



**CITY OF KNOXVILLE**  
 OFFICE OF THE PURCHASING AGENT  
 P.O. BOX 1631  
 400 MAIN ST., ROOM 667  
 KNOXVILLE, TN 37901

**QUOTATION SHEET**  
  
**THIS IS NOT AN ORDER**

DATE: 02/14/2018 PAGE 1 OF 1

DOCUMENT NUMBER: **502667**

READ ALL INSTRUCTIONS AND CONDITIONS ON ATTACHED PAGES BEFORE QUOTING. QUOTE ON THIS FORM ONLY.  
 QUOTE PRICE ON ITEMS LISTED OR EQUAL.

**\*\*ALL PRICES TO INCLUDE TRANSPORTATION CHARGES & NET TERMS UNLESS STATED OTHERWISE \*\***

Merchandise to be delivered to : Fire Fighting Division - Logistics  
 1625 Highland Ave  
 Basement - Contact Chris Poster at 740-9893 before delivery  
 Knoxville TN 37916

QUOTE will be received at: Office of the Purchasing Agent, Room 667, 400 Main St., Knoxville, TN 37902,  
 until 03/01/2018 11:00:00 AM

**RESCUE TOOLS**

**Special Instructions:**  
 Contract price will be in effect for a period of one year with the option to renew for two additional one year periods based upon the agreement of both parties. Consumer price index adjustment allowed at each renewal period. Direct all questions to jtucker@knoxvilletn.gov.

No.	Quantity	Description	Brand	Unit	Unit Price	Total	Applicable Discount
1	1 Each	FIRE - Extrication/Rescue Tools. See attached specifications, quote sheet and anticipated delivery schedule.					

**IMPORTANT - State Merchandise**

Delivery Date Here: \_\_\_\_\_

Buyer Name: Tucker, James  
 Phone: 865-215-2064  
 Fax: (865) 215-2277  
 Email: jtucker@knoxvilletn.gov

\_\_\_\_\_  
 (Company Name)  
 \_\_\_\_\_  
 (Authorized Signature)  
 \_\_\_\_\_  
 (Print Signed Name)  
 \_\_\_\_\_  
 (Phone Number)  
 \_\_\_\_\_  
 (Email Address)

**CITY OF KNOXVILLE  
INVITATION TO BID**

**RESCUE TOOLS**

Sealed bids, invited by the City of Knoxville, will be received by the Purchasing Agent of the City of Knoxville, in Room 667-674, City County Building; 400 Main Avenue; Knoxville, Tennessee, until 11:00:00 a.m. (Eastern Time) on March 1, 2018, at which time they will be opened and publicly read aloud and a contract awarded as soon thereafter as practicable.

**BID SUBMISSION REQUIREMENTS**

Bidders must furnish the following information in writing with their submission:

1. Bid Form showing bidder's name, address, quoted price, business license number, date of expiration of business license. A copy of the bidder's current business license may be submitted in lieu of providing the license expiration date.
2. Non-Collusion Affidavit
3. Iran Divestment Act Certification of Noninclusion

**INVITATION TO BID – INSTRUCTIONS AND CONDITIONS**

1. Sealed bids will be received by the Purchasing Agent of the City of Knoxville in Room 667-674, City/County Building; 400 Main Avenue; Knoxville, Tennessee 37902 until March 1, **2018 at 11:00:00 a.m.**, at which time they will be publicly opened and read aloud and the contract awarded as soon as practicable. **No bid will be received or accepted after the above-specified time for the opening of bids.** Bids that arrive late due to the fault of U. S. Postal Service, United Parcel Service, DHL, FEDEX, any delivery/courier service, or any other carrier of any sort are still considered late and shall not be accepted by the City. Such bids shall remain unopened and will be returned to the submitting entity upon request.
2. The City of Knoxville reserves the right to reject any or all bids, to accept or reject any items thereon, to waive technicalities or informalities, to split orders if in the best interest of the City, to evaluate bids by various criteria, and to accept any bid which, in its opinion, may be for the best interest of the City.
3. Included in the Invitation to Bid is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this bid or any other bid. The Bidder will be required to execute and submit this affidavit with the sealed bid.
4. Each bid must be submitted in a sealed envelope, addressed to the Purchasing Agent, City of Knoxville, Room 667-674, City/County Building, 400 Main Street, Knoxville, Tennessee, 37902. Each sealed envelope containing a bid must be plainly marked on the outside as: "RESCUE TOOLS."
5. **NO CONTACT POLICY:** After the posting of this solicitation to the Purchasing Division's website, any contact initiated by any proposer with any City of Knoxville representative concerning this proposal is strictly prohibited, unless such contact is made with the Purchasing Division representative listed

herein or with said representative's authorization. Any unauthorized contact may cause the disqualification of the proposer from this procurement transaction.

6. **INCLEMENT WEATHER:** During periods of inclement weather, the Purchasing Division will enact the following procedures with regard to solicitations and weather delays:
  - If City offices are closed due to inclement weather on the date that bids/proposals/qualifications/letters of interest are due into the Purchasing Office, all solicitations due that same day will be moved to the next operational business day.
  - The City of Knoxville shall not be liable for any commercial carrier's decision regarding deliveries during inclement weather.
7. All bids must be made on the Bid Form supplied with the contract documents, and no interlineations, excisions, or special conditions shall be made or included in the Bid Evaluation Sheet by the Bidder. **Any bid on which there is an alteration of or departure from the Bid Form may be considered irregular and may be rejected.** All bids must be signed in full by the Bidder or Bidders in their business name or style when submitted and must show his or their complete address.
8. No bidder may withdraw his bid for a period of 60 days after the actual date of the opening thereof.
9. Prior to submitting their bids, bidders are to be registered with the Purchasing Division by setting up a Vendor Self-Service Account. Instructions for registering on-line are available at [www.knoxvilletn.gov/purchasing](http://www.knoxvilletn.gov/purchasing).
10. **Bid submissions from un-registered bidders may be rejected.**
11. Payment for completed services delivered to and accepted by the City shall be at the contract price.
12. State makes or brand on each item. If quoting on other than the make, model, or brand specified, the manufacturer's name and catalog number must be given, along with warranty information and detailed specifications. Because the City is committed to environmentally sound practices, brands are expected to be procured with environmental responsibility in mind.
13. Time of delivery is part of the consideration and must be stated in definite terms; time of delivery is guaranteed by the bidder and must be adhered to upon award. If time varies on different items, the bidder shall so state.
14. All quotations must be signed with the firm name and by a responsible officer or employee. Obligations assumed by such signature must be fulfilled.
15. Samples of items, when required, must be furnished free of expense to the City and if not called for within fifteen (15) days from the date of bid opening, same will be disposed of in a manner deemed to be in the best interest of the City. Items shipped as a result of an Agreement to purchase (Purchase Order) must match the sample provided with Vendor's bid submission. The City of Knoxville will be the sole judge as to whether or not the shipped items match said supplied sample, and the City's decision will be final. Should shipped items not, in the City's judgment, be as represented by the sample provided, Vendor shall pay the City in full for all costs associated with returning shipped items to the Vendor. No restocking fee or other fees will be assessed against the City of Knoxville.
16. Bidders shall verify bids before submission, as bids cannot be withdrawn or corrected after being opened. Bids will be evaluated by unit price.

17. If federal excise tax applies, show amount of same and deduct. Bear in mind that the City is exempt from Tennessee sales tax.
18. Prices are considered FOB Knoxville unless otherwise stated in the Invitation to Bid.
19. By execution and delivery of a bid submission, the bidder agrees that any additional terms and conditions, whether submitted to the City purposely or inadvertently, shall have no force or effect.
20. Bidders must comply with the President's Executive Orders No. 11246 and 11375 which prohibit discrimination in employment regarding race, color, religion, sex or national origin. Bidders must not maintain or provide for their employees any facilities that are segregated on the basis of race, color, religion or national origin. Bidders must also comply with Title VI of the Civil Rights Act of 1964, Copeland Anti-Kick Back Act, the Contract Work Hours and Safety Standard Act, Section 402 of the Vietnam Veterans Adjustment Act of 1974 and Section 503 of the Rehabilitation Act of 1973, all of which are herein incorporated by reference.
21. All bidders must comply with Title VI of the Civil Rights Act of 1964, as codified in 42 U.S.C. 2000d. The successful bidder must follow Title VI guidelines in all areas including hiring practices, open facilities, insurance, and wages. The City of Knoxville reserves the right to review all compliance records by a contract compliance officer designated by the City.
22. No interpretation of the meaning of the plans, specifications, or other pre-bid documents will be made to any bidder orally. Each request for such interpretation should be in writing addressed to **James Tucker, Senior Buyer** for the City of Knoxville, 400 Main Street, Room 667, Knoxville, TN 37902, or emailed to him at [jtucker@knoxvilletn.gov](mailto:jtucker@knoxvilletn.gov). To be given consideration, such requests/questions must be received at least five (5) business days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted to the City's website at [www.knoxvilletn.gov/purchasing](http://www.knoxvilletn.gov/purchasing). Submitting organizations are strongly encouraged to view this website often to see if addenda are posted. Failure of any bidder to receive such addendum or interpretation shall not relieve such Bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.
23. Attention of all bidders is directed to the set off provision contained in Article II, Section 24-33, entitled, "Debts owed by persons receiving payments other than salary", and Section 2-1049 entitled "Receipt of benefits from City contracts by council members, employees, and officers of the City" of the Code of the City of Knoxville.
24. Before a Purchase Order is issued, the submitting entity, if selected, **must** provide the City Purchasing Division with a copy of its valid business license **or** with an affidavit explaining why it is exempt from the business licensure requirements of the city or county in which it is headquartered. If a contract is signed, the contractor's business license shall be kept current throughout the duration of the contract, and the contractor shall inform the City of changes in its business name or location. Any Agreement to purchase resulting from this Invitation to Bid shall be governed by and construed in accordance with the substantive laws of the State of Tennessee and its conflict of laws provisions. Venue for any action arising between the City and the Vendor from the Agreement shall lie in Knox County, Tennessee.
25. In compliance with Tennessee state law, bids must be accompanied by a certification attesting that, to the best of the bidder's knowledge, the bidder does not engage in investment activities in Iran. The Iran Divestment Act of 2014 Certification of Non-inclusion form may be found in this solicitation document.

26. By acceptance and delivery of the Purchase Order resulting from the award of this Invitation to Bid, the Vendor agrees to the following:

Contractor shall defend, indemnify and hold harmless the City, its officers, employees and agents from any and all liabilities which may accrue against the City, its officers, employees and agents or any third party for any and all lawsuits, claims, demands, losses or damages alleged to have arisen from an act or omission of Contractor in performance of this Agreement or from Contractor's failure to perform this Agreement using ordinary care and skill, except where such injury, damage, or loss was caused by the sole negligence of the City, its agents or employees.

Contractor shall save, indemnify and hold the City harmless from the cost of the defense of any claim, demand, suit or cause of action made or brought against the City alleging liability referenced above, including, but not limited to, costs, fees, attorney fees, and other expenses of any kind whatsoever arising in connection with the defense of the City; and Contractor shall assume and take over the defense of the City in any such claim, demand, suit, or cause of action upon written notice and demand for same by the City. Contractor will have the right to defend the City with counsel of its choice that is satisfactory to the City, and the City will provide reasonable cooperation in the defense as Contractor may request. Contractor will not consent to the entry of any judgment or enter into any settlement with respect to an indemnified claim without the prior written consent of the City, such consent not to be unreasonably withheld or delayed. The City shall have the right to participate in the defense against the indemnified claims with counsel of its choice at its own expense.

Contractor shall save, indemnify and hold City harmless and pay judgments that shall be rendered in any such actions, suits, claims or demands against City alleging liability referenced above.

The indemnification and hold harmless provisions of this Agreement shall survive termination of the Agreement.

**CITY OF KNOXVILLE**

**BID FORM**

TO: Purchasing Agent  
City of Knoxville  
Suite 667-674  
City/County Building  
400 Main Street  
Knoxville, TN 37902

Having carefully examined the specifications for the "Rescue Tools" to open on March 1, 2018 at 11:00 a.m. and the other Contract Documents and addenda, we hereby propose to furnish the items as specified:

GUARANTEE of delivery no later than \_\_\_\_\_ days after receiving an order.  
(Bidder must initial) \_\_\_\_\_

Firm Name: \_\_\_\_\_

Official Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(By) (Name Typed)

\_\_\_\_\_  
(Title)

Date \_\_\_\_\_

Terms \_\_\_\_\_

Email address \_\_\_\_\_

Telephone \_\_\_\_\_

**NON-COLLUSION AFFIDAVIT OF PRIME BIDDER**

State of \_\_\_\_\_

County of \_\_\_\_\_

\_\_\_\_\_, being first duly sworn, deposes and says that:

- (1) He is owner, partner, officer, representative, or agent of \_\_\_\_\_ , the Bidder that has submitted the attached Bid;
- (2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
- (3) Such Bid is genuine and is not a collusive or sham Bid;
- (4) Neither the said Bid nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from proposing in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, firm, or person to fix any overhead, profit, or cost element of the bid price or the bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Knoxville or any person interested in the proposed Contract; and
- (5) The price or prices quoted in that attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

Signed: \_\_\_\_\_

Title: \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_\_.

My commission expires: \_\_\_\_\_

# IRAN DIVESTMENT ACT

## Certification of Noninclusion

**NOTICE:** Pursuant to the Iran Divestment Act, Tenn. Code Ann. § 12-12-106 requires the State of Tennessee Chief Procurement Officer to publish, using creditable information freely available to the public, a list of persons it determines engage in investment activities in Iran, as described in § 12-12-105. Inclusion on this list makes a person ineligible to contract with the state of Tennessee; if a person ceases its engagement in investment activities in Iran, it may be removed from the list. A list of entities ineligible to contract in the State of Tennessee Department of General Services or any political subdivision of the State may be found here:

[https://www.tn.gov/content/dam/tn/generalservices/documents/cpo/cpo-library/public-information-library/List\\_of\\_persons\\_pursuant\\_to\\_Tenn. Code Ann. 12-12-106, Iran Divestment Act updated 7.7.17.pdf](https://www.tn.gov/content/dam/tn/generalservices/documents/cpo/cpo-library/public-information-library/List_of_persons_pursuant_to_Tenn._Code_Ann._12-12-106,_Iran_Divestment_Act_updated_7.7.17.pdf)

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to T.C.A. § 12-12-106.

Vendor Name (Printed)	Address
By (Authorized Signature)	Date Executed
Printed Name and Title of Person Signing	

**NOTARY PUBLIC:**

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_\_.

My commission expires: \_\_\_\_\_

# DIVERSITY BUSINESS ENTERPRISE (DBE) PROGRAM

The City of Knoxville strongly encourages prime contractors to employ diverse businesses in the fulfillment of contracts/projects for the City of Knoxville.

The City of Knoxville's Fiscal Year 2017 goal is to conduct 3.33% of its business with minority-owned businesses, 9.21% of its business with women-owned businesses, and 45.5% with small businesses.

While the City cannot engage (pursuant to state law), in preferential bidding practices, the city does **strongly encourage** prime contractors to seek out and hire diverse businesses in order to help the city meet its goals as stated above. As such, the City encourages prime contractors to seek out and consider competitive sub-bids and quotations from diverse businesses.

For DBE tracking purposes, the City requests that prime contractors who are bidding, proposing, or submitting statements of qualifications record whether or not they plan to employ DBE's as sub-contractors or consultants. With that in mind, please fill out, sign and submit (with your bid/proposal) the following sub-contractor/consultant statement.

**Subcontractor/Consultant Statement**  
(TO BE SUBMITTED IN THE BID/PROPOSAL ENVELOPE)

We \_\_\_\_\_ do certify that on the  
 \_\_\_\_\_  
 (Bidder/Proposer Company Name)  
 \_\_\_\_\_  
 (Project Name)  
 ( \$ \_\_\_\_\_ )  
 (Amount of Bid)

**Please select one:**

**Option A: Intent to subcontract using Diverse Businesses**

A Diversity business will be employed as subcontractor(s), vendor(s), supplier(s), or professional service(s). The estimated **dollar value** of the amount that we plan to pay is:

\$ \_\_\_\_\_.  
 Estimated Amount of Subcontracted Service

<b>Diversity Business Enterprise Utilization</b>			
Description of Work/Project	Amount	Diverse Classification (MOB, WOB, SB, SDOV)	Name of Diverse Business

**Option B: Intent to perform work “without” using Diverse Businesses**

We hereby certify that it is our intent to perform 100 % of the work required for the contract, work will be completed without subcontracting, or we plan to subcontract with non-Diverse companies.

DATE: \_\_\_\_\_ COMPANY NAME: \_\_\_\_\_

SUBMITTED BY: \_\_\_\_\_ TITLE: \_\_\_\_\_  
 (Authorized Representative)

ADDRESS: \_\_\_\_\_

CITY/STATE/ZIP CODE: \_\_\_\_\_

TELEPHONE NO: \_\_\_\_\_

## **CITY OF KNOXVILLE DIVERSITY BUSINESS DEFINITIONS**

Diversity Business Enterprise (DBE's) are minority-owned (MOB), women-owned (WOB), service-disabled veteran-owned (SDVO), and small businesses (SB), who are impeded from normal entry into the economic mainstream because of past practices of discrimination based on race or ethnic background. These persons must own at least 51% of the entity and operate or control the business on a daily basis.

Minority: A person who is a citizen or lawful admitted permanent resident of the United States and who is a member of one (1) of the following groups:

- a. African American, persons having origins in any of the Black racial groups of Africa;
- b. Hispanic American, persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race;
- c. Native American, persons who have origin in any of the original peoples of North America ;
- d. Asian American, person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

Minority-owned business (MOB) is a continuing, independent, for profit business that performs a commercially useful function, and is at least fifty-one percent (51%) owned and controlled by one (1) or more minority individuals.

Woman-owned business (WOB) is a continuing, independent, for profit business that performs a commercially useful function, and is at least fifty-one percent (51%) owned and controlled by one (1) or more women.

Service Disabled Veteran-owned business (SDOV) is a continuing, independent, for profit business that performs a commercially useful function, owned by any person who served honorably on active duty in the armed forces of the United States with at least a twenty percent (20%) disability that is service connected. Meaning such disability was incurred or aggravated in the line of duty in the active military, naval or air service, and is at least fifty-one percent (51%) owned and controlled by one (1) or more service disabled veteran.

Small Business (SB) is a continuing, independent, for profit business which performs a commercially useful function and has total gross receipts of not more than ten million dollars (\$10,000,000) average over a three-year period or employs no more than ninety-nine (99) persons on a full-time basis.

RESCUE TOOL QUOTATION SHEET

ITEM #1: HEAVY DUTY RESCUE COMBI TOOL; 2EA REQUIRED.	\$ _____/ea
ITEM #2: MINI CUTTER; 2EA REQUIRED	\$ _____/ea
ITEM #3: RESCUE CUTTER; 2EA REQUIRED	\$ _____/ea
ITEM #4: BATTERY OPERATED HD COMBI TOOL; 2EA REQUIRED	\$ _____/ea
ITEM #5; BATTERY OPERATED RIT COMBI TOOL; 7EA REQUIRED	\$ _____/ea
ITEM #6; BATTERY OPERATED LARGE COMBI TOOL; 17EA REQUIRED	\$ _____/ea
ITEM #7; BATTERY OPERATED CUTTER; 5EA REQUIRED	\$ _____/ea
ITEM #8; BATTERY OPERATED SMALL RAM; 5EA REQUIRED	\$ _____/ea
ITEM #9; BATTERY OPERATED LARGE RAM; 5EA REQUIRED	\$ _____/ea
ITEM #10; BATTERY OPERATED RESCUE SPREADER; 5EA REQUIRED	\$ _____/ea
ITEM #11; LARGE TELESCOPIC RESCUE RAM; 2EA REQUIRED	\$ _____/ea
ITEM #12; SMALL TELESCOPIC RESCUE RAM; 2EA REQUIRED	\$ _____/ea
ITEM #13; HYDRAULIC SPREADER; 2EA REQUIRED	\$ _____/ea
ITEM #14; COMPACT RESCUE PUMP; 2EA REQUIRED	\$ _____/ea
**ITEM #15; HD HYDRAULIC PUMP W/ ELECTRIC HOSE REEL;2EA REQUIRED	\$ _____/ea
ITEM #16; 50' OF HD PUMP HOSE; 2EA REQUIRED (GREEN)	\$ _____/ea
50' OF HD PUMP HOSE; 2EA REQUIRED (ORANGE)	\$ _____/ea
ITEM #17; V-STRUT; 12EA REQUIRED	\$ _____/ea

**\*\*Item # 15 electric hose reel specifications:** electric driven rewinding system, left or right version, standard hose connections for supplied hose, up to 100' capacity, single reels, rated at 10,500 psi, NFPA compliant, 12 volts DC, 4 way roller guide, chain and sprocket drive, stainless steel discs and chrome frame. To be approximately 15"x 15" x 18".

**RESCUE TOOLS ANTICIPATED DELIVERY DATE**

ITEM #1: \_\_\_\_\_

ITEM #2: \_\_\_\_\_

ITEM #3: \_\_\_\_\_

ITEM #4: \_\_\_\_\_

ITEM #5: \_\_\_\_\_

ITEM #6: \_\_\_\_\_

ITEM #7: \_\_\_\_\_

ITEM #8: \_\_\_\_\_

ITEM #9: \_\_\_\_\_

ITEM #10: \_\_\_\_\_

ITEM #11: \_\_\_\_\_

ITEM #12: \_\_\_\_\_

ITEM #13: \_\_\_\_\_

ITEM #14: \_\_\_\_\_

ITEM #15: \_\_\_\_\_

ITEM #16: \_\_\_\_\_

ITEM #17: \_\_\_\_\_

**Background:** Knoxville Fire Department currently has 17 Engine companies with rescue tools (cutter, spreader, 2 rams and a hydraulic pump). 1 front line Rescue truck and 1 back up Rescue truck with a complete complement of rescue tools and a front line Hazmat Unit with a complete complement of rescue tools. Each of these trucks have mounted and portable hydraulic pumps. Knoxville Fire has 2 complete sets of back up tools (cutter, spreader, rams and a hydraulic pump). The majority of our equipment is 15 plus years old. It is the desire of the department to replace all existing equipment and add to our complement over the next two to three years.

**Warranty:** The manufacturer shall warrant this tool against all defects in material and workmanship for as long as owned by the original purchaser. The manufacturer must be located in the U.S.A. and provide a full-service warranty and repair center in the U.S.A.

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### **Heavy Duty Rescue Combi Tool**

#### **General**

The tool must be **UL Listed**: This tool must have successfully completed the rescue tool test program certified by Underwriters Laboratories, Inc. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a UL requirement to provide maximum safety to the operator. This tool must *also* be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of other people. For this reason the tool will be equipped with a carrying handle, which allows the operator to keep the tool evenly balanced in all positions even with one hand. To eliminate connection errors and reduce deployment time the tool shall be supplied with only one hydraulic coupler. This single coupler shall have a coaxial design with the pressure line inside of the return line to allow for rapid simultaneous connection of both lines with one connection motion. To avoid hindrance to the operator the coupler must be extremely compact and lightweight. The coupler design shall incorporate an automatic return valve to permit connection and disconnection of the tool to the hose *while under flow*. The coupler must be a flat-face, non-drip coupling with built-in automatic locking feature and be one hand operated. The coupler shall permit an unhindered 360° rotation at the connection point to avoid twisting or stressing the hose. Coupler must be supplied with a protective aluminum dust cap. The hose connection point will be to the rear of the dead man's handle, leading away in line with the center axis of the tool, avoiding interference with the operation of the tool.

#### **Dead man's Handle**

The tool must be activated by means of a rotary dead man's handle grip, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle grip is released, it must return to the neutral position automatically. The dead man's handle design will provide one-handed ergonomic control of opening and closing functions that does not rely on thumb (single digit) operation. The dead man's handle shall provide 360° access to the operator allowing operation of the tool in any position. The dead man's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves.

The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

#### **Lighted Carrying Handle**

To assist the operator and increase safety while working in dark or poorly lit circumstances the carrying handle shall have integrated LED lights. The lights shall be focused on the working area of the tool and shall be completely weatherproof. Lights should be powered by a field replaceable single AA battery and shall provide a minimum of six continuous hours of illumination. The distance between the dead man's handle and the U-shaped carrying handle will be at least 10" (254 mm) to provide a natural position for both hands during operation and to allow for complete control of the tool. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

#### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against over pressurization caused by accidentally disconnecting the return line of the tool. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the deadman's handle is released, whether the tool is spreading or pulling. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load. All moving parts such as yoke and levers must be protected by a cover for the safety of the operator.

#### **Hinge bolt system**

To allow better access into tight spaces the cutter will contain a low profile locking hinge bolt system that does not extend beyond the blade holder profile. Bolt head and nut construction that protrude and impede tool operation are not acceptable. This low profile system allows greater precision and control on every cut by locking the factory set torque value. For ease of maintenance, the hinge bolt system must require a torque of no more than 38 ft-lb (50Nm). For extended tool life the cutter shall have a set of corrosion resistant steel covers in place to shield the front of the tool from damage during the extrication operation.

#### **Blades/Arms**

The blades of the combi cutter will be fabricated out of high grade tool steel that is hardened to improve durability. The cutting, gripping and spreading surfaces of the blades will be regrindable to ensure a longer life span. For maximum safety and gripping when cutting, cutting edges will have specially designed half round serrations.

#### **Pump**

Hydraulic power must be delivered from a gasoline or electrically driven pump. Alternatively, a manually operated pump or an air driven pump may be used. The pump must be a completely separate unit from the rescue tool.

#### **Forces**

The maximum cutting force will be no less than 85,427 lbf. (380 kN) in the recess. Maximum spreading force must be at least 47,435 (211 kN). Maximum pulling force must be at least 14,358 lbf (63.9 kN). Maximum squeezing force must be at least 17,085 lbf (76 kN). The NFPA Cutting classification must be no less than A7 B8 C6 D7 E7.

NFPA HPF shall be no less than 14,358 lbf. (63.9 kN)  
NFPA HSF shall be no less than 7,541 lbf. (33.5 kN)  
NFPA LPF shall be no less than 8,230 lbf. (36.6kN)  
NFPA LSF shall be no less than 6,598 lbf. (29.3 kN)

### **Method of Measuring Forces**

The spreading force must be measured at the effective tip area on the moving arms, perpendicular to the center line of the tool when in an unfixed state. This measurement of force was calculated and approved by UL and measures the actual force created by the tool when used by the operator.

### **Weight & Dimensions**

The weight of an operable tool may not exceed 31 lbs. (14 kg) including hydraulic oil. Maximum spreader opening will be no less than 14¼" (362mm). Maximum cutter opening will be 9" (229 mm). Width of spreading tips must be 1 3/16" (31mm) minimum for optimum gripping. Squeezing surface should be 1 3/16" x 2 ¼" (30mm x 57mm) minimum. Length of tool shall not exceed 31" (787 mm). Width not to exceed 9 5/16" (236 mm). Height not to exceed 7 1/2" (190 mm).

### **Accessories**

Pulling adapters and chains will be available for pulling operations. The adapters must have a quick-lock system. Pulling chains will be equipped with shortening hooks. The strength of the chain set will be at least 2 times the maximum pulling force of the tool.

### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be anodized to provide maximum durability. The tool must be capable of withstanding a 10-day salt spray test, and still be able to function normally.

2.

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## **Mini Cutter**

### **General**

The tool must be capable of withstanding a static over-load pressure of twice the working pressure. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of other people. To eliminate connection errors and reduce deployment time the tool shall be supplied with only one compact hydraulic coupler. This single coupler shall have a coaxial design with the pressure line inside of the return line to allow for rapid simultaneous connection of both lines with one connection motion. The coupler design shall incorporate an automatic return valve to permit connection and disconnection of the tool to the hose while under flow. The coupler must be a flat-face, non-drip coupling with built-in automatic locking feature and be one hand operated. The coupler shall permit an unhindered 360° rotation at the connection point to avoid twisting or stressing the hose. Coupler must be supplied with a protective aluminum dust cap. The hose connection will be to the rear of the dead man's handle, leading away in line with the center axis of the tool, avoiding hindrance to the operator.

### **Dead Man's Handle**

The tool must be activated by means of a toggle-type, push button dead man's handle, operated by depressing the push button by one's thumb or fingers. When the dead man's push button is released, it must return to the neutral position automatically. The dead man's push button will provide one-handed control of opening and closing functions. The dead man's push button must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's push button shall be inset into the handle in such a way that inadvertent activation is not possible.

### **Safety and Protection**

For maximum safety of the operator the cutter shall contain a safety relief valve to protect the tool against over pressurization.

### **Blades**

The blades of the cutter will be fabricated from high grade tool steel, hardened to improve durability. The blades will be constructed so as to be re-grindable. The blades will be manufactured with serrations in the cutting edge. The outside edge of the blades will have serrations to allow for spreading/pushing operations.

### **Pump**

Hydraulic power must be delivered from a gasoline or electrically driven pump. Alternatively, a manually operated pump or an air driven pump may be used. To provide maximum ease of use (lightest weight) to the operator the pump must be a completely separate unit from the rescue tool.

### **Forces**

The maximum cutting force exerted will be no less than 49,458 lbf. (220 kN) in the blade's recess.

### **Weight & Dimensions**

The ready to use weight may not exceed 8.5 lbs. (3.9 kg). The maximum opening of the blades will be no less than 2 3/16" (55 mm) measured at the tips. The dimensions of the complete tool shall be within (L x W x H): 15" x 2 13/16" x 5 5/16" (380 x 72 x 135mm).

### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be anodized to provide maximum durability.

## 3.

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### **Rescue Cutter**

#### **General**

This tool must have successfully completed the rescue tool test program certified by Underwriters Laboratories, Inc. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a UL requirement to provide maximum safety to the operator. This tool must *also* be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of other people. For this reason the tool will be equipped with a carrying handle, which allows the operator to keep the tool evenly balanced in all positions even with one hand. To eliminate connection errors and reduce deployment time the tool shall be supplied with one hydraulic coupler. This single coupler shall have a coaxial design with the pressure line inside of the return line to allow for rapid simultaneous connection of both lines with one connection motion. To avoid hindrance to the operator the coupler must be extremely compact and lightweight. The coupler design shall incorporate an automatic return valve to permit connection and disconnection of the tool to the hose *while under flow*. The coupler must be a flat-face, non-drip coupling with a built-in automatic locking feature and must be one hand operated. The coupler shall permit an unhindered 360° rotation at the connection point to avoid twisting or stressing the hose. The coupler must be supplied with a protective aluminum dust cap. The hose connection point will be to the rear of the dead man's handle, leading away in line with the center axis of the tool, avoiding interference with the operation of the tool.

### **Forces**

The maximum force will be no less than 312,260 lbf. (1389 kN) in the recess of the blades, near the hinge bolt. The NFPA performance level rating for this tool shall be A8 B8 C7 D9 E9.

### **Ergonomic Advantage**

Cutter jaw mounted at an angle of 30 degrees in relation to the body of the tool to reduce the effect of tool movement towards the passenger cell and thus the patient. This blade design allows for a more ergonomic positioning when cutting above or below waist height, less strain on the rescuer.

### **Weight and dimensions**

The maximum opening of the blades will be no less than 7.2" (182 mm) measured at the tips. The weight of the tool must not exceed 35.7 lbs. (16.2 kg). The dimensions (LxWxH) must not exceed 30.8" x 10.5" x 11.1" (783 x 266 x 281 mm).

### **Dead man's handle**

The tool must be activated by means of a rotary deadman's handle grip, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the deadman's handle grip is released, it must return to the neutral position automatically. The deadman's handle design will provide one-handed ergonomic control of opening and closing functions that does not rely on thumb (single digit) operation. The deadman's handle shall provide 360° access to the operator allowing operation of the tool in any position. The deadman's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The deadman's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have six integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 6-LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. The LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Blades**

The blades of the cutter will be fabricated from high grade tool steel, hardened to improve durability. The blades shall be manufactured from forged bar stock by CNC machining technology. The design of the blade shall be derived to meet the requirement of today's rescuer facing *New Car Technology*. The blades will be constructed so as to be re-grindable.

### **Hinge Bolt System**

To allow better access to tight spaces and improve cutting and spreading precision, the-tool shall utilize an integrated locking hinge bolt system that must not extend beyond the blade holder profile. It shall be physically locked by means of a precision interlocking ring that maintains factory set torque values. For added protection from damage, corrosion resistant steel covers will shield the hinge bolt system and blade holders on each side. The profile height at the widest point must be less than 3.38". Bolt heads or nuts that protrude beyond the blade holder profile, 1) impede tool operation; 2) increase surface area exposed to damage; 3) risk compromised torque values and blade performance due to exposure during rescue operations. For these reasons, this type of hinge bolt system is unacceptable. For ease of maintenance and lower maintenance cost, the hinge bolt system must not use any blade shims, and the factory recommended torque may not exceed 38 ft-lb (50Nm).

#### **Pump**

Hydraulic power must be delivered from a gasoline, electrical or hydraulically driven pump. Alternatively, a manually operated pump or an air driven pump may be used. The pump must be a completely separate unit from the rescue tool.

#### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against sudden load shift. All moving parts such as yoke and levers must be protected by a cover for the safety of the operator.

#### **Corrosion and wear protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

4.

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### **Battery Operated Heavy Duty Combi Tool**

#### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of others. The tool must operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

#### **Forces**

The maximum cutting force will be no less than 85,427 lbf. (380 kN) in the recess. Maximum spreading force must be at least 47,435 (211 kN). Maximum pulling force must be at least 14,358 lbf (63.9 kN). Maximum squeezing force must be at least 17,085 lbf (76 kN). The NFPA Cutting classification must be no less than A7 B8 C6 D7 E7.

NFPA HPF shall be no less than 14,358 lbf. (63.9 kN)

NFPA HSF shall be no less than 7,541 lbf. (33.5 kN)

NFPA LPF shall be no less than 8,230 lbf. (36.6kN)  
NFPA LSF shall be no less than 6,598 lbf. (29.3 kN)

### **Weight & Dimensions**

Maximum spreader opening will be no less than 14.2 (360 mm). Maximum cutter opening will be 9" (229 mm). Width of spreading tips must be 1.2" (31mm) minimum for optimum gripping. Squeezing surface should be 1.1" x 2.25 (30mm x 57mm) minimum. Length of tool shall not exceed 35.4" (900 mm). Width not to exceed 10.8" (275 mm). Height not to exceed 8.1" (205 mm). Weight, excluding battery shall not be more than 42.1 lbs (19.1 kg), including battery shall not exceed 44.3 lbs (20.1 kg).

### **Accessories**

Pulling adapters and chains will be available for pulling operations. The adapters must have a quick-lock system. Pulling chains will be equipped with shortening hooks. The strength of the chain set will be at least 2 times the maximum pulling force of the tool.

### **Deadman's Handle**

The tool must be activated by means of a rotary deadman's handle grip, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the deadman's handle grip is released, it must return to the neutral position automatically. The deadman's handle design will provide one-handed ergonomic control of opening and closing functions that does not rely on thumb (single digit) operation. The deadman's handle shall provide 360° access to the operator allowing operation of the tool in any position. The deadman's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The deadman's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have four integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 4-LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Hinge bolt system**

To allow better access to tight spaces and improve cutting and spreading precision, the tool shall utilize an integrated locking hinge bolt system that must not extend beyond the blade holder profile. It shall be physically locked by means of a precision interlocking ring that maintains factory set torque values. For added protection from damage, corrosion resistant steel covers will shield the hinge bolt system and blade holders on each side. The profile height

at the widest point must be less than 3.38". Bolt heads or nuts that protrude beyond the blade holder profile, 1) impede tool operation; 2) increase surface area exposed to damage; 3) risk compromised torque values and blade performance due to exposure during rescue operations. For these reasons, this type of hinge bolt system is unacceptable. For ease of maintenance and lower maintenance cost, the hinge bolt system must not use any blade shims, and the factory recommended torque may not exceed 38 ft-lb (50Nm).

### **Blades/Arms**

The blades of the combi cutter will be fabricated out of high grade tool steel that is hardened to improve durability. The cutting, gripping and spreading surfaces of the blades will be regrindable to ensure a longer life span. For maximum safety and gripping when cutting, cutting edges will have specially designed half round serrations.

### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 5Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

The battery shall have 4 LED lights to indicate its SOC (state of charge). The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The charger shall comply with FCC15 electronic noise emission standards. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against over pressurization caused by accidentally disconnecting the return line of the tool. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the deadman's handle is released, whether the tool is spreading or pulling. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load. All moving parts such as yoke and levers must be protected by a cover for the safety of the operator.

### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be anodized to provide maximum durability. The tool must be capable of withstanding a 10-day salt spray test, and still be able to function normally.

## 5.

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### **Battery Operated RIT Combi-tool**

#### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of others. The tool must be operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

#### **Forces**

The maximum cutting force exerted will be no less than 46,311 lbf. (206 kN) Maximum spreading force must be at least 102,738 lbf (457 kN). Maximum squeezing force must be at least 9892 lbf (43.5 kN). The NFPA performance level rating for this tool shall be A5 B5 C5 D6 E4. The spread force calculations using the NFPA 1936 standard shall be no less than: HSF - 11690 lbf. (52 kN); LSF - 8992 lbf. (40 kN).

#### **Weight and Dimensions**

Maximum spreader opening will be no less than 11.1" (281 mm). Maximum cutter opening will be 7.7" (196 mm). Dimensions of the tool (LxWxH) shall not exceed 26.8" (680 mm) x 10.9" (278 mm) x 8.1" (205 mm). Weight shall not exceed 28.9 lbs (13.1 kg), excluding the battery; 31.1 lbs. (14.1kg) including the battery.

#### **Deadman's Handle**

The tool must be activated by means of a rotary dead man's handle, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle is released, it must return to the neutral position automatically. The dead man's handle will provide one-handed control of opening and closing functions. The dead man's handle shall provide 360 degree access to the operator allowing operation of the tool in any position. The dead man's handle

must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

#### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have four integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

#### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 4-LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

#### **Hinge bolt system**

To allow better access to tight spaces and improve cutting and spreading precision, the tool shall utilize an integrated locking hinge bolt system that must not extend beyond the blade holder profile. It shall be physically locked by means of a precision interlocking ring that maintains factory set torque values. The profile height at the widest point must be less than 2.4" (61 mm). Bolt heads or nuts that protrude beyond the blade holder profile, 1) impede tool operation; 2) increase surface area exposed to damage; 3) risk compromised torque values and blade performance due to exposure during rescue operations. For these reasons, this type of hinge bolt system is unacceptable. For ease of maintenance and lower maintenance cost, the hinge bolt system must not use any blade shims, and the factory recommended torque may not exceed 38 ft-lb (50Nm).

#### **Blades/Arms**

The blades of the combi cutter will be fabricated out of high-grade tool steel that is hardened to improve durability. The cutting, gripping and spreading surfaces of the blades will be regrindable to ensure a longer life span. For maximum safety and gripping when cutting, cutting edges will have specially designed half round serrations.

#### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

#### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 5Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

The battery shall have 4 LED lights to indicate its SOC (state of charge). The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The charger shall comply with FCC15 electronic noise emission standards. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

#### **Safety and Protection**

For maximum safety of the operator a safety relief valve to protect the tool against over pressurization. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the pump handle is released, whether the tool is spreading or pulling. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load. To provide for the safety of the operator, a cover must protect all moving parts such as yoke and levers.

#### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

#### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodize to provide maximum durability. The tool must be capable of withstanding a 10-day salt spray test, and still be able to function normally. Blades must have a method of lubrication through the hinge bolt using a grease gun.

6.

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### **Battery Operated Large Combi-Tool**

#### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety

to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of others. The tool must be operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

### **Forces**

The maximum cutting force exerted will be no less than 45,861 lbf. (204 kN) Maximum spreading force must be at least 12,140 lbf (54 kN). The NFPA performance level rating for this tool shall be A5 B5 C4 D6 E4. The spread force calculations using the NFPA 1936 standard shall be no less than:

HSF - 7194 lbf. (32 kN)

LSF - 5620 lbf. (25 kN)

HPF - 6070 lbf (27 kN)

LPF – 4047 lbf (18 kN)

### **Weight and Dimensions**

Maximum spreader opening will be no less than 17" (431 mm). Maximum cutter opening will be 13.9" (352 mm). Weight shall not exceed 30.6 lbs (13.9 kg), excluding the battery; 32.8 lbs. (14.9kg) including the battery. Dimensions of the tool (LxWxH) shall not exceed 30.6" x 11 x 8" (778 x 279 x 204 mm).

### **Deadman's Handle**

The tool must be activated by means of a rotary dead man's handle, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle is released, it must return to the neutral position automatically. The dead man's handle will provide one-handed control of opening and closing functions. The dead man's handle shall provide 360 degree access to the operator allowing operation of the tool in any position. The dead man's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have four integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 4-LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Hinge bolt system**

To allow better access to tight spaces and improve cutting and spreading precision, the tool shall utilize an integrated locking hinge bolt system that must not extend beyond the blade holder profile. It shall be physically locked by means of a precision interlocking ring that maintains factory set torque values. The profile height at the widest point must be less than 2.4" (61 mm). Bolt heads or nuts that protrude beyond the blade holder profile, 1) impede tool operation; 2) increase surface area exposed to damage; 3) risk compromised torque values and blade performance due to exposure during rescue operations. For these reasons, this type of hinge bolt system is unacceptable. For ease of maintenance and lower maintenance cost, the hinge bolt system must not use any blade shims, and the factory recommended torque may not exceed 38 ft-lb (50Nm).

### **Blades/Arms**

The blades of the combi cutter will be fabricated out of high-grade tool steel that is hardened to improve durability. The cutting, gripping and spreading surfaces of the blades will be regrindable to ensure a longer life span. For maximum safety and gripping when cutting, cutting edges will have specially designed half round serrations.

### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 5Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

The battery shall have 4 LED lights to indicate its SOC (state of charge). The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The charger shall comply with FCC15 electronic noise emission standards. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

#### **Safety and Protection**

For maximum safety of the operator a safety relief valve to protect the tool against over pressurization. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the pump handle is released, whether the tool is spreading or pulling. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load. To provide for the safety of the operator, a cover must protect all moving parts such as yoke and levers.

#### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodize to provide maximum durability. The tool must be capable of withstanding a 10-day salt spray test, and still be able to function normally. Blades must have a method of lubrication through the hinge bolt using a grease gun

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### **Battery Operated Cutter**

#### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of others. The tool must be operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

#### **Forces**

The maximum force will be no less than 312,260 lbf. (1389 kN) in the recess of the blades, near the hinge bolt. The NFPA performance level rating for this tool shall be A8 B8 C7 D9 E9.

#### **Weight and dimensions**

The maximum opening of the blades will be no less than 7.2" (182 mm) measured at the tips. Weight of the tool not to exceed 46.1 lbs. (20.9 kg) excluding the battery; 48.3 lbs. (21.9 kg) including the battery. Dimensions (LxWxH) not to exceed 35.4" x 11.7" x 10.6" (898 x 298 x 268 mm).

#### **Dead man's handle**

The tool must be activated by means of a rotary deadman's handle grip, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either

direction. When the deadman's handle grip is released, it must return to the neutral position automatically. The deadman's handle design will provide one-handed ergonomic control of opening and closing functions that does not rely on thumb (single digit) operation. The deadman's handle shall provide 360° access to the operator allowing operation of the tool in any position. The deadman's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The deadman's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### **Ergonomic Advantage**

Cutter jaw mounted at an angle of 30 degrees in relation to the body of the tool to reduce the effect of tool movement towards the passenger cell and thus the patient. This blade design allows for a more ergonomic positioning when cutting above or below waist height, less strain on the rescuer.

### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have six integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 6-LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Blades**

The blades of the cutter will be fabricated from high grade tool steel, hardened to improve durability. The blades shall be manufactured from forged bar stock by CNC machining technology. The design of the blade shall be derived to meet the requirement of today's rescuer facing *New Car Technology*. The blades will be constructed so as to be re-grindable.

### **Hinge Bolt System**

To allow better access to tight spaces and improve cutting and spreading precision, the-tool shall utilize an integrated locking hinge bolt system that must not extend beyond the blade holder profile. It shall be physically locked by means of a precision interlocking ring that maintains factory set torque values. For added protection from damage, corrosion resistant steel covers will shield the hinge bolt system and blade holders on each side. The profile height at the widest point must be less than 3.38". Bolt heads or nuts that protrude beyond the blade holder profile, 1) impede tool operation; 2) increase surface area exposed to damage; 3) risk compromised torque values and blade performance due to exposure during rescue operations. For these reasons, this type of hinge bolt system is unacceptable. For ease of maintenance and lower maintenance cost, the hinge bolt system must not use any blade shims, and the factory recommended torque may not exceed 38 ft-lb (50Nm).

### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 5Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

The battery shall have 4 LED lights to indicate its SOC (state of charge). The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The charger shall comply with FCC15 electronic noise emission standards. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against sudden load shift. All moving parts such as yoke and levers must be protected by a cover for the safety of the operator.

### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

### **Corrosion and wear protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

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## Battery Operated Small Ram

### General

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of others. The tool must be operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

### Forces

The ram will have a maximum pushing force (NFPA 1936 HSF, LSF) of no less than 36,460 lbf (162 kN) and a maximum pulling force (NFPA 1936 HPF, LPF) of no less than 11,265 lbf (50.1 kN).

### Weight & Dimensions

Weight of the tool not to exceed 39 lbs (17.7 kg) excluding the battery; 41.2 lbs (18.7 kg) including the

battery. Closed length not to exceed 23.3" (593 mm); length of extended must be at least 33.2" (843 mm).

Width not to exceed 9.4" (239 mm). Height not to exceed 17.8" (452 mm).

Spreading/Pulling stroke not less than 9.8" (250 mm).

### Dead man's handle

The tool must be activated by means of a rotary deadman's handle grip, operated by a twist of the wrist. For operational continuity the deadman's handle shall be of the same design as for the non-battery operated tools. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the deadman's handle grip is released, it must return to the neutral position automatically. The deadman's handle design will provide one-handed ergonomic control of opening and closing functions that does not rely on thumb (single digit) operation. The deadman's handle shall provide 360° access to the operator allowing operation of the tool in any position. The deadman's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The deadman's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### Lighted Carrying Handle

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### Task Lighting

To assist in any poorly lit or nighttime rescue scenario, 4-LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Grip Heads**

The end of the plunger will have a twist-lock design to allow rotation of the grip heads even when the tool is under a load. Rams with threaded grip heads that could become corroded and prevent use of interchangeable accessories shall not be acceptable. The twist-lock design shall accept interchangeable tool accessories. Likewise, the rear of the tool shall have a twist-lock design to also accept extension pipes. Tool shall be delivered with two diamond shaped grip heads designed to prevent off-center loads.

### **Accessories**

All accessories shall be of a twist lock design. No threading and/or loose locking pins are allowed.

#### **-Pulling attachments**

Pulling adapters and chains will be provided for pulling operations. The adapters must have a quick-change design. Pulling chains will be equipped with shortening hooks. Safety factor of the chain set will be at least 2 times the maximum pulling force of the tool

#### **-Attachments**

-Wedge tip for splitting.

-Conical point for piercing holes in sheet materials.

-Round flat base min. diameter 4 ½" (115 mm) for better distribution of the forces.

#### **-Extension Pipes**

Extension pipes in the following lengths will be available for pushing operations:

6 ½" (165 mm), 13" (330 mm) and 23 ½" (597 mm)

#### **-Ram Support Unit**

Provides firm surface to allow for full extension and effectiveness of the ram during pushing operations such as dash displacements.

### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 5Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

The battery shall have 4 LED lights to indicate its SOC (state of charge). The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, and rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The charger shall comply with FCC15 electronic noise emission standards. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

#### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against sudden load shift. All moving parts such as yoke and levers must be protected by a cover for the safety of the operator.

#### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

#### **Corrosion and wear protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

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### **Battery Operated Large Ram**

#### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of

others. The tool must be operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

### **Forces**

The ram will have a maximum pushing force (NFPA 1936 HSF, LSF) of no less than 36,460 lbf (162 kN) and a maximum pulling force (NFPA 1936 HPF, LPF) of no less than 11,265 lbf (50.1 kN).

### **Weight & Dimensions**

Weight of the tool not to exceed 42.1 lbs (19.1 kg) excluding the battery; 44.3 lbs (20.1 kg) including the battery. Closed length not to exceed 27.2" (691 mm); length of extended must be at least 41" (1041 mm). Width not to exceed 9.4" (239 mm). Height not to exceed 17.8" (452 mm). Spreading/Pulling stroke not less than 13.8" (350 mm).

### **Dead man's handle**

The tool must be activated by means of a rotary deadman's handle grip, operated by a twist of the wrist. For operational continuity the deadman's handle shall be of the same design as for the non-battery operated tools. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the deadman's handle grip is released, it must return to the neutral position automatically. The deadman's handle design will provide one-handed ergonomic control of opening and closing functions that does not rely on thumb (single digit) operation. The deadman's handle shall provide 360° access to the operator allowing operation of the tool in any position. The deadman's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The deadman's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 4 LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Grip Heads**

The end of the plunger will have a twist-lock design to allow rotation of the grip heads even when the tool is under a load. Rams with threaded grip heads that could become corroded and prevent use of interchangeable accessories shall not be acceptable. The twist-lock design shall accept interchangeable tool accessories. Likewise, the rear of the tool shall have a twist-lock design to also accept extension pipes. Tool shall be delivered with two diamond shaped grip heads designed to prevent off-center loads.

### **Accessories**

All accessories shall be of a twist lock design. No threading and/or loose locking pins are allowed.

#### **-Pulling attachments**

Pulling adapters and chains will be provided for pulling operations. The adapters must have a quick-change design. Pulling chains will be equipped with shortening hooks. Safety factor of the chain set will be at least 2 times the maximum pulling force of the tool

#### **-Attachments**

-Wedge tip for splitting.

-Conical point for piercing holes in sheet materials.

-Round flat base min. diameter 4 ½" (115 mm) for better distribution of the forces.

#### **-Extension Pipes**

Extension pipes in the following lengths will be available for pushing operations:

6 ½" (165 mm), 13" (330 mm) and 23 ½" (597 mm)

#### **-Ram Support Unit**

Provides firm surface to allow for full extension and effectiveness of the ram during pushing operations such as dash displacements.

### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 4.1Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

The battery shall have 4 LED lights to indicate its SOC (state of charge). The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, and rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The charger shall comply with FCC15

electronic noise emission standards. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against sudden load shift. All moving parts such as yoke and levers must be protected by a cover for the safety of the operator.

### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

### **Corrosion and wear protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

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### **Battery Operated Rescue Spreader**

#### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be capable of operating as a self-contained unit without power cables for maximum portability. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of others. The tool must be operate efficiently in all weather conditions and environments from -4 F (-20 C) to 131 F (55 C).

#### **Forces**

The arms of the spreader will have a maximum opening width of 28.5" (725 mm), must exert no less than 62,947 lbf (280 kN) at the base of the tips.

NFPA HSF shall be no less than 15,737 lbf (70 kN)

NFPA LSF shall be no less than 8,543 lbf (38 kN)

NFPA HPF shall be no less than 10,566 lbf (47 kN)

NFPA LPF shall be no less than 5,620 lbf (25 kN)

#### **Weight & Dimensions**

The weight of the tool may not exceed 43.2 lbs (19.6 kg) without the battery, 45.4 lbs (20.6 kg), with the battery. Dimensions (LxWxH) not to exceed 37.5" (952 mm) x 11.3" (286 mm) x 8.5" (216 mm).

### **Accessories**

The following accessories will be available:

#### **-Pulling attachments**

Pulling adapters and chains will be provided for pulling operations. The adapters must have the same quick-change design as the spreading tips. Pulling chains will be equipped with shortening hooks. Safety factor of the chain set will be at least 2 times the maximum pulling force of the tool.

#### **-Cutting Tip**

An optional cutting tip for cutting sheet metals will be available. The cutting tip must have the same quick-change design as the spreading tips.

### **Deadman's Handle**

The tool must be activated by means of a rotary dead man's handle, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle is released, it must return to the neutral position automatically. The dead man's handle will provide one-handed control of opening and closing functions. The dead man's handle shall provide 360 degree access to the operator allowing operation of the tool in any position. The dead man's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

### **Lighted Carrying Handle**

Designed for ease of control, the tool's carrying handle shall allow natural hand position for right or left handed operators. The lightweight, steel carrying handle shall have six integrated LED lights. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

### **Task Lighting**

To assist in any poorly lit or nighttime rescue scenario, 6 LED lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands in the carrying handle. The lights shall be focused on the working area of the tool and must be completely weatherproof. To dedicate all of the tool's 28v lithium ion battery power to the rescue operation, the LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life an on/off switch for the lights must also be included in the carrying handle.

### **Arms**

The arms and yoke of the spreader must be manufactured out of extremely high tensile aluminum alloy, anodized to offer protection against corrosion. The arms of the spreader will be equipped with investment cast hardened tool steel tips, specially designed for quick field replacement without the use of any tools. Spring-loaded tip locking pins will be incorporated into the arms so that no loose parts can be lost. The tips will have serrations on both the inside and the outside for a superior grip in spreading or crushing operations.

### **Pump**

Hydraulic power must be delivered from an internally mounted axial piston pump driven by an internal electric motor that operates on 28v Lithium-Ion batteries or AC/DC Adapter. The pump shall produce a maximum of 10,443 psi and operate on mineral-based hydraulic oil.

#### **Battery & Battery Charger**

28v Lithium-Ion (lithium manganese oxide/graphite) batteries shall be supplied standard with the tool. The battery shall be available in two types - 3Ah or 5Ah, each weighing no more than 2 lbs. The battery must be able to operate in wet weather conditions.

Run time will vary, depending on how heavily the battery is taxed during the rescue operation, and ambient air temperature. In order to simulate a rescue, we have defined a "standard" test cycle as: open/close for 30 seconds, full pressure for one minute, open/close for 30 seconds, rest for 30 seconds. Repeating this cycle, the 3Ah battery will last about 11 minutes; 5Ah battery about 20 minutes.

The battery shall have internal safeguards designed to protect against: Short-circuit, Deep discharge, Over and under voltage (battery and cells), Over-current during charging and discharging, Overcharging, Over temperature (individual cells and electronics), Charging and discharging outside allowed temperature range. The batteries must be recyclable through a service available in North America. Nickel Cadmium batteries are not acceptable.

The charger shall provide a 90% charge to either battery in 30 minutes; 100% full charge in 45 minutes for the 3Ah battery; 1 hr. for the 5Ah battery. The battery chargers shall be available for 120 VAC or 230v. The charger shall have green LED lights to indicate the battery's state of charge, red LED lights to indicate the battery's condition.

#### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against over pressurization caused by sudden load shift on the tool. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the dead man's handle is released, whether the tool is spreading or pulling. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load. All moving parts such as yoke and levers must be protected by a cover for the safety of the user.

#### **Performance and Durability**

The tool shall remain operational after being submerged under 3 feet of water for 10 minutes. The tool shall withstand a 5-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

#### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally

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## **Large Telescopic Rescue Ram**

### **General**

This tool must also be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be capable of performing 1000 endurance cycles, whereby one cycle consists of completely opening and closing the tool at its maximum pressure during its stroke. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the assistance of other people. For this reason the tool will be equipped with a carrying handle, which allows the operator to keep the tool evenly balanced in all positions even with one hand. To eliminate connection errors and reduce deployment time the tool shall be supplied with only one compact hydraulic coupler. This single coupler shall have a coaxial design with the pressure line inside of the return line to allow for rapid simultaneous connection of both lines with one connection motion. The coupler design shall incorporate an automatic return valve to permit connection and disconnection of the tool to the hose while under flow. The coupler must be a flat-face, non-drip coupling with built-in automatic locking feature and be one hand operated. Coupler must be supplied with a protective aluminum dust cap. The hose connection will be to the rear of the dead man's handle, leading away in line with the center axis of the tool, avoiding hindrance to the operator.

### **Dead man's Handle**

The tool must be activated by means of a rotary dead man's handle, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle is released, it must return to the neutral position automatically. The dead man's handle will provide one-handed control of opening and closing functions. The dead man's handle shall provide 360 degree access to the operator allowing operation of the tool in any position. The dead man's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool. In addition, the ram must be able to rotate under load to allow the operating handle to be moved out of the way for patient removal.

### **Carrying Handle**

To assist in carrying and positioning of the rescue ram it shall be supplied with a carrying handle.

### **Safety and Protection**

When both ram plungers are fully extended and under maximum load, the safety factor against bending or buckling must be at least 2:1. For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against over pressurization caused by sudden load shift on the tool. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the dead man's

handle is released. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load.

### **Pump**

Hydraulic power must be delivered from a gasoline or electrically driven pump. Alternatively, a manually operated pump or an air driven pump may be used. To provide maximum ease of use (lightest weight) to the operator the pump must be a completely separate unit from the rescue tool.

### **Grip Heads**

The ends of the plungers will have non-threaded connections of the grip heads to allow rotation of the tool even when the tool is under a load. Tool shall be delivered with two diamond shaped grip heads designed to prevent off-center loads.

### **Forces**

The first plunger will have a maximum pushing force of no less than 49,145 lbf (218.6 kN). The second plunger will have a maximum pushing force of no less than 18,210 lbf (81 kN).

### **Weight & Dimensions**

Length of closed tool not to exceed 21 1/8" (537 mm).

Length of extended tool not to exceed 49 15/16" (1269 mm).

Width not to exceed 13 3/4" (350 mm),

Height not to exceed 5 1/4" (133 mm)

Stroke of first plunger 14 15/16" (380 mm).

Stroke of second plunger 13 13/16" (352 mm).

Weight not to exceed 36.5 lbs (16.6 kg).

### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

### **Accessories**

#### **-Ram Support Unit**

Provides firm surface to allow for full extension and effectiveness of the ram during pushing operations such as dash displacements

# 12.

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## **Small Telescopic Rescue Ram**

### **General**

This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2010 edition. The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a requirement to provide maximum safety to the operator. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position,

guide and operate the tool without the assistance of other people. For this reason the tool will be equipped with a carrying handle, which allows the operator to keep the tool evenly balanced in all positions even with one hand. To eliminate connection errors and reduce deployment time the tool shall be supplied with only one hydraulic coupler. This single coupler shall have a coaxial design with the pressure line inside of the return line to allow for rapid simultaneous connection of both lines with one connection motion. To avoid hindrance to the operator the coupler must be extremely compact and lightweight. The coupler design shall incorporate an automatic return valve to permit connection and disconnection of the tool to the hose *while under flow*. The coupler must be a flat-face, non-drip coupling with built-in automatic locking feature and be one hand operated. The coupler shall permit an unhindered 360° rotation at the connection point to avoid twisting or stressing the hose. Coupler must be supplied with a protective aluminum dust cap. The hose connection point will be to the rear of the dead man's handle, leading away in line with the center axis of the tool, avoiding interference with the operation of the tool.

### **Dead man's Handle**

The tool must be activated by means of a rotary dead man's handle, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle is released, it must return to the neutral position automatically. The dead man's handle will provide one-handed control of opening and closing functions. The dead man's handle shall provide 360 degree access to the operator allowing operation of the tool in any position. The dead man's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool. In addition, the ram must be able to rotate under load to allow the operating handle to be moved out of the way for patient removal.

### **Carrying Handle**

To assist in carrying and positioning of the rescue ram it shall be supplied with a carrying handle.

### **Safety and Protection**

When both ram plungers are fully extended and under maximum load, the safety factor against bending or buckling must be at least 2:1. For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against over pressurization caused by sudden load shift on the tool. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the dead man's handle is released. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load.

### **Pump**

Hydraulic power must be delivered from a gasoline or electrically driven pump. Alternatively, a manually operated pump or an air driven pump may be used. To provide maximum ease of use (lightest weight) to the operator the pump must be a completely separate unit from the rescue tool.

### **Grip Heads**

The ends of the plungers will have non-threaded connections of the grip heads to allow rotation of the tool even when the tool is under a load. Tool shall be delivered with two diamond shaped grip heads designed to prevent off-center loads.

### **Forces**

The first plunger will have a maximum pushing force of no less than 49,145 lbf (218.6 kN). The second plunger will have a maximum pushing force of no less than 18,210 lbf (81 kN).

### **Weight & Dimensions**

Length of closed tool not to exceed 12 1/16" (307 mm).  
Length of extended tool not to exceed 23 1/8" (588 mm).  
Width not to exceed 13 3/4" (350 mm),  
Height not to exceed 5 1/4" (133 mm)  
Stroke of first plunger 6 3/16" (157 mm).  
Stroke of second plunger 4 7/8" (124 mm).  
Weight not to exceed 23.5 lbs (10.7 kg).

### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

### **Accessories**

#### **-Ram Support Unit**

Provides firm surface to allow for full extension and effectiveness of the ram during pushing operations such as dash displacements.

# 13.

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## **Hydraulic Spreader**

### **General**

The tool must be capable of withstanding a static over-load pressure of twice the working pressure. This 2:1 over-load ratio is a UL requirement to provide maximum safety to the operator. This tool must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The tool must be a "one-person" operated lightweight tool, which means that one person will be able to position, guide and operate the tool without the

assistance of other people. For this reason the tool will be equipped with a carrying handle, which allows the operator to keep the tool evenly balanced in all positions even with one hand. To eliminate connection errors and reduce deployment time the tool shall be supplied with only one compact hydraulic coupler. This single coupler shall have a coaxial design with the pressure line inside of the return line to allow for rapid simultaneous connection of both lines with one connection motion. The coupler design shall incorporate an automatic return valve to permit connection and disconnection of the tool to the hose while under flow. The coupler must be a flat-face, non-drip coupling with built-in automatic locking feature and be one hand operated. Coupler must be supplied with a protective aluminum dust cap. The hose connection will be to the rear of the dead man's handle, leading away in line with the center axis of the tool, avoiding hindrance to the operator.

#### **Dead man's Handle**

The tool must be activated by means of a rotary dead man's handle, operated by a twist of the wrist. For ease of operation, the handle shall have a maximum rotation of 20° in either direction. When the dead man's handle is released, it must return to the neutral position automatically. The dead man's handle will provide one-handed control of opening and closing functions. The dead man's handle shall provide 360 degree access to the operator allowing operation of the tool in any position. The deadman's handle must be located in such a way that it can be operated, guided and supported easily by right and left handed operators without having to change the position of the hands, even when wearing gloves. The dead man's control must be capable of withstanding 6000 endurance cycles, one cycle consisting of opening and closing the tool.

#### **Lighted Carrying Handle**

To assist in any poorly lit or nighttime rescue scenario, 6 integrated LED task lights shall be included. To provide maximum lighting, with minimal interference, the LEDs should be oriented in a position forward of the operator's hands. The lights shall be focused on the working area of the tool and must be completely weatherproof. The LED task lights must be powered by a single field replaceable AA battery and shall provide a minimum of six continuous hours of illumination. To preserve AA battery life when not needed, an on/off switch for the lights must also be included in the carrying handle. The tool shall remain in a balanced horizontal position when held only by the carrying handle. In order to provide improved grip in all weather conditions, the carrying handle must have a non-slip surface.

#### **Forces**

The arms of the spreader will have a maximum opening width of 32.4" (822 mm) with a maximum spreading force of 117,350 lbf (522 kN).

NFPA HSF shall be no less than: 26,303 lbf. (117 kN)

NFPA LSF shall be no less than: 13,039 lbf. (58 kN)

NFPA HPF shall be no less than: 18,434 lbf. (82 kN)

NFPA LPF shall be no less than: 8,318 (37 kN)

#### **Weight & Dimensions**

The weight of the ready-for-use tool may not exceed 43.9 lbs (19.9 kg) including hydraulic oil. Length of not to exceed 36.2" (919 mm). Width not to exceed 12.6" (321 mm). Height not to exceed 8.7" (220 mm)

### **Method of Measuring Forces**

The spreading force must be measured at the effective tip area on the moving arms, perpendicular to the centerline of the tool when in an unfixed state. This measurement of force measures the actual force created by the tool when used by the operator.

### **Safety and Protection**

For maximum safety of the operator all cutters, spreaders and rams shall contain a safety relief valve to protect the tool against over pressurization caused by sudden load shift on the tool. The tool will have automatic, non-return check valves built in so that the tool will hold the load when the dead man's handle is released, whether the tool is spreading or pulling. If pressure should drop because of interruption of the power source for any reason, the tool must hold the load. All moving parts such as yoke and levers must be protected by a cover for the safety of the user.

### **Arms**

The arms and yoke of the spreader must be manufactured out of extremely high tensile aluminum alloy, anodized to offer protection against corrosion. The arms of the spreader will be equipped with investment cast hardened tool steel tips, specially designed for quick field replacement without the use of any tools. Spring-loaded tip locking pins will be incorporated into the arms so that no loose parts can be lost. The tips will have serrations on both the inside and the outside for a superior grip in spreading or crushing operations.

### **Pump**

Hydraulic power must be delivered from a gasoline or electrically driven pump. Alternatively, a manually operated pump or an air driven pump may be used. To provide maximum ease of use (lightest weight) to the operator the pump must be a completely separate unit from the rescue tool.

### **Accessories**

The following accessories will be available:

#### **-Pulling attachments**

Pulling adapters and chains will be provided for pulling operations. The adapters must have the same quick-change design as the spreading tips. Pulling chains will be equipped with shortening hooks. Safety factor of the chain set will be at least 2 times the maximum pulling force of the tool.

#### **-Cutting Tip**

An optional cutting tip for cutting sheet metals will be available. The cutting tip must have the same quick-change design as the spreading tips.

### **Corrosion & Wear Protection**

Internal and external aluminum parts of the tool that are susceptible to wear or corrosion must be protected by anodization to provide maximum durability. The tool must be capable of withstanding a 10 day salt spray test, and still be able to function normally.

# 14.

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## Compact Rescue Pump

### General

This pump must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. It must also comply with EN 13204. Classification to Third Party Standards shall be performed by Underwriters Laboratories or by a test laboratory recognized and accepted by this AHJ. The pump must allow operation in a humid and dusty environment. The pump must be capable of powering two tools at full power, independently and simultaneously. The pump must have a connecting block incorporating flat face female couplers of a coaxial design, with the pressure line inside of the return line, allowing for simultaneous connection of both lines with one connection motion. The couplers must be of a flat-face, non-drip style, with built-in automatic locking feature, capable of being operated with one hand and must be supplied with aluminum protective dust caps. The pump shall not require a manual pressure release valve for the purpose of connecting or disconnecting hoses and the user must be able to connect and disconnect hoses and rescue tools while the pump is flowing oil. The pump shall be provided with a Pressure Relief Device to allow the relief of pressure in hose lines resulting from temperature changes.

### Engine

The pump shall be driven by a Honda GX100 4-stroke gasoline engine. The engine shall have a gasoline tank of at least 57.5 ozs. (1700cc), that allows the pump to run for 3.5 continuous hours. For ease of operation the fuel tank shall incorporate a highly visible fuel level indicator.

### Pump

To provide maximum efficiency during rescue operations, the hydraulic pump shall be a 3-stage axial design with two automatic sequence valves, switching to 2<sup>nd</sup> stage at approximately 2,175 psi (150 bar), to 3<sup>rd</sup> stage at approximately 4,350 psi (300 bar) to allow full pressure to be built up to a maximum working pressure of 10,443 psi (720 bar). The pump shall be protected with an internal safety valve. In addition, the pump must have an external safety valve, factory set at 10,443 psi (720 bar).

The pump shall have an output of not less than:

- 98.1 oz/min (2900 cc/min) in the 1<sup>st</sup> stage
- 44 oz/min (1300 cc/min) in the 2<sup>nd</sup> stage
- 18.6 oz/min (550 cc/min) in the 3<sup>rd</sup> stage

### Carrying frame

The pump shall have a protective carrying frame designed for mobility with a hand grip centered for balance. In order to provide improved grip in all weather conditions, the frame must have a non-slip surface. The frame shall be provided with anti-vibration dampers to keep the pump at its position while running.

### Tank and Fluid

The effective oil contents of 135.3 oz. (4 l) must allow for the simultaneous deployment of at least four full size rescue tools. The pump shall be designed for the use of non-toxic mineral oil base hydraulic fluid.

### Weight and Dimensions

The complete pump ready for use, including gas, oil and carrying frame shall weigh no more than: 50 lbs. (22.7 kg). The complete pump unit shall be extremely compact with dimensions within: (LxWxH): 17.9" 12.4" x 18.1" (455 mm x 315 mm x 460 mm).

#### **Sound level**

The sound level of the pump must not exceed 81 dB(A) unloaded, 85 dB(A) loaded when measured at a distance of 3.28 ft. (1m).

#### **Options:**

**Noise Reduction Mode.** The unit must have as an option, a switch / button on the pump to activate optimal reduction of noise and fuel consumption.

**Mounting Bracket.** The unit must have as an option, a mounting bracket, offered by the same manufacturer, to protect and quickly secure the unit inside the apparatus compartment. The bracket shall consist of an adapter that is bolted to the underside of the power unit, and a locking mount that is bolted to the compartment floor. The locking mechanism shall have a detent position that allows the operator to easily secure the pump in its locked, storage position with a simple flip of a lever. To further facilitate ease of access to the unit, an optional angle bracket shall be available, which tilts 8 degrees downward toward the operator. When unlocked, it easily slides forward, with no impedance from the compartment's four sides.

## 15.

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### **Heavy Duty Hydraulic Pump**

#### **General**

This pump must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. It must also comply with EN 13204. Classification to Third Party Standards shall be performed by Underwriters Laboratories or by a test laboratory recognized and accepted by this AHJ. The pump must allow operation in a humid and dusty environment. The pump must be capable of powering four tools at full power, independently and simultaneously. The pump must have a connecting block incorporating flat face female couplers of a coaxial design, with the pressure line inside of the return line, allowing for simultaneous connection of both lines with one connection motion. The couplers must be of a flat-face, non-drip style, with built-in automatic locking feature, capable of being operated with one hand and must be supplied with aluminum protective dust caps. The pump shall not require a manual pressure release valve for the purpose of connecting or disconnecting hoses and the user must be able to connect and disconnect hoses and rescue tools while the pump is flowing oil. The pump shall be provided with a Pressure Relief Device to allow the relief of pressure in hose lines resulting from temperature changes.

### **Hydraulic Motor**

Powered by a hydraulic motor supplied by Harrison Hydraulic Solutions

### **Pump**

To provide maximum efficiency during rescue operations, the hydraulic pump shall be a 3-stage axial design with two automatic sequence valves, switching to 2<sup>nd</sup> stage at approximately 2,175 psi (150 bar), to 3<sup>rd</sup> stage at approximately 4,350 psi (300 bar) to allow full pressure to be built up to a maximum working pressure of 10,500 psi (720 bar). The pump shall be protected with an internal safety valve. In addition, the pump must have an external safety valve, factory set at 10,500 psi (720 bar).

The pump shall have an output of not less than:

101.4 oz (3000 cc/min) in the 1<sup>st</sup> stage

45.6 oz (1350 cc/min) in the 2<sup>nd</sup> stage

19.44 oz. (575 cc/min) in the 3<sup>rd</sup> stage

### **Carrying frame**

The pump shall have a protective carrying frame designed for mobility with two hand grips centered for balance. In order to provide improved grip in all weather conditions, the frame must have a non-slip surface. The frame shall be provided with anti-vibration dampers to keep the pump at its position while running.

### **Tank and Fluid**

The effective oil contents 6.34 qt. (6 l) must allow for the simultaneous deployment of at least four full size rescue tools. The pump shall be designed for the use of non-toxic mineral oil base hydraulic fluid.

### **Weight and Dims**

The complete pump ready for use, including mineral oil and carrying frame shall weigh no more than 92.3 lbs (41.9 kg). The complete pump unit shall be extremely compact with dimensions within (LxWxH): 19.6" 18.4" x 19.4" (497 mm x 467 mm x 492 mm).

# 16.

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## General

This hose must be compliant with NFPA 1936 Standard on Powered Rescue Tools, 2015 edition. The hose assembly shall be of a "coaxial" design with a single coupler and protective bend restrictor at each end. For increased safety to the user the hose pressure line shall be encapsulated inside of the outer return line to shield the pressure line from damage inherent on the rescue scene. The working pressure of the interior pressure line shall be 10,500 psi (720 bar). The outer return line shall have a working pressure of 365 psi (25 bar). The hose must be capable of withstanding a static overload pressure of at least four times the maximum working pressure. This overload ratio is a requirement to provide maximum safety to the operator. All hoses shall be delivered ready to use as a complete unit that has been pre-filled with hydraulic mineral oil and hydrostatically tested

The inner pressure hose shall be constructed from polyurethane reinforced with para-aramid yarn for increased strength, reduced weight and maximum flexibility. Para-aramid fibers as a reinforcement in this construction offer very desirable properties such as high strength (5X stronger than steel), low weight, no corrosion, non-conductive. The outer return hose shall be constructed of polyurethane reinforced with polyester yarn. The hose shall remain flexible in cold temperatures, with a useable temperature range of -4°F (-20 °C) to 162°F (72°C). The outer hose shall be designated by the manufacturer to be electrically non-conductive.

The couplers must allow for simultaneous connection of both pressure and return lines to eliminate connection errors and reduce deployment time. To avoid hindrance to the operator the coupler must be extremely compact and lightweight. The coupler design shall incorporate an automatic return valve that will permit connection and disconnection to the tool or pump while under flow. The couplers must be flat-face, non-drip couplings with built-in automatic locking feature and be one hand operated. To avoid stressing the hose the couplers shall allow the hose to freely swivel 360° while connected to a pump and a tool, without twisting or kinking the hose. Each coupler must be supplied with a protective aluminum dust cap.

Hose assemblies shall be available in the following:

32 ft hose. Shall not exceed 11 lbs. Be available in multiple colors – Orange, Green, Black & Blue to help distinguish tools during extrication.

100 ft hose mounted on electric reels. Shall not exceed 90 lbs. Be available in multiple colors – Orange, Green, Black & Blue to help distinguish tools during extrication. Dimensions not to exceed L: 19 x W 17.6 x H 18.1.

17.

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## V - Strut

### General

The strut must be capable of quickly and efficiently stabilizing all types of cars, trucks, SUVs, MPVs, and truck cabins oriented in any position on any surface. For maximum portability and strength the strut must be manufactured out of extremely high tensile aluminum alloy, anodized to offer protection against corrosion.

### Deployment

The unit shall have a one-step extension and automatic locking system achieved in a single motion using spring activated pawls. For maximum efficiency no separate manual lock pins shall be required to lock the extension. The unit shall have no less than 24 adjustment points at 1.2 inch/30mm intervals.

The unit shall have a serrated multi-purpose grip head, making it easier to grip and hold any vehicle surface profile.

### Base Plate

The base plate shall have an aggressive non-slip profile for optimal grip on all surfaces, preventing the strut from slipping. The strut shall attach to the base plate through a tilting mechanism to allow for set up at any angle.

### Ratchet Belt

The strut shall come with an integrated 16ft (5m) ratchet strap on a storage reel. The ratchet mechanism shall provide for fast and easy deployment and use a hook to enable the rapid creation of a stable triangle for stabilization operations. The ratchet belt must have a protective sleeve to protect against sharp objects or extreme heat common in the rescue environment.

### Capacity

The maximum axial load of the strut must be 3,597 lbf. (16 kN) symmetrical to the strut head.

### Weight and Dimensions

The strut must have a deployment weight of no more than 15.9 lbs (7.2 kg). The complete strut must be compact within (LxWxH): L: 8.27" x W: 5.87" x H: closed 42.52", open 70.87" (210mm x 149mm x 1080 closed, 1800 open). The strut's stroke shall be no less than 28.35" (720mm).

### Options

The strut must include a knife accessory to force a slot into the vehicle's bodywork so the hook of the ratchet can function properly.

**Lifetime Warranty**

The manufacturer shall warrant this tool against all defects in material and workmanship for as long as owned by the original purchaser.