Philips NIBP cuffs prove strength and reliability

Summary

Rigorous testing helps demonstrate that Philips non-invasive blood pressure cuffs can withstand the demands of hospital use. Philips recently compared our cuffs to other manufacturers' cuffs in a series of durability tests. Tested cuffs include both reusable and disposable adult cuffs.

Purpose

Philips durability testing program is designed to demonstrate that our NIBP cuffs can withstand extreme use, so that you can be confident of outstanding performance during typical use. Recently, we extended that testing to our competitors' cuffs, to benchmark the performance of Philips cuffs vs. other options.

Tests performed

Four tests were performed on a sample size of three cuffs of each kind:

- Tube connection durability
- Hook and loop durability
- Seams durability
- Burst resistance

Results

Results were divided into green, yellow, or red ratings.

- Green: all three samples passed the test
- Yellow: One sample failed; cuff did not meet Philips standards but is probably adequate for most clinical uses
- Red: More than one sample failed

		Tube connection durability	Hook and loop durability	Seams durability	Burst resistance
Reusable cuffs	Philips Comfort Care	🟢	🟢	🟢	🟢
	Philips EasyCare	🟢	🟢	🟢	🟢
	Critikon Dura-Cuf	🟢	🟢	🟢	🟢
	Welch-Allyn Flexiport Reusable	🟢	🟢	🟡	🟡
Vinyl cuffs	Philips Multi-Care	🟢	🟢	🟢	🟢
	Critikon Classic-Cuf	🔴	🟢	🔴	🔴
	Welch-Allyn Flexiport Vinyl Disposable	🟢	🟢	🟢	🔴
Soft cuffs	Philips Gentle Care	🟢	🟢	🟢	🟢
	Critikon Soft-Cuf	🟢	🟢	🟢	🔴
	Welch-Allyn Flexiport Soft Disposable	🟢	🟢	🟡	🔴

*All testing performed by the Andover Hardware Testing Center (AHTC).

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Test protocol

All cuffs were preconditioned for storage temperature, operating temperature and relative humidity in an environmental chamber, based on Philips limits. The cuffs were then subjected to the durability tests. All tests were performed by the same investigator, using the same equipment.

Tube connection durability

The tube connection durability test determines the cuff's ability to withstand long-term flexing without forming leaks at the point where the tubing joins the cuff. First, the cuff is tested to identify any existing leaks. Next, a one-pound weight is attached to the tube and the cuff body is flexed through a 180° arc a specified number of times.

Test family	Number of cycles
Adult reusable cuffs	10,000 cycles
Adult vinyl cuffs	2,000 cycles
Adult soft cuffs	1,000 cycles

Following the test cycle, the investigator performs a final leak test. The Philips specification for acceptable leaks is 2mmHg/minute maximum, averaged over five minutes.

Hook and loop durability

The hook and loop durability test determines the cuff's ability to withstand long-term open/close cycles of the hook and loop. Each cuff is attached to the Philips hook and loop cycle tester, which opens and closes the cuff a specified number of times.

Test family	Number of cycles
Adult reusable cuffs	80,000 cycles
Adult vinyl cuffs	10,000 cycles
Adult soft cuffs	1,500 cycles

Following the test cycle, the investigator performs a final leak test. The Philips specification for acceptable leaks is 2mmHg/minute maximum, averaged over five minutes.

At the completion of cycling, the cuff is closed around an Instron cuff test fixture, which pulls the cuff at a steady rate of five inches per minute to determine the maximum force that the cuff can withstand. Anything less than 100 lbf is considered failure.

Seams durability

The seams durability test determines the cuff's ability to withstand long-term inflate/deflate cycling. After an initial test to identify any existing leaks, the cuff is inflated to 300mmHg and deflated to under 15mmHg within a 4-second cycle for a specified number of times.

Test family	Number of cycles
Adult reusable cuffs	150,000 cycles
Adult vinyl cuffs	10,000 cycles
Adult soft cuffs	3,000 cycles

Following the test cycle, the investigator performs a second leak test. The Philips specification for acceptable leaks is 2mmHg/minute maximum, averaged over five minutes.

Burst resistance

This two-part test is designed to assess the ability of the cuff's bladder and cover to resist bursting during a real-world torture test, as well as a lab robustness test.

In the first part of the test, the investigator places the cuff flat on a table and inflates it unbound up to 300mmHg. The cuff is held at that pressure for five seconds, and then deflated. This mimics the situation that arises when a cuff is attached to a monitor with auto-timed readings, and a user removes the cuff from a patient's arm without turning off the monitor's autotimer. In these cases, the monitor can inflate the cuff up to the maximum pressure the monitor is capable of producing (300mmHg) before the monitor detects that the cuff is not on a patient.

In the second part of the test, the same cuff is placed in concentric mandrels to control its swelling, and subjected to 700mmHg pressure for one minute. While this pressure is well outside the normal limits, the test is designed to demonstrate that the cuff can perform beyond expected use.

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