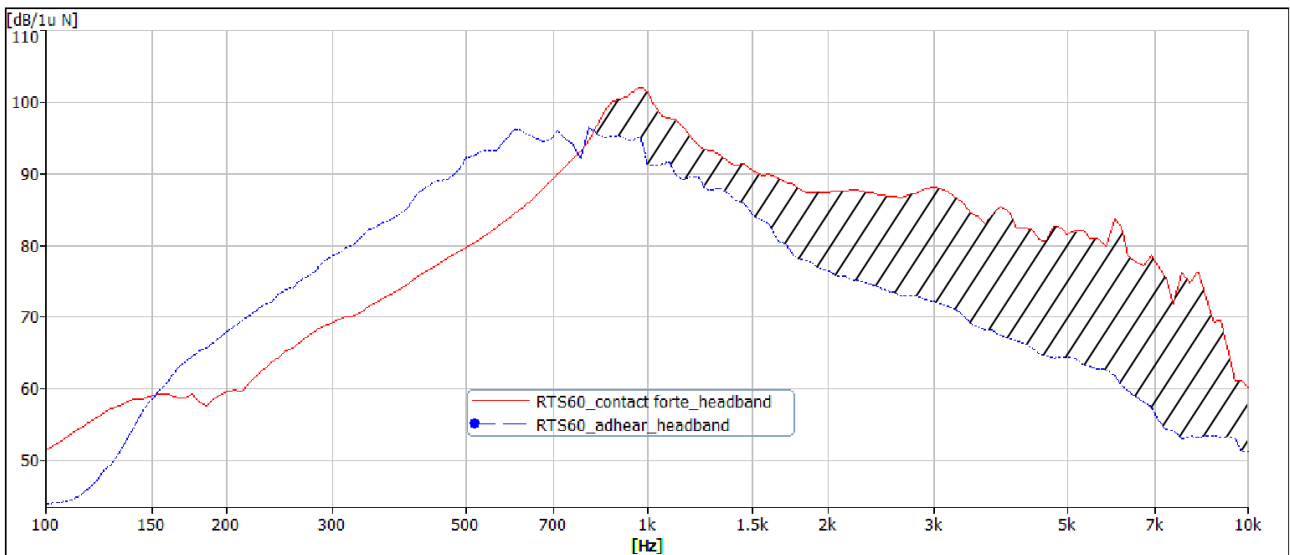


Measurements according to EN IEC 60118-9:2021

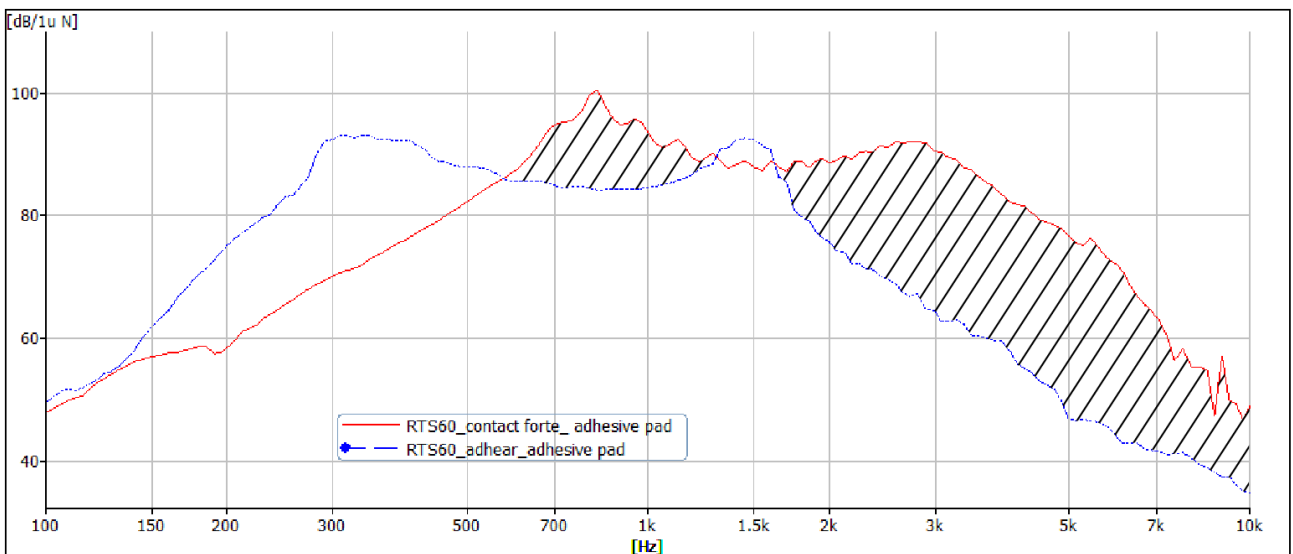
Acousto mechanical sensitivity level (AMSL) setting @ 60 dB SPL input

Reference test setting (RTS) has been calculated by use of the following formula:

$$RTS = \frac{(OVFL)1 \text{ kHz} + (OVFL)1.6 \text{ kHz} + (OVFL)2.5 \text{ kHz}}{3} - 77 \text{ [dB]}$$



Measurement results with headband



Measurement results with adhesive pad

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### Total harmonic distortion (THD)

The following table shows the measurement values with the RTS settings to specific frequencies according to the standard:

Wearing possibility	Hearing aid	Input signal			
		70 dB @ 500 Hz [%]	70 dB @ 800 Hz [%]	65 dB @ 1,6 kHz [%]	60 dB @ 3,2 kHz [%]
Connected to headband	contact forte	13,6	0,129	0,118	0,1
	adhear	4,19	1,062	0,125	0,049
Connected to adhesive pad	contact forte	1,246	0,051	0,067	0,014
	adhear	3,3	3,6	0,18	0,025

Additionally, contact forte has already shown a maximum value of 5% with headband connection and even 2% with adhesive pad at all frequencies higher than 500 Hz, while generating a sound pressure level of 65 dB in the measurement chamber.

### Equivalent input noise

The following table reveals the calculated equivalent noise while headband connection:

Hearing aid	total output noise	Level @ 1,6 kHz	Input level [dB]	Equivalent input noise
	VFL [dB]	with 60 RTS [dB]		
contact forte	40,7	90	60	10,7
adhear	45,9	83	60	22,9

### Battery current

The following battery current values have been measured in the presence of an input sound pressure level of 65 dB at 1 kHz:

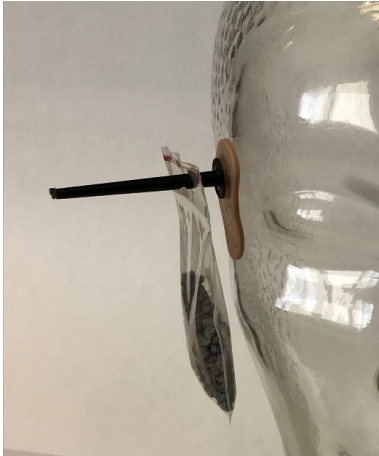

Hearing aid	Battery current [mA]
contact forte	1,55
adhear	1,04

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## Sweat persistence

This test has been performed in a measurement chamber with a temperature of 42 ° in the presence of a high humidity. In this test the bond strength of the adhesive has been rated through the time a mass of 35 g lasted until it fell down.

	contact forte	adhear
		
Sweat persistence time	42 days	3 days

## Conclusion

Besides a much more user friendly and quicker fitting software, **contact forte** has already proven numerous advantages in comparison to **adhear**. Related to OVFL 90, OVFL50 as well as OVFL 60 RTS, **contact forte** had a higher response level in general. So, the resonance peak was at some certain dBs higher consequently. Other benefits of **contact forte** are the lower amount of total harmonic distortion as well as equivalent input noise. The adhesive pad of **contact forte** is made out of a much more resistant material which lasted much longer in the sweat persistence test. **contact forte** has nevertheless a smaller height with headband which makes it more comfortable to be used by clients and patients.