

Meet the HALO®



Revolutionary vision joins cutting-edge technology to produce the Hemorrhage Arresting Lever Operated Tourniquet (HALO®), the world's most intuitive combat tourniquet. Designed by veterans, orthopedic surgeons and medics, the innovative, snag-free profile of the HALO® provides effective vascular compression to stop life-threatening bleeding faster than ever before.

By combining modern engineering principles with the realities of battlefield medicine, the HALO®'s reliable design mitigates the deficiencies of today's windlass style tourniquets (Dennis, 2019). When each moment counts, a proven decrease in fine motor abilities during emergent hemorrhage situations can mean life or death (Cuper, n.d.). Developed to virtually eliminate the need for these skills, the HALO® replaces the windlass with the most simple, effective mechanical device: a lever.

Under mounting stress during conflict, users just actuate the device's lever to apply the HALO®. The tourniquet then secures with an aggressive hook and loop locking tab for a low-profile, snag-free fit. With 1.75-inch wide nylon straps, the HALO® minimizes nerve damage and can be self-applied or applied to an entrapped extremity via a detachable re-direct buckle with a self-guiding reattachment hook.

Meet the critical challenges of combat with the HALO®, the world's only lever-operated tourniquet that achieves rapid occlusion with minimal training.

Building Better

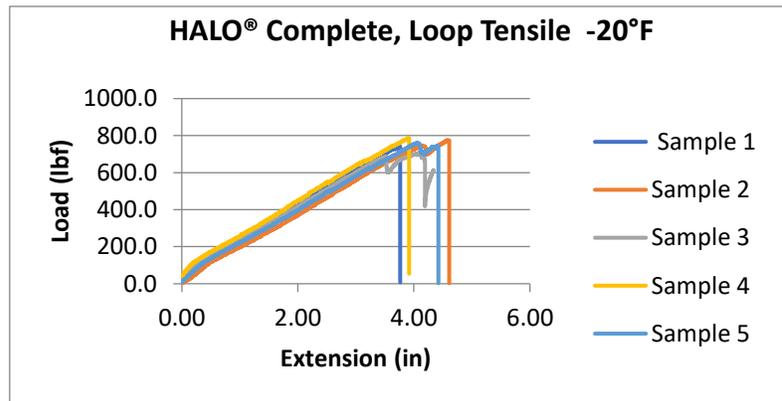
To develop the best tourniquet on the market, HALO® designers defined, then exceeded, the characteristics of an ideal medical device using recent CoTCCC criteria (Butler, 2019), including:

- ***Complete Arterial Occlusion***
The HALO® tourniquet has undergone extensive use, doppler and efficacy testing to demonstrate complete occlusion. Exclusively designed by medics, engineers and doctors trained in the science of battlefield medicine, experts have proven the HALO® can reach complete arterial occlusion faster than any other combat tourniquet. ([View Doppler Video](#))
- ***Rapid Application and Occlusion***
Rapid tourniquet application saves lives. When efficiency matters most, the HALO® provides occlusion within 12 seconds, a critical four seconds faster than any competitor and 48 seconds faster than current CoTCCC standards (Butler, 2019). ([View Speed of Application](#))
- ***Simplicity and Ease of Use***
The replacement of the windlass with a powerful lever makes the HALO® an inherently easy and intuitive tourniquet, allowing users to become proficient in HALO® application within one minute. The unique one-palm tightening design reduces the need for fine motor skills and provides occlusion in a single motion (e.g. C-A-T and S-O-F-T), (Wall, 2013).
- ***Achieve Occlusion, Minimize Harm and Nerve Damage***
Tourniquet application is historically associated with nerve injuries (known as tourniquet paresis). Specifically correlated to higher tourniquet pressure levels (McEwen, n.d.), the HALO® minimizes this risk by using a 1.75-inch hook and loop strap compared with current windlass designs. Unlike the HALO®'s innovative model, windlass tourniquets transfer force to the impacted limb through narrow internal straps

(McKeague, 2012). Designed with maximum width, the HALO[®] band uses the entire width of the strap, applying the lowest tourniquet pressure required for occlusion.

- **Reliability**

Paramount to tourniquet efficacy, the reliability of the HALO[®] lies in repeated testing and quality control. To ensure maximum security, the HALO[®] has undergone extensive testing and is awaiting approval for a CE. Determined through third-party failure mode testing, the HALO[®] can handle more than 3.5 times the maximum force necessary to achieve occlusion in a 95th percentile leg circumference subjected to the equivalent of 350 mmHG as reference to a standard three-inch inflatable surgical tourniquet (Blew, 2020). Conducted at room temperature, -20°F and 120°F, testing demonstrates the tourniquet will function as expected in typical field environments.



The HALO[®] has integrated functional tensile testing within the manufacturing process. In addition, a sample set of tourniquets will undergo full destructive testing to ensure the safety and reliability of each lot. To further guarantee the HALO[®] will perform as expected throughout its lifecycle, environmental aging testing is currently underway.

Testing documentation is available upon request.

- **Cost Competitive**

The HALO[®] team understands the military must justify costs when ordering units for soldiers. To simplify this process, the HALO[®] tourniquet is competitively priced.

Notable Improvements

Although the following features are not defined as CoTCCC tourniquet assessment criteria, each component significantly improves current tourniquet design:

- **Snag-Free Design**

Consistent complaints about windlass-based designs include catching or snagging during transport, rendering the device non-effective. However, the low-profile design of the HALO[®] lever reduces opportunities for snagging and provides soldiers the option to pre don the HALO[®] prior to combat with minimal encumbrance.

- Size and Low Profile**
Based on experience, HALO® designers know tourniquets are less effective with bulky, complicated storage options. To achieve maximum convenience, the device folds into a smaller package compared to its competitors.
- Single-Handed Application and Entrapped Limb Capability**
The rigid structure of the base and strap material lets users thread a limb through the tourniquet for single-handed application. ([View Single-hand Application](#))
- Secondary Lock**
The HALO®'s unique finger pull/hold-down strap acts as a secondary lock to ensure main strap security during transport over rough terrain.

A unique self-aligning redirect buckle quickly disconnects the strap from the base, wrapping around an entrapped limb and reattaching with little to no fine motor skills. ([View Entrapped Limb Application](#))

Specifications

Designed with strict consideration to battlefield applications, the HALO® meets the following specifications:

- Package Size and Weight**
The HALO® folds into a sleek 2.1 in.(W) x 5 in. (L) x 1.25 in. (H) package and weighs just 3.8 oz. as compared to the SOF at 4.9 oz. and the C-A-T at 2.9 oz. Users can also insert the device into current tourniquet pouches or a new pouch. Additionally, the HALO® is Berry Compliant, manufactured in Huntersville, NC, and packaged in a shrink-wrapped polyolefin package that is easily opened for immediate deployment.



Figure 1: HALO® Folded

- Materials**
Chosen for strength, reliability and biocompatibility, the HALO® comprises the components and materials below:

Part Number	Description	Materials
HLT-10001-1-A	HALO® Base	Thermoplastic Elastomer Polymer
HLT-10001-1-B	Redirect Buckle	Powder Coated Steel (A1011)
HLT-10001-2-A	Main Strap	Nylon and Polyester
HLT-10001-2-B	Lever	Powder Coated Steel (A570)
HLT-10001-3-A	Hook Strap	Polyester / Polypropylene
HLT-10001-3-B	Time Tab	Polyester and Silicone
HLT-10001-4-A	Flag Tab	Polyester and Silicone

Table 1: HALO® Materials

- *FDA Regulated*
As a device regulated by the Federal Drug Administration, the HALO[®] must meet the stringent requirements of ISO 10993-1. The full product master file is available upon request.

The HALO[®]: A Superior Tourniquet

Developed and tested for combat as the fastest, easiest and most-effective tourniquet on the market, the HALO[®] device revolutionizes battlefield medicine. While other tourniquets may provide varied results, only the HALO[®] features new lever-operated technology to surpass the application time of comparable units by up to 25 percent. When every second counts, experts count on the reliable, innovative design of the HALO[®].

Works Cited

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