

Force Testing Comparison of Healthmark CC-230-900 New Brush Head and Olympus 9 mm Brush

Procedure

The two brushes tested were the new CC-230-900 brush head and the equivalent Olympus brush (BW-17K).

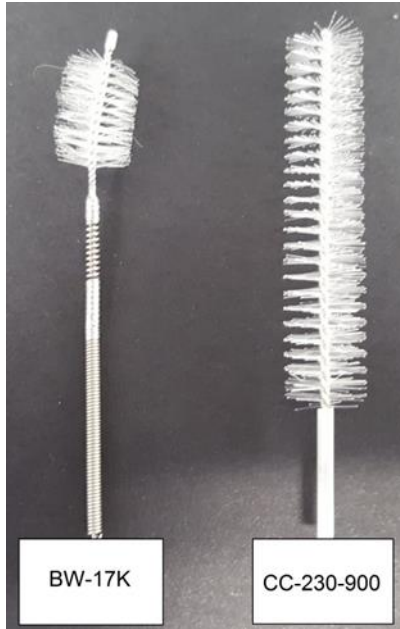


Figure 1 – The two brushes

Brush	Diameter (mm)	Bristle Length (mm)
BW-17K	9	12
CC-230-900	9	42

Table 1 – The dimensions of each brush

Each brush was run using the standard brush testing in lumen program. The stainless steel lumens used had diameters of 5, 6, and 7 millimeters. The program was set to insert and remove the brush from the lumen a total of 3 times. The program was run 5 times for each brush. The data was analyzed and is displayed below:

Brush	Maximum Force Inserting into Lumen (N)	Average Force Inserting into Lumen (N)
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BW-17K	0.3870	0.1957
CC-230-900	2.8958	1.7659

Table 2 – The forces required to insert each brush into a 5 mm lumen

Brush	Maximum Force Inserting into Lumen (N)	Average Force Inserting into Lumen (N)
BW-17K	0.2980	0.1646
CC-230-900	3.1671	1.8238

Table 3 – The forces required to insert each brush into a 6 mm lumen

Brush	Maximum Force Inserting into Lumen (N)	Average Force Inserting into Lumen (N)
BW-17K	0.2491	0.1646
CC-230-900	2.7846	1.5257

Table 4 – The forces required to insert each brush into a 7 mm lumen

Brush	Maximum Force Pulling out of Lumen (N)	Average Force Pulling out of Lumen (N)
BW-17K	0.4359	0.2224
CC-230-900	4.0345	2.4510

Table 5 – The forces required to pull each brush out of a 5 mm lumen

Brush	Maximum Force Pulling out of Lumen (N)	Average Force Pulling out of Lumen (N)
BW-17K	0.5427	0.2046
CC-230-900	6.4321	1.7926

Table 6 – The forces required to pull each brush out of a 6 mm lumen

Brush	Maximum Force Pulling out of Lumen (N)	Average Force Pulling out of Lumen (N)
BW-17K	0.5382	0.2046
CC-230-900	4.2569	1.3967

Table 7 – The forces required to pull each brush out of a 7 mm lumen

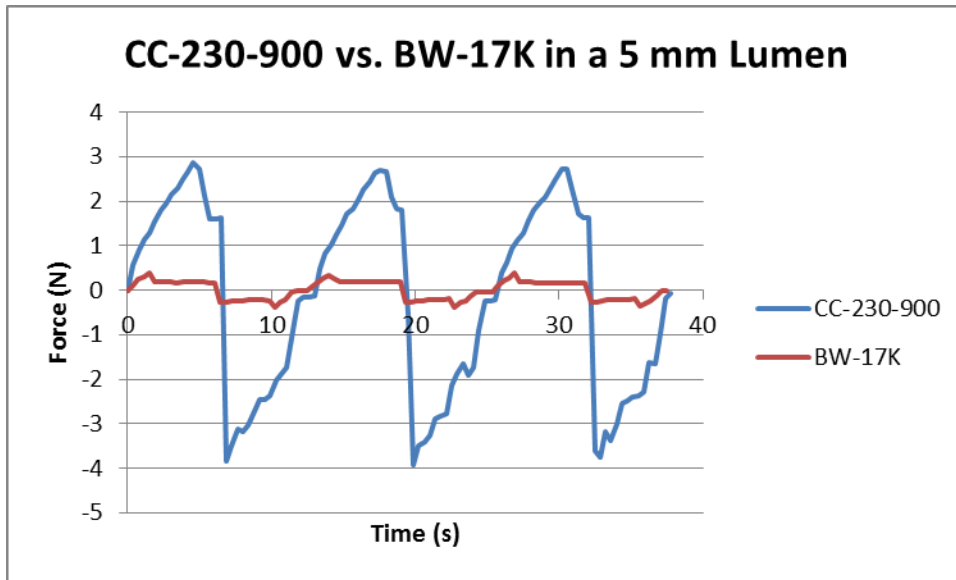


Figure 2 – One program run of each brush in a 5 mm Lumen

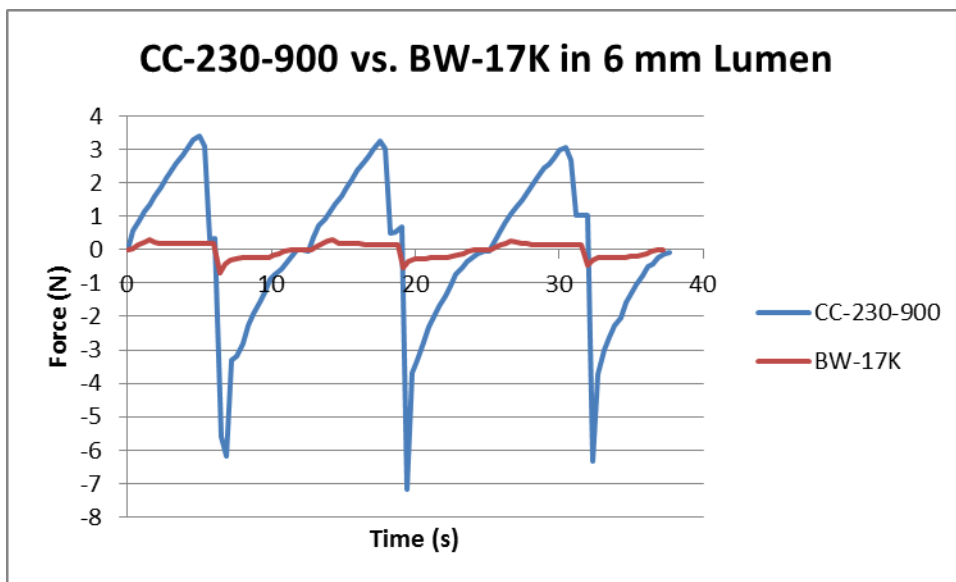


Figure 3 – One program run of each brush in a 6 mm Lumen

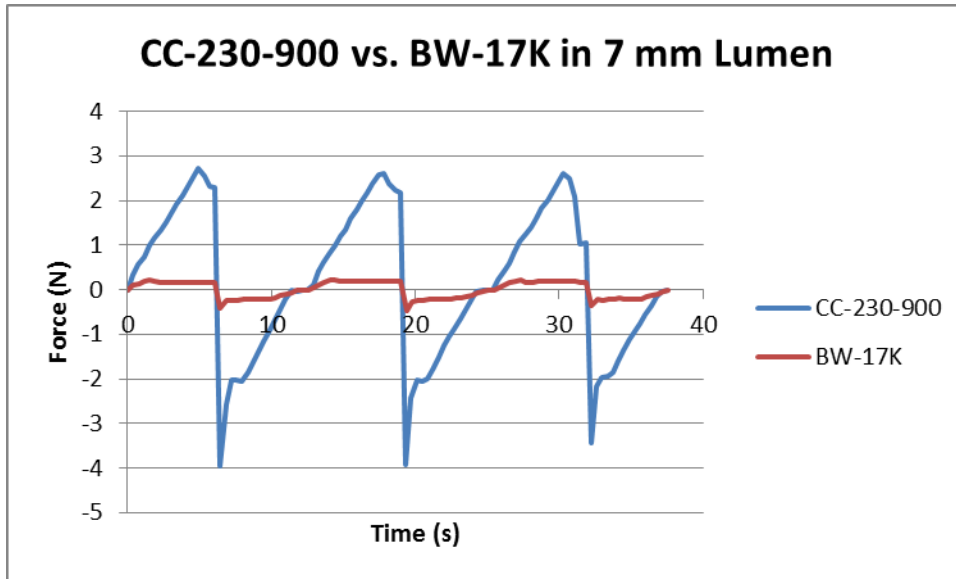


Figure 4 – One program run of each brush in a 7 mm Lumen

The ability of each brush to remove soil was tested by soiling 5 and 6 mm Teflon tubes and running the standard brush testing in lumen program. The weights were taken at each step to determine soil added and removed. After the brushing program was run, the lumens were flushed with water and air to simulate a real world cleaning scenario.

Brush	Average % of Soil Removed From Brushing	Average % of Soil Removed From Brushing & Flushing
BW-17K	78	94
CC-230-900	71	98

Table 8 – Amount of soil removed with a dry brush in a 5 mm lumen

Brush	Average % of Soil Removed From Brushing	Average % of Soil Removed From Brushing & Flushing
BW-17K	62	87
CC-230-900	69	99

Table 9 – Amount of soil removed with a dry brush in a 6 mm lumen

Discussion

When comparing the CC-230-900 and the BW-17K in 5, 6, and 7 mm lumens, the CC-230-900 always required a greater amount of force to be inserted and removed from the lumens (Tables 2-7 & Figures 2-4). This is likely due to the greater length of bristles along the shaft of the brush on the CC-230-900, and the bristles of the CC-230-900 being stiffer than their BW-17K counterparts. As explained previously, a greater force required for removing and inserting the brush can be related to higher friction and greater cleaning power. When tested in 5 and 6 mm soiled lumens (Tables 8 & 9), the CC-230-900 did a better job of loosening the soil, resulting in a higher percentage of soil removed after flushing the lumen with water. The higher friction and bristle contact of the CC-230-900 results in more soil being removed by the final water flush.