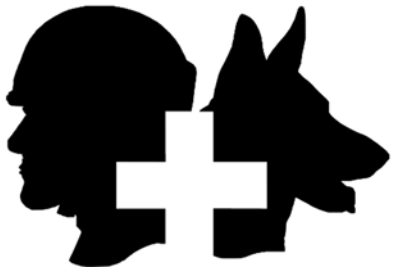
TRAUMA F/X®

Improving Survivability



CLINICAL RESPONSE UPPER - RESUSCITATE (CRU-R)

Clinical Response Upper – Resuscitate (CRU-R) Medical Simulator User Guide

Rev_Q4_2020_TSR

TRAUMA F/X®

Improving Survivability

TraumaFX®

Clinical Response Upper - Resuscitate (CRU-R)

TraumaFX Customer Service
MATTsupport@traumafx.net
1-800-200-7465

Rev_Q4_2020_TSR

Chapter 1

Chapter 1: Introduction

About the Clinical Response Upper - Resuscitate (CRU-R)

The TraumaFX® Clinical Response Upper - Resuscitate (CRU-R) is a ruggedized tetherless medical training upper body unit that delivers powerfully realistic simulations of traumatic injuries to the upper body. It helps trainees learn how to treat and perform interventions on patients suffering from traumatic upper body and airway injuries. The CRU-R is covered in lifelike synthetic skin and includes a simulated rib cage and sternum. Students learn to find realistic anatomic landmarks to execute critical patient treatment without relying on marked indicators. The CRU-R helps teach responders to perform life-saving tasks such as maintaining a patient's airway, central line insertion, CPR, needle chest decompression, cricothyroidotomy, intraosseous infusion, chest tube insertion, blood pressure measurement, and intubation. The TraumaFX CRU-R is unparalleled in ruggedness and durability, and was designed specifically for use in tough outdoor terrains, and features articulating shoulders and realistic, reinforced silicone arms. It can be carried, dragged, and transported in a variety of vehicles and aircraft. The CRU-R can withstand nearly any weather condition, making it ideally suited for real world simulation training for Tactical Combat Casualty Care (TCCC) and Combat Lifesaver training courses.

The CRU-R is a multi-purpose training simulator that can function as a stand-alone skills station or be connected to any TraumaFX® lower torso trainer for use in training lanes. The CRU-R's simulated injury and intervention sites allow for multiple uses with cost-effective replacement components.

The CRU-R is designed for rugged use in realistic training environments. To ensure proper operation, do not subject CRU-R units to unnecessarily harsh treatment. Care for the CRU-R as you would a live patient. Also, careful preventive maintenance and frequent after-use inspection is essential to ensure the service life of your CRU-R unit. Please review ***Chapter 6: After Use Care*** which outlines the standard preventive maintenance required under the terms of the CRU-R limited warranty.

Item Checklist

The components listed below are required to set up and operate your CRU-R unit and come standard with each TraumaFX, CRU-R purchase. Optional components may or may not be included – check your order or packing lists to determine if any optional components were purchased.

Standard Components and Accessories

Accessory Name	Order Number	Quantity Included
Needle D skin plugs (Left and Right)	AS-0337-AS	1 set
Pleural Membranes for Needle D	KA-00-00036	1 pkg of 20
Needle D pressure seals	AS-00339-AS	1 set
Chest tube tab - Set (Left and Right)	AS-00336-AS	1 set
Chest tube tab tape	MT-0342	1 roll
Sternal Non-Infusible Plug	SP-01206-AS	1
Sternal IO Disc Assembly	AS-01201-AS	5
IV Skin plug	SP-00911-AS	5
Humeral IO skin plug	KA-00-00077	1 pkg of 5
Humeral IO Cap	KS-01199-20	5
Deltoid IM Skin Plug	SP-00740-AS	1
Cric saddle - multi-use	UP-00277-AS	1
Silicone Cric skin tape	AS-01181-AS	1 roll
Silicone Trachea skin tape	AS-01190-AS	1 roll
Cric skin - multi-use	SP-00268-SP	1
Cric saddle - single use	KA-00-00075	1
Cric skin - single-use	KA-00-00069	1 pkg of 5
Skin Plug Central Line Blank	SP-01421-AS	1
Skin Plug Central Line Plug	UP-01346-AS	3
Makita Charger	EL-0222-C	1
8oz Airway Lubricant	AS-00122-AS	1
18v Makita Battery	EL-0724	3
Blood Paste (1 Pint)	KS-00929-20	1
Blood Powder	KA-00-00017	1 pkg of 5
1-gal Gravity fill bucket w/ quick disconnect	KA-00-00011	1
Blood Stir Sticks	MP-0618	2

O-rings	KA-00-00035	1 pkg of 5
Touchscreen Remote Control Transmitter	TFX-TSREM-1	1
CRU-R User Documentation	KGS-TFX-CRUR-UG-1	1
Makita Charger Operating Manual	KGS-TFX-LO-OMM-1	1
Silpoxy (1/2 oz) w/ stick applicator	MO-0476	1
CRU-R Drain bag assembly	AS-01458-AS	1
Fill-hose connector assembly	AS-01451-AS	1
Arterial blood package	AS-01449-AS	1
2-Way Audio Assembly	KA-00-00097	1

Figure 1

Other standard components not listed

- Storage Case

Optional Components

- Clinical Response Lower (CRL)
- Multiple Amputation Trauma Trainer (MATT)®
- Packable Hemostatic (HEMO) Trauma Trainer
- MATT Abdominal Casualty Expectant (MATT-ACE)
- Emergency Medical Trauma Trainer – Tactical Medical Lower (EMITT-TML)
- Emergency Medical Trauma Trainer – Active Shooter Lower (EMITT-ASL)
- Injured Hands
- Vital Signs Monitor (VSM)
- ECG Simulator

System Overview

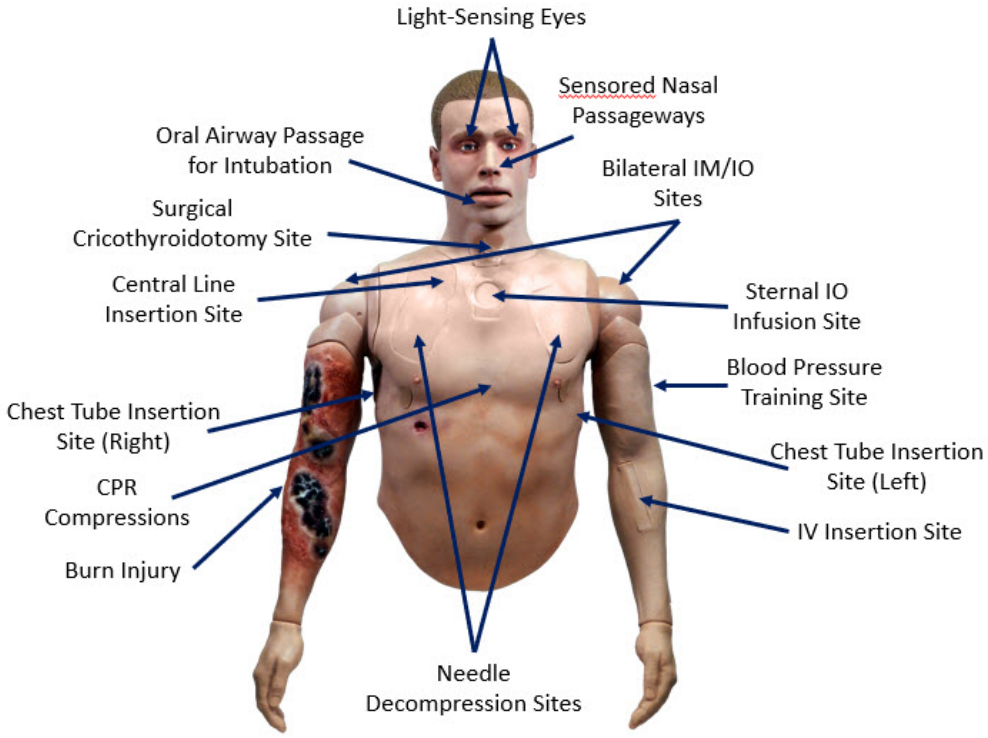


Figure 2

Note - Posterior Gunshot Exit Wound Not Shown

Special Notes and Cautions

Read all TraumaFX® instructional manuals before attempting to assemble, install, or operate the Clinical Response Upper - Resuscitate (CRU-R) Trainer or accessories.

Do Not Over Lubricate

The CRU-R throat is pre-lubricated, but additional lubrication is necessary to simulate realistic throat moisture and to reduce friction and allow for easier intubation. It also serves to extend the life of the throat. An 8 oz. bottle of silicone lubricant is provided for this purpose. Use two or three sprays only – do not over lubricate! Over lubrication will make intubation more difficult. It is recommended to also lightly spray lubricant on the ET Tubes, King LT-Ds and other insertion devices for easier insertion into the throat.

After Use Care

The CRU-R is designed for rugged use in realistic training environments. To keep the CRU-R working optimally, careful preventive maintenance and frequent after-use inspection will extend the service life of the CRU-R, and is required under the terms of the limited warranty. Please review ***After Use Care (Chapter 5)*** which details the tasks to perform at the end of every training session.

Water Resistance and Cleanup

DO NOT USE PRESSURIZED WATER OR SUBMERGE THE CRU-R UNDER WATER. REMOVE BATTERIES BEFORE CLEAN UP TO AVOID ELECTRIC SHOCK!

The CRU-R is water resistant, but is not waterproof. With water only, carefully wash the CRU-R with a soft, wet cloth or sponge after each use. Vigorous scrubbing of the skin can result in permanent damage. If the CRU-R is used with any TraumaFX simulated blood products, the simulated blood should be washed out of clothes within 24 hours to avoid staining; pre-treatment of stains and vigorous cleaning will usually remove simulated bloodstains.

Possible Reaction to Synthetic Blood Mix

The chemical components that comprise TraumaFX' organic dye blood mix may cause skin and eye irritation for some users. Avoid ingestion or inhalation. If eye contact occurs, check for and remove any contact lenses, immediately flush eyes with water for at least 15 minutes; cold water may be used. Get medical attention if irritation occurs. Should skin contact occur and the skin becomes irritated, wash with soap and water. Get medical attention if irritation persists. If blood powder is accidently inhaled, remove victim to fresh air. If breathing difficulties occur, seek medical attention immediately. If blood mix is ingested (powder or liquid form), DO NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious

person. Loosen tight clothing such as a collar, tie, belt, or waistband. Immediately get medical attention.

System Weight

The CRU-R is designed to replicate the weight and feel of a live human patient. To prevent injury, use caution and proper procedures when lifting or carrying the manikin or cases.

Simulated Blood

Only use TraumaFX-provided simulated blood and blood mixes in the CRU-R unit. Use of other liquids or the addition of any substance, including detergents, to the blood mix may damage internal components and will void the manufacturer's limited warranty.

To preserve the life of the simulated blood paste, please store in a dark, cool location.

Radio Control

The Radio Control (RC) system used to operate the CRU-R has an extended range (see technical specifications) and can be used indoors or outdoors. Note that indoor range is subject to building design and construction materials. Test system operations whenever setting up in a new location or moving to a different area of a building.

Cric Saddle

If the cric saddle surface becomes contaminated with grit or silicone lubricant, it will lose adhesion capabilities and the cric tape will not stick properly. Please wipe cric saddle with alcohol or acetone to remove contaminants.

Third Party User Manuals

The CRU-R uses third-party commercially available equipment. Where such equipment is provided, the associated user manuals and any pertinent documentation are provided as well.

Storage

The CRU-R unit, accessories, and fluids should be stored in a cool, dry location.

Compliance

If the CRU-R is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Chapter 2

Chapter 2: Clinical Response Upper - Resuscitate (CRU-R) Features

This section describes the highly realistic features of the CRU-R that contribute to the unique training experience the CRU-R Trainer provides. The CRU-R contains the following features:

- Subclavian central line training site on right side, sensored to show depth of catheter insertion.
- Simulated breathing and coordinated patient sounds with radial, carotid and brachial pulse points
- CPR capable, sensored to show depth and frequency on the TSR Transmitter.
- Blood pressure simulation site on left arm
- Infusible bilateral I/O and IM trainer at the humerus/deltoid
- Bilateral chest tube insertion training sites with replaceable, multiple use skin plugs (suturing degrades multi-use capability)
- Hyper realistic silicone head complete with facial trauma and moveable jaw with internal tracheal landmarks for endotracheal intubation
- Light sensing eyes with programmable fixed states of pinpoint or dilated pupil to cue for Traumatic Brain Injury (TBI), overdose, or nerve agent
- Simulated nasal airways with option for nasal airway obstruction to cue endotracheal intubation or cricothyroidotomy.
- Sensor to detect NPA insertion
- Simulated oral airway cavity with teeth and tongue for use with King LT-D, i-gel, or other esophageal airways, and with optional obstruction available to cue cricothyroidotomy.
- Sensored airway to detect intubation and trigger a chest or abdomen rise with bagged ventilation
- Breakaway section of teeth for airway clearance training
- Upper body torso made of lifelike, wrap-around silicone skin with self-healing intervention sites.
- Advanced cricothyroidotomy training site with larynx and single and multi-use replaceable skin plugs.

- Infusible and Non-infusible sternal intraosseous trainer for use with any Intraosseous (I/O) Infusion System, and replaceable manubrium membranes
- Bilateral needle decompression (3¼" 14-gauge needle) sites with responsive pleural membranes and replaceable skin plugs.
- Infusible IV insertion training site with flash cue.
- Articulating shoulders that provide full range of motion.
- Reinforced silicone arms that allow natural elbow movement and provide for a soft grip during casualty training scenarios.
- Oximeter hands for placement of an oximeter during training.
- Gunshot entrance and exit wounds.
- 2-way audio communication system
- Burn injury on right arm
- Optional interchangeable injured hands
- Optional ECG Simulator
- Optional Vital Signs Monitor (VSM)

Ruggedized, Realistic Synthetic Skin

The outer skin of the CRU-R is designed to provide the "look-and-feel" of real skin and incorporates simulated injuries for added realism in trauma training. The skin is very rugged, but must be maintained regularly to ensure longevity. CRU-R's simulated skin is made of a proprietary silicone compound and features realistic wounds.

Material

The CRU-R's skin is made of a silicone-based compound that requires cleaning with water. This simulated skin covers the CRU-R trainer. The internal structure of the CRU-R's upper body is composed of a ruggedized core and layered with realistic silicone-based skin. This construction results in a high-fidelity look and feel with exceptional durability that allows the CRU-R to be carried or dragged on many surfaces such as outdoors or flooring commonly found in buildings.

Cautions and Care

The CRU-R unit is water resistant, but not waterproof. Avoid direct water contact with the battery compartment. When washing the CRU-R, use only water. Never use ink or marker to write on the CRU-R. Doing so can cause damage to the skin's surface during removal.

When washing the CRU-R, use caution to prevent water from entering the mechanical and electrical areas of the unit – the battery compartment should be closed and secured before cleaning. Always use gentle pressure and avoid vigorous scrubbing of the skin.

Often in live training scenarios, the CRU-R's simulated blood may come into contact with a user's clothes. To reduce the risk of staining, simulated blood should be treated with detergent and be washed out of clothes within 24 hours of exposure.

Chapter 3

Chapter 3: Getting Started

Read all TraumaFX manuals before attempting to assemble, install, or operate the Clinical Response Upper - Resuscitate (CRU-R) Trainer or accessories.

Notes on General Use and Care

The CRU-R is designed for rugged use in realistic training environments. To ensure proper operation, care for the unit as you would a human patient by not subjecting the CRU-R to unnecessarily harsh treatment. Also, careful preventive maintenance and frequent after-use inspection is essential to ensure the service life of the unit(s). Please review **Chapter 6: After Use Care**, which outlines the after use care required under the terms of the CRU-R limited warranty.

Only use TraumaFX-provided TraumaFX® simulated blood and blood mixes in your CRU-R unit. Use of other liquids or the addition of any substance, including detergents, to the blood mix may damage internal components and will void the limited warranty.

Charging the Batteries

CRU-R & TSR Transmitter Batteries

Read all instructions provided in the Operating Manual – Makita Battery Charger before using.

Each CRU-R trainer utilizes three (3) 18v (5.0Ah) Makita Lithium-Ion batteries for operation. Two batteries power the unit, and the third battery powers the touchscreen remote control (TSR) transmitter. Additional batteries are available for purchase through TraumaFX by contacting your account representative or customer support.

Only use the batteries and charger(s) provided by TraumaFX; use of different equipment may result in damage to the batteries and/or TraumaFX equipment and will void the limited warranty. Read the instructions for the Makita battery and charger in the *Operating Manual – Makita Battery Charger* provided.

The CRU-R and TSR Transmitter battery is a consumable item (with a one (1) year manufacturer's warranty); as with most batteries, Makita batteries have a finite shelf

life. After considerable use, a "used" battery's voltage will drop to a point that it will no longer be able to hold a charge.

The CRU-R contains a low voltage disconnect feature that will automatically shut the unit off when battery voltage drops to a certain level. If the CRU-R stops operating, remove and recharge batteries or replace with fully charged batteries.

Recharging the CRU-R and TSR Transmitter Batteries

1. **Plug** the Makita quick charger (Figure 3) into a standard 110V wall outlet.
2. **Slide** the battery onto the quick charger until firmly in place and the indicator light illuminates (each battery takes approximately 30-45 minutes to charge, and depending on the amount of usage, provides up to 6-8 hours of training support).
3. **Remove** the battery when readout indicates charging is complete.

Figure 3

NOTE: A 220V Makita charger is available for International use. This is a special-order item and available for purchase through TraumaFX by contacting customer support or your account representative.

General Use and Care of Batteries

All batteries used in TraumaFX products were specially selected to provide optimal operational performance. However, as with all batteries, they will last longer with proper care and maintenance. To preserve the life of the batteries, the following best practices are recommended:

1. Only use the batteries and charger(s) provided by TraumaFX; use of different equipment may result in damage to the batteries and/or the TraumaFX unit(s).
2. Remove all batteries from the CRU-R and TSR Transmitter at the end of each training session. Batteries should never be stored inside a unit (CRU-R or TSR Transmitter)
3. Recharge batteries immediately after use by placing them in the Makita battery charger.
4. Fully recharge all batteries before each training exercise. This is indicated by a solid green light on the charger for each battery.

5. Never mix a fully charged battery with a partially charged battery as this will cause the TraumaFX unit to not operate properly.
6. Never mix an old battery with a new battery as this will quickly degrade the new battery.
7. Do not mix batteries of different capacities (Amp hours), as the lower capacity battery will exhaust first and may fail.
8. Store batteries indoors, away from extreme temperatures (not above 120°F or below 38°F).
9. Only charge TraumaFX-related batteries using the approved chargers supplied with the TraumaFX system.

Installing and Removing the Batteries

CRU-R Batteries

1. **Select** two (2) 100% fully charged Makita Lithium-Ion batteries.
2. **Open** the battery compartment door on the CRU-R unit by twisting the two (2) latches on the battery box door counter-clockwise (Figure 4).

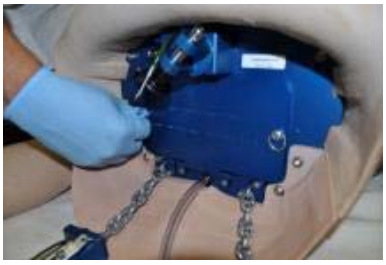


Figure 4

3. **Insert** the two (2) fully charged batteries into the battery compartment (Figure 5)
4. **Push** each battery into the battery compartment until they audibly 'click' into place (Figure 5).
5. **Close** the battery compartment door and secure it by twisting the two (2) latches *clockwise* until tight (do not over tighten).

Figure 5

Removing the CRU-R Batteries

1. **Open** the battery compartment door on the CRU-R unit by twisting the two (2) latches on the battery door (Figure 4) *counter-clockwise*.
2. **Press** the white, push button (Figure 6) located on each of the batteries to remove them from the CRU-R unit.

Figure 6

Installing and Removing the TSR Transmitter Battery

Figure 7

1. **Install** the battery by inserting the battery into the back of the unit (Figure 7) by sliding the battery into the battery slot until it locks into place.

2. **Remove** the battery by pressing the white, push button located on the battery to remove the battery from the remote control transmitter.

Attaching an Optional TraumaFX® Lower Trainer to the CRU-R

The CRU-R unit can attach to any TraumaFX® lower unit to help trainees learn how to treat patients suffering from multiple traumatic injuries.

Be sure to install fully charged batteries in CRU-R before connecting the lower unit – the connection will block access to the battery compartment. Both units have been designed to enable rapid battery replacement during training exercises.

1. **Fold back** the upper unit chest fascia to expose the quick connect system (Figure 8).

2. **Bring the Lower and Upper units together** and line up one side of the Upper quick connect with the corresponding Lower unit quick connect (Figure 9).

Figure 8

3. **Insert** the cotter pins into the bracket holes (Figure 9) on both sides of the unit.

4. **Pull** down chest fascia to cover the space between the upper and lower units.

Figure 9

Simulated Bleeding for IV Flash Cue and Central Line

Mixing the TraumaFX® Blood Powder

The blood powder and mixed blood solutions may stain fabric and porous surfaces. Do not add any other substance to the blood (including detergents) as they may damage internal components and will void the limited warranty.

Use care when transporting pre-mixed blood or open bags of blood mix powder. If a surface or fabric comes into contact with the simulated blood solution, treat with detergent as soon as possible to avoid permanent stains. Simulated Blood should be washed out of clothing as soon as possible (preferably within 24 hours) to avoid staining. Pre-treatment of stains and vigorous cleaning will usually remove simulated bloodstains. Only use detergents and cleansers that are recommended by the manufacturer(s) of the affected surfaces or fabrics. If dry blood powder is spilled, avoid contact with liquids. Sweep or vacuum the affected area immediately.

To mix the blood powder, follow the instructions below:

1. **Remove** any items from inside the blood filling system, and check that bucket is clear of dirt or debris

2. **Fill** the blood fill container with the desired amount of water

3. **Open** the corresponding number of blood powder packets (1 packet per gallon) and empty the entire contents of each blood powder packet into the blood fill container

4. **Stir** the blood powder into the water until thoroughly mixed.

Applying Blood Paste

Blood paste can be applied to enhance the realism of the CRU-R's wounds and various surfaces in staged training areas (Figure 10). The CRU-R unit comes with one (1) pint of pre-mixed blood paste. Additional quantities can be purchased by contacting TraumaFX customer service or your account representative.

Blood paste provides the look of coagulated blood. The paste can be rubbed onto simulated wounds using a paintbrush, sponge, or fingers to enhance their realistic appearance and feel, and can be used to provide the appearance of coagulated blood on floors, walls, doors, or other surfaces (see caution above regarding staining of surfaces with simulated blood compounds).

Figure 10

Skin Plug and Component Replacement

Inserting the Manubrium and Manubrium Skin Plug

Insert the manubrium with the skin plug removed into the sternal recess by matching the ball and socket joints (Figure 11). Insert skin plug cap and turn clockwise to set firmly in place. Place the manubrium skin around the skin plug cap and adjoining skin. Lubricating with water will help installation. Adjust the skin plug edges as needed to minimize seams. If training without infusion, the red stopper can be placed within the manubrium prior to installing the skin plug cap.

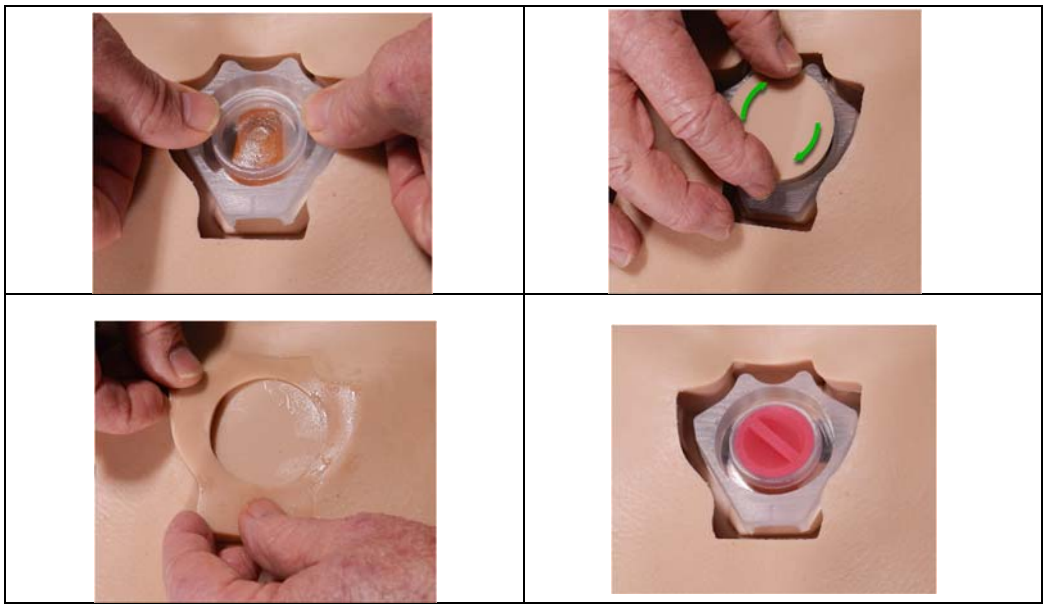


Figure 11

Inserting the Multi/Single Use Cric Skin Plug and Saddle

With the CRU-R, users have the option to use a multi-use or single use cric skin plug. The multi-use cric skin has an insertion incision already present, and can be used for numerous training rotations. A piece of the supplied Trachea Skin Tape can be placed over the incision to provide a more realistic experience. The CRU-R's single use cric skin allows the trainee to make the insertion incision, and is a single use item. For each use, whether single or multi-use, place a single piece of Cric Skin Tape on the cric saddle over the tracheal opening to simulate the cricoid membrane.

The CRU-R is equipped with two (2) multi-use Cric 'Saddles' and one (1) single use. These allow for pre-assembly of cric tape and cric skin into the saddle and replacement of the entire system into the neck 'cage'. This system may prove especially useful for single use cric skins although replacement of the Cric Skin Tape and single use cric skins while the cric saddle is still in neck will work as well.

For easy insertion, tilt head up and physically pull up at the top of the neck opening while placing cric saddle assembly into neck opening (Figure 12). For easy removal, place fingers on one side of cric saddle and press in to release retaining clips on the bottom of the saddle.

Figure 12

Inserting the Pressure Seal and Pleural Membrane

The pressure seal forms a pressurized seal at the needle D training site. With the mounting frame removed, insert the Needle D Pressure Seal into the recess located at the Needle D training site just under the Pleural Membrane. Replace the mounting frame, pressing firmly to lock in place.

Insert the pleural membrane so the edges are under the tabs in the pleural membrane recess, and gently depress pleural membrane until it 'snaps' into place, as shown below in (Figure 13).

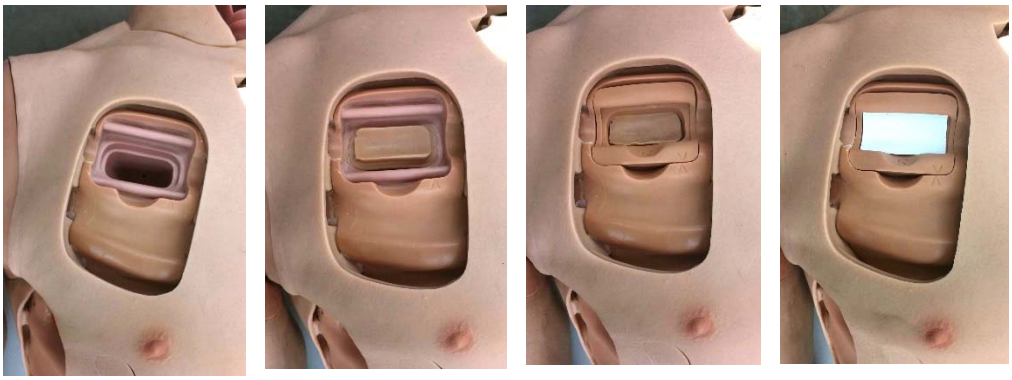


Figure 13

Inserting the Needle "D" Skin Plugs

Insert the left or right needle "D" skin plug into the matching side recess. Ensure all tabs are securely in place under the skin, and adjust the skin as needed (Figure 14). Note that the left plug abuts the central line skin plug.

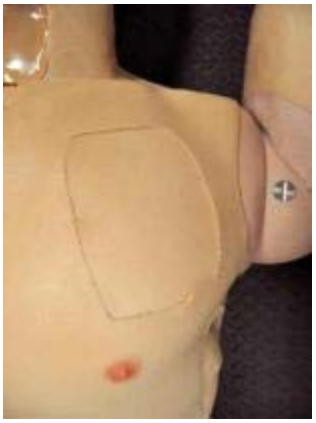


Figure 14

Inserting the Central Line Skin Plug Blank

The CRU-R is equipped with a blank central line skin plug for use in training when the central line site is not being used. This plug is made of the same silicone as the skin and other skin plugs, and is not for use when inserting a central venous catheter.

Before inserting the skin plug, pull the clavicle off to the side and lay on the sternum. Place the skin plug in the recess above the right needle decompression skin plug, and fit the blood inlet and outlet ports into the recesses in the skin plug. Lubricate the clavicle w/ Isopropyl alcohol or water, lift the upper medial corner of the plug to expose the opening and fully insert the lateral end of the clavicle first. Make sure when you insert the clavicle the engraved LAT and MED are facing up. Manipulate the skin edges to fully seat the plug.

Inserting the Left or Right Chest Tube Skin Plug and Chest Tab

Insert the chest tube skin plug into the matching side recess, align the rivets to the corresponding holes located in the core, depress rivets into holes until completely inserted, and adjust the skin as needed (Figure 15).

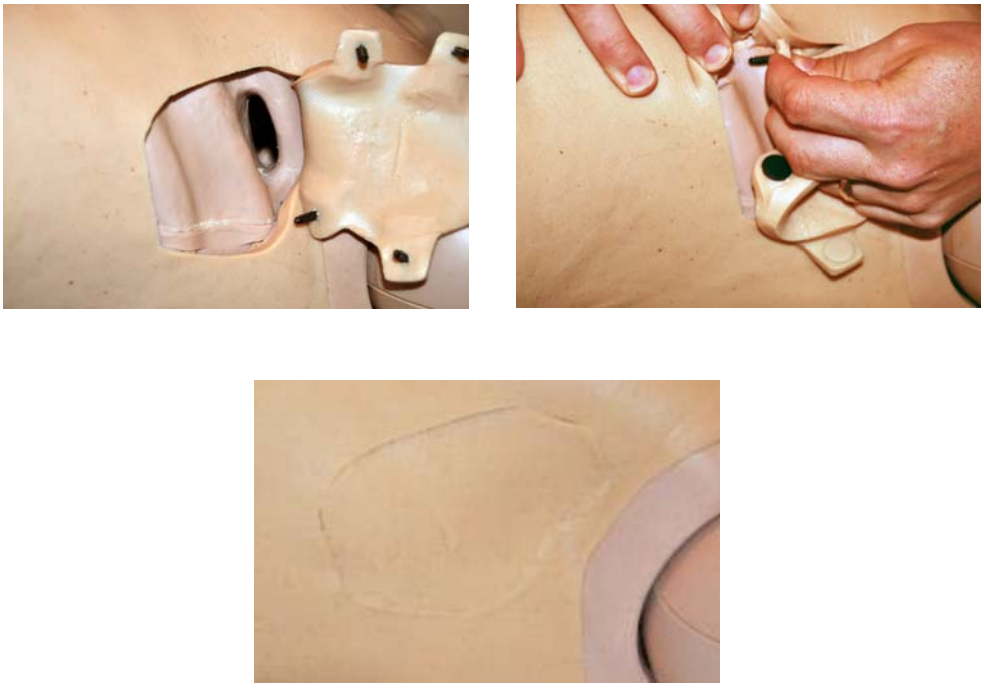


Figure 15

****The Chest Tube skin plug comes equipped with two incision sites. The medic incision site is located at the 6th and 7th intercostal rib space, and the civilian incision site is located in the middle of the 6th rib.*

Insert the chest tab by lining up the chest tab with the adjacent slot near the left areola (Figure 16).

The chest tube tab tape has a limited number of uses, and will require replacement. Remove the red tape from the chest tube tab, and replace it in like fashion with the chest tube tab tape provided with the unit.

Figure 16

Setting up the Humeral IO or Deltoid Intramuscular Injection Site

The CRU-R can be configured for either intraosseous (IO) infusion or intramuscular (IM) injection training sites on both shoulders. For use as an IO site, insert the infusible humeral block and humeral skin plug into the shoulder of the CRU-R. Adjust the skin plug edges as needed to eliminate "seams." For IM use, place the skin plug directly over the site without the humeral block.

Inserting the IV Skin Plug

Insert the IV insertion skin plug (Figure 17) by lining up the holes and pressing the IV Insertion Skin Plug into the IV recess located at the left forearm. Adjust the skin plug edges as needed to eliminate "seams."

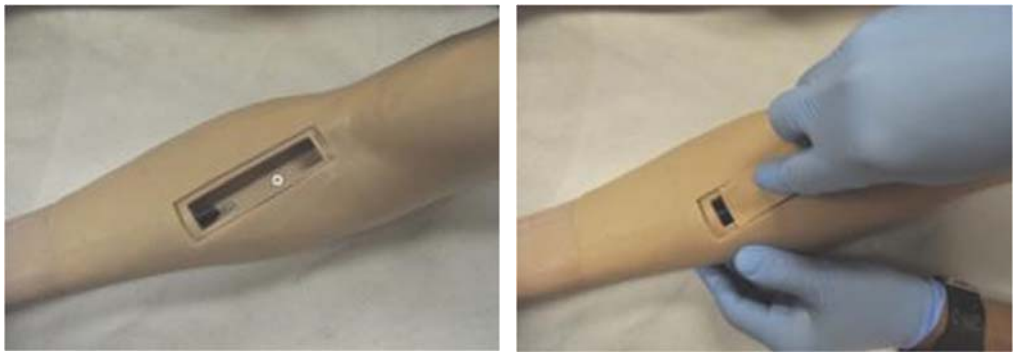


Figure 17

Setting up the Subclavian Central Line Site

To set up the subclavian central line training site, follow these steps to charge the artery with blood, insert the skin plug, and fill the internal venous blood reservoir.

The CRU-R is supplied with two (2) different types of skin plugs for the central line training site; a silicone plug and urethane plugs. The silicone plug is for training scenarios when the central line site is not in use; it is not a consumable item. The urethane plugs are compatible with ultrasound, and are to be used for insertion of a central line catheter.

Orient the urethane plug in your hand such that the clavicle would lie at the top with the skin surface facing up (Figure 18). The artery injection port can be seen along the left side of the skin plug as seen in. Using the supplied 10 ml syringe and a 22ga needle, withdraw 8ml of the Arterial Blood, provided in a 120 ml bottle. Insert the 22ga needle into the artery injection port and pull a vacuum with the syringe, allowing the air to rise to the top of the liquid, then inject the 8 ml of blood.

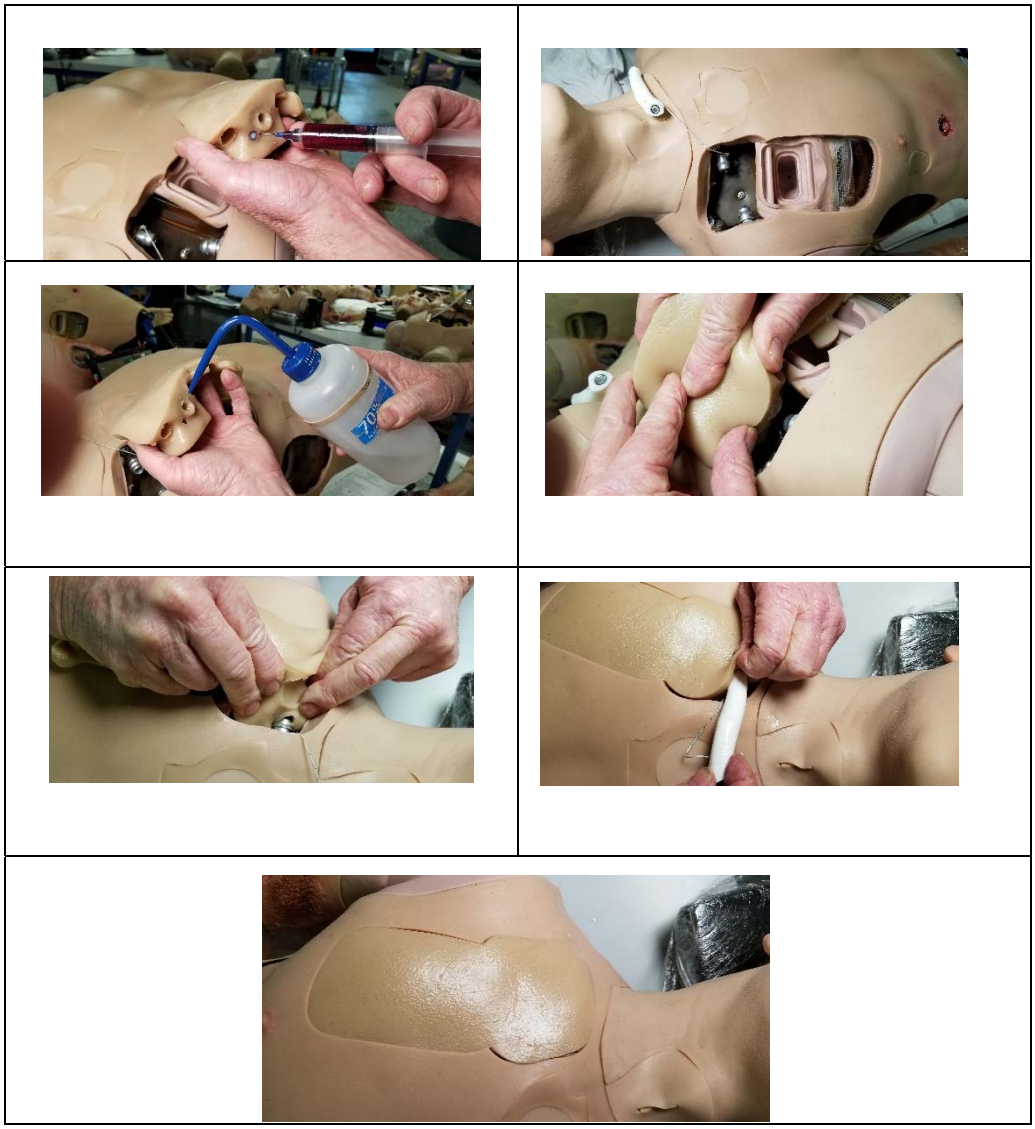


Figure 18

To install the Central Line Plug, begin by angling the plug over the lateral inflow barb first then compressing the plug enough to see that the outflow barb is inserted into the venous cavity. Tuck in the remaining needle decompression area of the plug into the surrounding skin. The clavicle goes in last just as described for the silicone needle decompression only plug.

To fill the venous reservoir, first prepare the venous blood as follows:

- Add 1 gallon of tap water to the red Blood Bucket.
- Add 1 envelope of TraumaFX Blood Powder to the bucket.
- Stir the water with the Blood Stir Stick to dissolve the Blood Powder.

- Liquid blood should not be stored for more than 24 hours.

To fill the venous reservoir:

- Attach the 120 ml Luer syringe to the Luer-Blood Bucket adapter provided and attach the adapter to the quick disconnect fitting on the Blood Bucket.
- Draw 80 ml of liquid blood from the bucket, and disconnect the Luer fitting from the Luer-Blood Bucket adapter.
- Attach the Luer fitting on the syringe to the Luer fill port behind the right shoulder.
- Depress the syringe to fill the venous reservoir with 80ml venous blood.
- Remove the Luer syringe from the fill port

Note: Do not fill the venous reservoir until the central line plug has been installed.

Reusing the Subclavian Central Line Skin Plug

The urethane skin plug is consumable but can be used several times before replacement. After removal of the venous catheter and draining the system, place a single drop of super glue in the surface cut on the skin plug. The glue will dry in seconds, and the plug can be used again. The artery within the plug is single-use, however, and the plug will need to be replaced if the artery had been penetrated.

Chapter 4

Chapter 4: Operating the Clinical Response Upper - Resuscitate (CRU-R)

This chapter describes the operational features of the CRU-R. In-depth instructions on how the CRU-R and Touchscreen Remote Control (TSR) Transmitter work together are located in the ***TraumaFX® Touchscreen Remote Control Transmitter User Guide*** that accompanies the CRU-R unit.

Power

Power for the CRU-R's lower body is provided by two (2) 18v (5.0Ah) Makita Lithium-Ion batteries. Power for the TSR transmitter is provided by one (1) 18v (5.0Ah) Makita Lithium-Ion battery. All batteries are fully rechargeable and come with a charger and manufacturer's instructions and operating manuals.

Sync Check

Prior to beginning a training exercise with the CRU-R trainer, performing a quick link check between the TSR transmitter and the CRU-R is highly recommended. Prior to shipment, each TSR transmitter is synced and fully tested with its paired CRU-R unit and should not require any customer adjustment. Instructions on how to sync your unit to the TSR Transmitter are located in the ***TraumaFX® Touchscreen Remote Control Transmitter User Guide*** that accompanies this unit.

To perform a quick sync check, perform the following:

1. **Power on the CRU-R transmitter** by pressing the power switch on the top of the TSR transmitter.

2. **Power on the CRU-R** by pressing the power switch (push button) located on the upper left side (patient right) of the CRU-R trainer. When the power switch is on a bright green LED will light up.

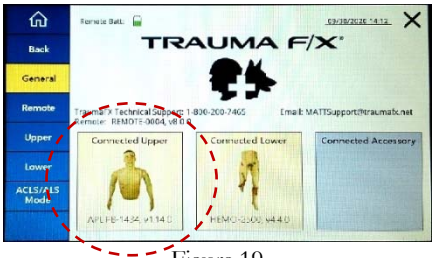


Figure 19

3. The Remote Control will initially present the **Main Control Screen.** Press the ***Settings*** button in the lower left corner to see what systems(s) are paired to the TSR transmitter (Figure 19). Units paired with the Remote Control appear in the lower left corner.

Simulated Nasal Airway

The *Simulated Nasal Airway* provides for nasopharyngeal intubation into the nostrils to facilitate opening and maintaining a clear airway (Figure 20). A sensor in the nasal passageways detects the presence of a fully-inserted NPA, which will be shown on the Control screen of the TSR Transmitter.

Figure 20

Nasal Airway Obstruction

The nasal passageways can be closed to cue for another airway treatment, such as endotracheal intubation, oral pharyngeal airway, or cricothyroidotomy. This can be achieved via the remote control.

Instructions on how to block the nasal airway are located in the ***TraumaFX®*** ***Touchscreen Remote Control Transmitter User Guide*** that accompanies this unit.

Simulated Oral Airway

The *Simulated Oral Airway* cavity with teeth and tongue provides for pharyngeal intubation, and to facilitate opening and maintaining a clear airway for mechanical ventilation (Figure 21). This simulated airway can be used with i-gel, King LT-D, i-gel, or other esophageal airways.

Figure 21

The Simulated Oral Airway provides trainees with a flexible neck and jaw to perform endotracheal intubation.

Oral Airway Obstruction

The oral passageways can be closed to cue for another airway treatment, such as cricothyroidotomy. Blocking the CRU-R airway can be achieved via the remote control.

Instructions on how to block the oral airway are located in the ***TraumaFX® Touchscreen Remote Control Transmitter User Guide*** that accompanies this unit.

Sensored Airway

The CRU-R has sensors in the airway to detect the insertion of airway adjuncts and to respond appropriately. The system can detect if a tube is placed properly in the trachea, in the right mainstem bronchi, or in the esophagus.

When attempting to bag ventilate, the system will respond according to the tube placement. If it is placed correctly, both sides of the chest will inflate with ventilation. If placed in the right mainstem, only the right side will inflate, and if placed in the esophagus then the abdomen will inflate. This information is also displayed on the ***Session Control*** screen on the TSR transmitter.

Teeth Sensors

The CRU-R has teeth sensors that trigger a 'contact' setting when the upper teeth are touched during endotracheal intubation (Figure 22). A signal is sent to the TSR and a "Teeth Contact" message is displayed on the screen.

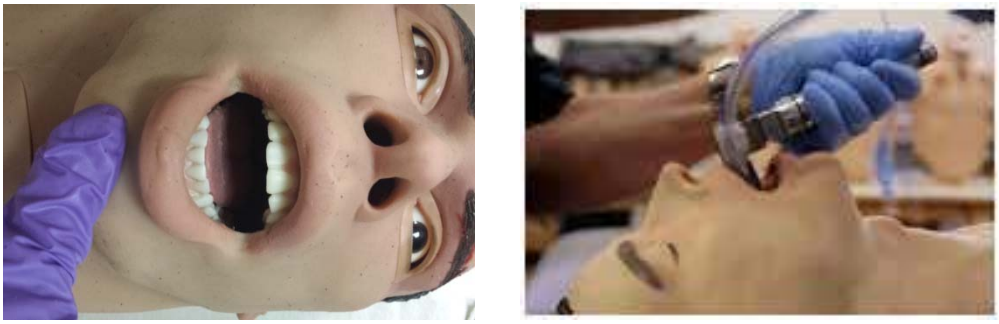


Figure 22

Simulated Cricothyroidotomy Site

The *Simulated Cricothyroidotomy Site* is a multi-use training site that allows for the palpation of landmarks to properly identify and locate the larynx (Figure 23). Additionally, this site allows trainees to create an incision through the skin and cricothyroid membrane for airway intubation. A cricothyroidotomy is generally required during certain life threatening conditions where nasopharyngeal or

pharyngeal intubation is unfeasible such as with severe facial trauma, cervical spine trauma, or severe chemical inhalation injuries. This site uses replaceable, single or multi-use skin plugs to accommodate repeated simulations.

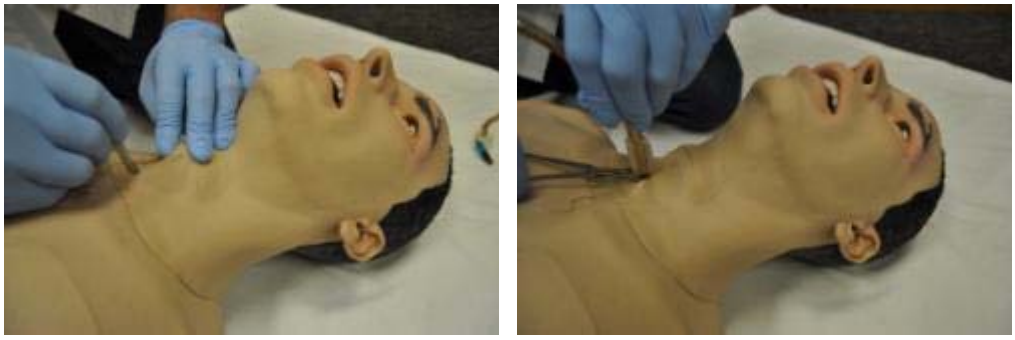


Figure 23

Simulated Infusible Intraosseous Sites

Manubrium Infusion Site

The *Simulated Infusible Intraosseous Site* allows trainees to palpate the sternal notch for proper placement and any Intraosseous (I/O) infusion introducer (Figure 24). I/O infusion provides immediate, vascular access for fluid and medication infusion for victims experiencing shock and trauma, and allows trainees to rapidly, safely and reliably administer adult sternal I/O infusions. The I/O training site uses a multi-use, infusible manubrium cap to accommodate repeated simulations.

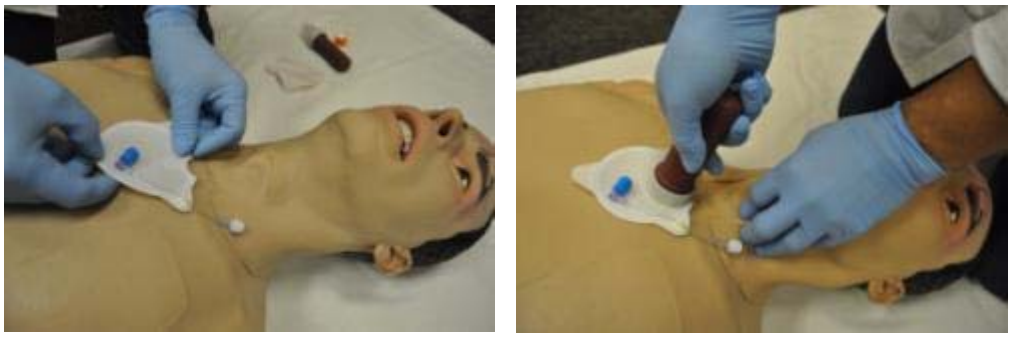


Figure 24

****the CRU-R is also equipped with a non-infusible manubrium insert.*

Humeral Infusion and Intramuscular Injection Sites

The *Simulated Infusible Humeral Intraosseous and Intramuscular Injection Sites* allow trainees to insert an intraosseous infusion introducer or an intramuscular injection at this location. These sites uses a multi-use, infusible humeral block with replaceable skin plugs to accommodate repeated simulations.

Simulated Blood Pressure Measurement Site

The CRU-R features simulated blood pressure measurement on the left arm. The user can apply a standard blood pressure cuff to the arm, inflate the cuff, and take a reading using typical blood pressure measurement techniques. The CRU-R will simulate the blood pressure based on the physiology model or that which was selected by the trainer using the TSR transmitter.

For best accuracy of the simulated blood pressure measurement, it is recommended that the site be calibrated before daily training begins. To calibrate, power on the CRU-R and the remote transmitter, press "Settings", and from the main Settings screen press "Upper Settings". This will take you to the following screen (Figure 25) which shows the procedure for calibration.

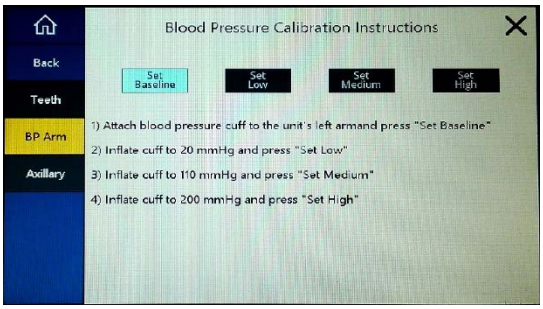


Figure 25

- Attach the blood pressure cuff to the left arm of the CRU-R; do not inflate
- Press the "Set Baseline" button
- Inflate the blood pressure cuff so the pressure gauge reads 20mm Hg; press "Set Low" button
- Inflate the blood pressure cuff to 110mm Hg; press "Set Medium" button
- Inflate the blood pressure cuff to 200m Hg; press "Set High"

In each case, only a single Set button will be available. At any time, the user can start over by pressing Exit and reentering the Upper Settings screen.

Simulated CPR Site

The CRU-R features a flexible chest to allow a student to perform simulated CPR while in CPR Mode.

IMPORTANT: Do not perform chest compressions on the CRU-R while it is actively breathing. This could cause damage to the lung bladders.

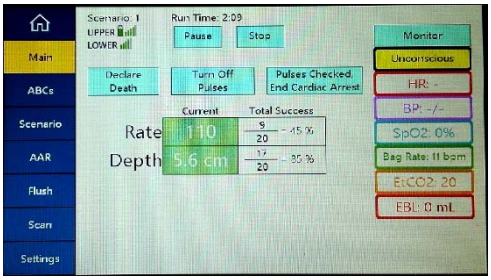


Figure 26

The CRU-R has a dedicated mode for CPR training. In CPR Mode all other features are turned off to focus on CPR training. The Session Control table is replaced with a rate and depth table (Figure 26). The rate and depth of the current compressions are displayed as well as the overall percent success for the session. Bagging rate is displayed in the vitals column. Note the upper unit will not show a physical bagging response as performing compressions while the unit breathes will damage the unit. Sensors in the chest monitor each chest compression for rate and depth, which is then shown on the screen and color-coded as green or red. Per AHA and Red Cross guidelines, chest compressions should be at a rate of 100-120 per minute, and at a depth between 5 and 6 cm (~2-2.4 in); compressions within these ranges are coded as green, while those outside the range are red. The screen also displays the number of compressions that are within the range as well as the total number of compressions, and a success percentage is shown. The bagging rate is also displayed on the screen during CPR along with the elapsed run time for the session. *Note*: the chest does not inflate with bagged ventilation in CPR Mode.

Switching to CPR Mode

To enter CPR Mode, go to the *Settings Screen* by pressing '**Settings**' on the main menu. If a CRU-R is connected, the '**CPR Mode**' option will be available on the main menu in the lower left-hand corner. Press it to enter CPR Mode.

To exit CPR Mode, return to the *Settings Screen*. The last entry will now be labeled '**Standard Mode**'. Press it to exit CPR Mode and return to Standard Mode.

Cardiac Arrest

CPR Mode can be turned on in the middle of an active session using the Cardiac Arrest injury. The Cardiac Arrest injury is located under the Circulation submenu. The Cardiac Arrest injury can be set on a timer using the minute and second sliders. Set the timers to 0 to start immediately. The ECG waveform can also be defined. The default is Asystole; any chosen waveform will automatically be pulseless.

Simulated Bilateral Needle 'D' (3¼" 14 gauge) Sites

The *Simulated Bilateral Needle 'D' Sites* provide trainees with palpable landmarks at the ribs to allow trainees to locate the correct needle decompression site and fully insert the decompression needle (Figure 27) to relieve pneumothorax caused by physical trauma to the chest such as a blast injury. This site uses reusable and replaceable needle 'D' skin plugs to accommodate repeated simulations.

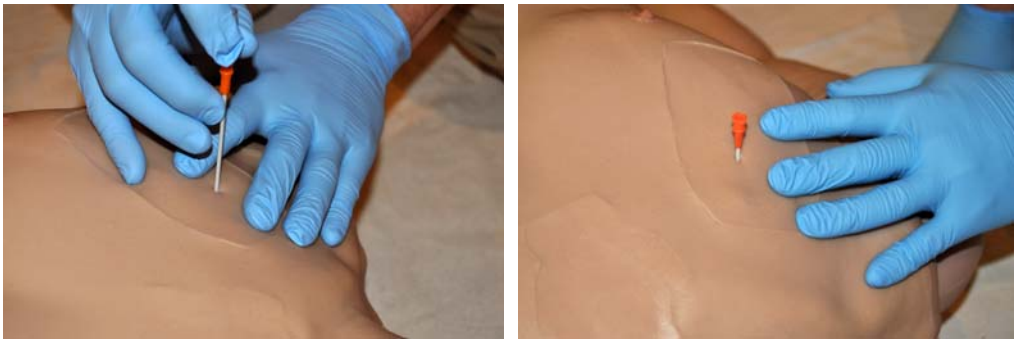


Figure 27

Simulated Bilateral Chest Tube Site

The *Simulated Chest Tube Site* provides trainees with palpable landmarks at the ribs to allow trainees to locate the correct chest tube insertion site and insert a chest tube to relieve pneumothorax or hemothorax (Figure 28). The chest tube must pass through a pleural membrane, and once inserted, trainees can practice securing the chest tube with various suturing techniques used to keep the chest tube in place. This site uses a reusable and replaceable chest tube skin plug to accommodate repeated simulations.

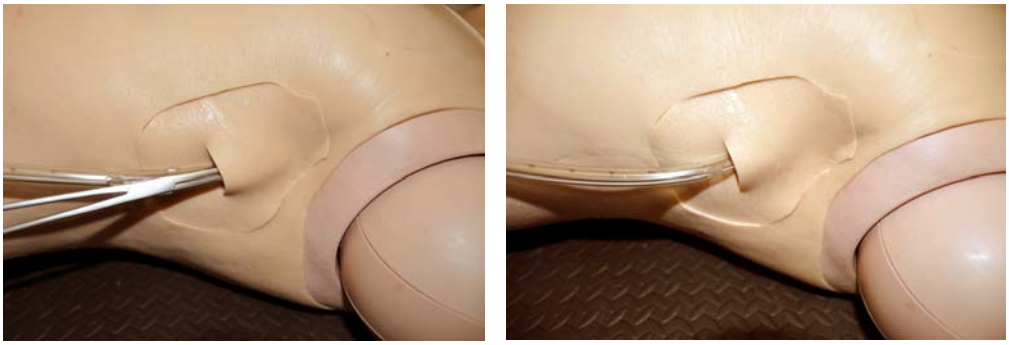


Figure 28

Light Sensing Eyes Featuring Simulated Dilated or Pinpoint Pupil

The CRU-R features light sensing eyes that automatically adjust from a normal dilation to either dilated or constricted/pinpoint pupils based on changing ambient light. The pupils will contract when a bright light is shined in one or both eyes, and will adjust back to normal when the light source is removed. The pupils will dilate when both eyes are covered, and again revert back to normal when uncovered (Figure 29).

The eyes can also be set to either *Dilated, Pinpoint Pupil, or Fixed-Normal* using the TSR transmitter to cue for symptoms of Traumatic Brain Injury (TBI) such as the case with the following two scenarios:

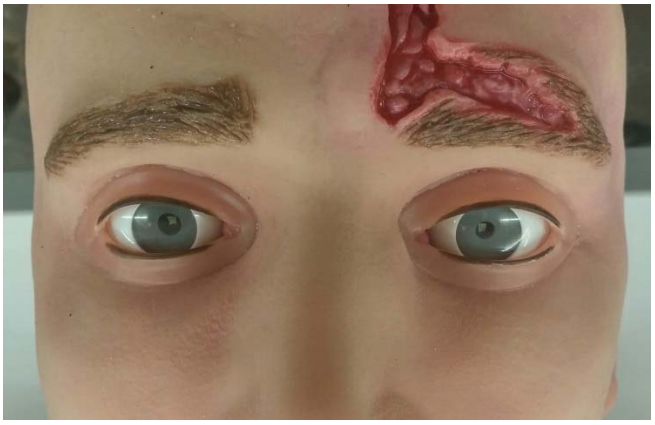


Figure 29

Dilated pupil (Figure 30) indicating a concussion accompanied by nasal blockage (remote option) and/or laceration to the forehead

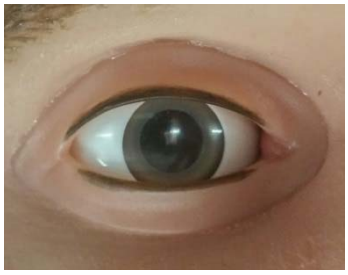


Figure 30

Pinpoint pupil (Figure 31) indicating basilar skull fracture accompanied by oral airway blockage (severe case) – initiated by selecting on the TSR (See Section: Oral Airway Obstruction) – and battle signs or raccoon eyes (achieved through moulage). Pinpoint pupils are also indicative of drug overdose, and exposure to nerve agents.

Figure 31

Simulated Infusible IV Insertion Site with Flash Cue

This site is designed to provide trainees with a practice area for IV insertion and is accompanied with flash cue (Figure 32). To fill the IV reservoir, slowly inject 80 ml of simulated blood into the fill port located under the left arm at the hard shoulder cuff using the 120 ml Luer syringe provided. To operate, insert the IV needle until you see the flash, remove the needle and attach the IV bag and hang it 36" above the patient's heart. The infusate will drain out the patient's left wrist through a female Luer fitting. A drainage line can be attached to this fitting and conduct the drainage to a separate reservoir.

Figure 32

When the training is finished, or the blood pressure no longer provides a flash, the blood reservoir should be drained. To accomplish this, screw the 120 ml syringe (completely depressed) into the Luer in the wrist and pull back on the plunger until you hear a sucking sound indicating the bladder is empty. To continue training repeat the instructions above. To finish for the day, inject 50 ml of water through the shoulder port and the suck it out through the wrist port.

- Each skin plug will last for many training sessions and can have their life further extended by smearing a small amount of Sil-Poxy over the top of the plug sealing the previous puncture sites. A small tube of Sil-Poxy is supplied with each manikin.

- Should the drain continue to drip after the IV is disconnected, compress the vein with 3 fingers 2 or 3 times rapidly to reset the check valve.

- Should the check valve need to be replaced it can be accessed by removing the skin plug and pulling it straight out, then wetting the barb of the new one and inserting straight down, making sure the arrow is pointing away from the skin plug. The check valve is part number KGS-MP-C-CV-1.

Cleaning

Prior to turning off the CRU-R, the IV system should be drained of all simulated blood and flushed with potable water.

IMPORTANT: Make sure there is no water or simulated blood in CRU-R blood system prior to storing the CRU-R unit.

To drain and clean the CRU-R IV system:

Attach the 120 ml Luer syringe provided (with the plunger fully depressed) into the drain connector in the wrist and pull back on the plunger until you hear a sucking sound indicating the bladder is empty

Inject 50 ml of clean water through the shoulder inlet port and the withdraw it out through the wrist port.

To drain and clean the CRU-R central venous catheter system:

Attach the 120 ml Luer syringe (with the plunger fully depressed) to the dorsal port (closest to the back of the body) on the right shoulder cuff and draw out all the remaining blood.

When you are done for the day, follow the blood draining by injecting 50 ml of tap water through the anterior port (closest to the front of the body) then drain it as well.

To clean CRU-R's exterior features:

1. Gently **clean** the CRU-R after each use with water only (never use abrasive materials on CRU's skin).

2. If stains persist on the CRU-R's exterior, gently clean with a soft wet cloth or sponge. DO NOT vigorously scrub the CRU-R's skin or surface area as this can remove hair and skin coloring, and cause permanent abrasions.

3. Clothing that comes into contact with simulated blood can be cleaned using standard laundry techniques, but should be cleaned separately from other items to avoid discoloration. Simulated bloodstains should be pre-treated and washed out of clothes within 24 hours to avoid permanent staining.

Packing

Prior to storing the CRU-R in its storage case, always perform the following procedures:

1. **Power down** the CRU-R

2. **Remove** the batteries from the CRU-R unit

3. **Store** the batteries and their charger in their proper places in the CRU-R storage case

4. **Close** the CRU-R battery compartment securely prior to placement in its case

5. **Turn off** the TSR Transmitter and **Remove** the battery from the TSR transmitter and place it in its proper place in the CRU-R storage case
6. **Place** the TSR transmitter in its proper place in the CRU-R storage case
7. **Empty and rinse out** the blood fill bucket with water
8. **Clean** the surface of the CRU-R with a wet sponge or cloth
9. **Place** the CRU-R unit in its proper place in the CRU-R storage case

Chapter 5

Chapter 5: Operating the 2-Way Communication System (TWC)

The CRU-R offers Two Way Communication (TWC) feature that allows trainers to communicate to trainees through the CRU. This system can be used for increased realism by allowing the trainer to play the part of the casualty, or can also allow the trainer to communicate real-time instruction to the trainee through the CRU-R unit.

The TWC is powered by one (1) rechargeable Li-Ion battery.

Use only the charger provided with your CRU-R to recharge the batteries

To install the Battery:

- Access the panel on the back of the TWC Controller
- Insert the Li-Ion battery (place on top of the ribbon for easy removal)

To operate the TWC:

- Turn on the power to the CRU-R by pressing the power button at the waist plate.
- Turn the power switch on the TWC Controller to the On position (Figure 33).
- Ensure that the TWC is paired with the CRU-R by observing the blinking LED; if the LED blinks rapidly twice before pausing and repeating then it is paired properly. If the LED blinks once, pauses, and blinks once again, there is no communication between the TWC Controller and the CRU-R.

Figure 33

- Use the button on the right side of the TWC Controller to adjust the volume coming out of the CRU-R speaker.

To pair a TWC with a CRU-R:

- Turn on the CRU-R upper unit remote
- Turn on the CRU-R upper unit
- Turn on the TWC Controller
- Mute the headset microphone
- Turn up the headset volume
- Move the lower end of the TWC Controller across the top of the CRU-R head until audio is heard through the headset or the LED shows Connected (e.g. blink, blink..) on the TWC Controller

The TWC is water resistant but is not waterproof. DO NOT SUBMERGE THE TWC UNDER WATER

For troubleshooting guide, please refer to the TWC Quick Start Guide that accompanied the CRU-R unit.

Chapter 6

Chapter 6: After Use Care

To keep the CRU-R operating as designed, the following preventive maintenance actions must be completed after each training session.

These easy to perform maintenance actions will help ensure the CRU-R remains in peak operating condition for each training session:

1. **Empty the CRU-R's simulated blood bladder** daily by withdrawing any remaining blood from both the central line reservoir and the IV reservoir using the Luer-tipped syringe.

2. **Flush the CRU-R's IV system and central line system with water** daily and prior to storage lasting longer than one day.

3. **Remove batteries** daily after training is complete. Do not store batteries in the CRU-R unit or in the transmitter as this could cause the batteries to fail.

4. **Fully recharge the CRU-R batteries** after each training exercise. Also fully recharge the TSR transmitter batteries prior to each training exercise. To extend the service life of the batteries, do not run the batteries until they are completely out of charge.

5. **Do not mix** a fully charged battery with a partially charged battery as this will cause the CRU-R unit to not operate properly.

6. **Do not mix a** new battery with an old battery as this will quickly degrade the new battery.

7. **Only use** approved chargers supplied with the CRU-R system to recharge the CRU-R and transmitter batteries.

8. **Wash skin and wounds with water** after each day of use. Blood paste is cellulose based and could attract insects if left on TraumaFX lower or upper training products.

9. **If the skin is cut**, then clean the cut with alcohol or with a silicone-approved cleaner that does not leave a residue. Allow the cut to thoroughly dry. Repair

the cut using a silicone adhesive such as Sil-Poxy© by Smooth-On. Allow all repairs to fully cure prior to use.

10. **Read the User's Manual** for the Battery Chargers and follow instructions and precautions listed inside the manual.

Chapter 7

Chapter 7: Troubleshooting & Repair

Contact TraumaFX Technical Support at: MATTsupport@traumafx.net, or by calling 1-800-200-7465 if trouble-shooting steps do not resolve an issue you are experiencing.

Issue	Actions
Skin appears cut or torn	▪ See Chapter 7: How to Repair the CRU-R Skin of this User Guide.
Loose H-Bar at the quick connect waist plate	▪ Periodically check the H-Bar attachment bolts and mounting hardware located at the unit waist plate, and tighten as needed with an adjustable wrench.
Skin plugs will not stay in place or appear damaged from multiple simulation use	▪ Replace with a new skin plug. For replacement skin plugs, please contact MATTSupport@traumafx.net
Cric Box skin channel is blocking placement of the cric skin	▪ Ensure the cric box skin channel is clear of any foreign debris or dirt. ▪ If debris is found, clean the channel with a cotton tipped applicator to clear the skin plug channel.
Receiving less than adequate resistance on needle chest decompression	▪ Replace the pleural membrane. For replacement pleural membranes, please contact MATTSupport@traumafx.net
Needle Decompression shows positive result before needle stick	▪ Check that pressure seals are properly set ▪ Change pressure seals and/or pleural membranes if they are too worn.
Power light is flashing or has turned off	▪ This indicates that your battery is too low. Change out the batteries with fully charged ones.

TSRS transmitter is not working	• Check to see if the CRU-R unit is turned on. • Is the LCD displaying information (located on the front panel)? • Is the TSR Transmitter showing "Paired" with the CRU-R unit? • Ensure all batteries in the CRU-R unit and TSR transmitter are fully charged.

Additional Support

Customer Service and Support

For other troubleshooting issues not identified above, please contact TraumaFX Technical Support at MATTSupport@traumafx.net or 1-800-200-7465.

How to Repair the CRU-R Skin

The CRU-R skin is very rugged, but just like human skin, it is not impervious to accidental damage from cuts or tears from sharp objects or physical abuse. Regular maintenance will ensure its longevity. The CRU-R skin is made of a silicone compound that can be easily repaired using a silicone adhesive specifically made for repairing silicone cuts and tears.

1. Thoroughly clean cut or tear with water followed by rubbing alcohol.
2. Thoroughly dry the skin surface.
3. Generously spread the Sil-Poxy inside of, and over, the cut or tear (Figure 35 and Figure 36).
4. For a cut, pinch the cut back together.
5. For a tear, replace the skin flap. Apply tape/medical bandage if necessary, to hold together until the Sil-Poxy cures.
6. Gently and immediately wipe off excess Sil-Poxy. Do not let sit.
7. Allow the Sil-Poxy to cure at least 8 hours before skin is used. Once cured, the repaired cut or tear should be difficult to see.

Figure 34

Figure 35

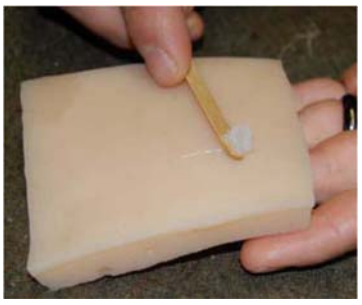


Figure 36

Appendix A

Appendix A – CRU-R Technical Specs

CRU-R Upper Unit

Weight: 79 lbs.
Dimensions: Max length 36", max width 23", chest 45", neck 17.5", shoulders 51"
Case Dimensions: 51x26x12", 153 lbs.
Power Supply: Two (2) 18 V (5.0Ah) Li-ion batteries
Indoor or Outdoor Use
Altitude Rating: Altitude up to 2000 m
Temperature Rating: Temperatures between 32°F and 109°F (0°C to 43°C)
Humidity Rating: Maximum relative humidity 90% for temperatures up to 84°F (29°C) decreasing linearly to 42% relative humidity at 109°F (43°C)

Makita DC18RC Battery Charger

Input: A.C. 120 V 50 – 60 HZ
Output: D.C. 7.2 V – 18 V
Weight: 1.0 kg (2.2 lbs)

Touchscreen Remote Control Transmitter

Effective Range: Outdoor range is 200 meters (line of site); indoor range is 50 meters but is subject to building construction materials that may impede signal.
Power supply: 18v Lithium Ion Battery
Transmit power: 63mW (18dBm)
RF Data Rate: 250,000 bps
FCC ID: Contains FCC ID: OUR-XBEEPRO** The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

FCC Approval: Systems that include XBee/XBee-PRO Modules inherit MaxStream's Certifications. FCC ID: OUR-XBEEPRO

ISM (Industrial, Scientific & Medical): 2.4 GHz frequency band
Manufactured under ISO 9001:2000 registered standards XBee/XBee-PRO RF Modules are optimized for use in US, Canada, Australia, Israel, and Europe (contact MaxStream for complete list of approvals).

IMPORTANT: The XBee/XBee-PRO OEM RF Module has been certified by the FCC for use with other products without any further certification (as per FCC section 2.1091). Modifications not expressly approved by MaxStream could void the user's authority to operate the equipment.

Appendix B – Material Safety Data Sheets

- **Blood Paste**
- **Blood Powder**
- **Lithium-Ion Batteries**
- **Airway Lubricant**

Blood Paste SDS

SAFETY DATA SHEET

"BLOOD" PASTE

blair adhesives

www.blairadhesives.com

SECTION 1: IDENTIFICATION

PRODUCT NAME: "BLOOD" PASTE
MANUFACTURER NAME: BLAIR ADHESIVE PRODUCTS, INC
11034 LOCKPORT PLACE
SANTA FE SPRINGS, CA 90670
562-946-6004
EMERGENCY PHONE: CHEMTREC 1-800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

SKIN CONTACT: PROLONGED OR REPEATED CONTACT MAY CAUSE SLIGHT SKIN IRRITATION IN PEOPLE PRONE TO ALLERGIC REACTIONS.

EYE CONTACT: DIRECT CONTACT WITH MATERIAL MAY CAUSE IRRITATION.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS#	%
METHYL CELULOSE	9004-65-3	TRADE SECRET
WATER	7732-18-5	TRADE SECRET
PROPRIETARY FOOD COLORS	8028-89-5	TRADE SECRET
SODIUM BENZOATE	532-32-1	TRADE SECRET

SECTION 4: FIRST AID MEASURES

SKIN CONTACT: WASH AFFECTED SKIN AREAS THOROUGHLY WITH SOAP & WATER.

EYE CONTACT: FLUSH EYES WITH LARGE QUANTITIES OF WATER UNTIL IRRITATION CEASES.

SECTION 5: FIRE FIGHTING MEASURES:

EXTINGUISHING AGENTS: NO SPECIAL REQUIREMENTS FOR THIS PRODUCT; USE FOAM, CARBON DIOXIDE, OR DRY CHEMICAL FIRE-FIGHTING APPARATUS APPROPRIATE FOR SURROUNDING FIRE.

UNUSUAL HAZARDS: NONE.

PERSONAL PROTECTIVE EQUIPMENT: NONE REQUIRED.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: NONE REQUIRED

EMERGENCY PROCEDURES: SPILLAGE MAY BE CLEANED WITH WATER. USE CAUTION, PRODUCT IS SLIPPERY. DO NOT WASH INTO STORM SEWER OR OPEN WATERWAY.

CONTAINMENT: NONE REQUIRED

DISPOSAL: DISPOSE OF USED PRODUCT IN ACCORDANCE WITH APPLICABLE LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS.

SECTION 7: HANDLING AND STORAGE

HANDLING PROCEDURES: USE CAUTION, AS PRODUCT IS SLIPPERY.

"BLOOD" PASTE 1

SAFETY DATA SHEET

STORAGE CONDITIONS: KEEP PRODUCT AS CLEAN AS POSSIBLE TO AVOID POSSIBLE PRODUCT CONTAMINATION. STORE IN CLOSED CONTAINERS AT 80* - 90* F. AVOID EXTREME VARIATIONS OF TEMPERATURE AND HUMIDITY.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

	OSHA PEL		ACGIH	
	ppm	mg/M	ppm	mg/M
CHEMICAL NAME				
METHYL CELLULOSE	NONE LISTED		NONE LISTED	
WATER	NONE LISTED		NONE LISTED	
PROPRIETARY FOOD COLORS	NONE LISTED		NONE LISTED	
SODIUM BENZOATE	NONE LISTED		NONE LISTED	

ENGINEERING CONTROLS: MECHANICAL GENERAL ROOM VENTILATION.

RESPIRATORY PROTECTION: NO RESPIRATORY PROTECTION IS EXPECTED TO BE NEEDED IN NORMAL USE.

EYE PROTECTION: GENERALLY NOT NECESSARY. PERSONAL PREFERENCE.

HAND PROTECTION: GENERALLY NOT NECESSARY. PERSONAL PREFERENCE.

OTHER PROTECTIVE EQUIPMENT: NONE REQUIRED.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	SMOOTH THICK RED LIQUID
ODOR	NONE
MELTING POINT	NOT APPLICABLE
BOILING POINT	212* F WATER
FLASH POINT	NOT APPLICABLE
EVAPORATION RATE	NOT APPLICABLE
FLAMMABILITY	NOT APPLICABLE
UPPER EXPLOSIVE LIMIT	NOT APPLICABLE
LOWER EXPLOSIVE LIMIT	NOT APPLICABLE
VAPOR PRESSURE	NOT APPLICABLE
VAPOR DENSITY	NOT APPLICABLE
SPECIFIC GRAVITY	1.2 - 1.4 (WATER =1)
SOLUBILITY IN WATER	COLLOIDAL SUSPENSION
AUTO IGNITION TEMP.	NOT APPLICABLE

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: NONE KNOWN.

CHEMICAL STABILITY: THIS MATERIAL IS CONSIDERED STABLE.

SECTION 11: TOXICOLOGICAL INFORMATION

NO TOXICITY DATA ARE AVAILABLE FOR THIS MATERIAL.

SECTION 12: ECOLOGICAL INFORMATION

NO APPLICABLE DATA.

SECTION 13: DISPOSAL CONSIDERATIONS

PROCEDURE :
DISPOSE OF USED PRODUCT IN ACCORDANCE WITH APPLICABLE LOCAL, COUNTY, STATE, AND FEDERAL REGULATIONS.

SAFETY DATA SHEET

CONTAINERS :
'EMPTY' CONTAINERS SHOULD NOT BE GIVEN TO INDIVIDUALS, BUT BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS.

SECTION 14: TRANSPORT INFORMATION

US DOT HAZARD CLASS ------ NOT REGULATED

SECTION 16: REGULATORY INFORMATION

WORKPLACE CLASSIFICATION: THIS PRODUCT, **AS SUPPLIED**, IS NON HAZARDOUS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29CFR 1910.1200).

THIS PRODUCT IS NOT A 'CONTROLLED PRODUCT' UNDER THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS).

EMERGENCY PLANNING & COMMUNITY RIGHT TO KNOW:

SARA TITLE III.: SECTION 311/312 CATEGORIZATIONS (40CFR 370)
THIS PRODUCT IS NOT A HAZARDOUS CHEMICAL UNDER 29CFR 1910.1200, AND THEREFORE IS NOT COVERED BY TITLE III. OF SARA.

SARA TITLE III.: SECTION 313 INFORMATION (40CFR 372)
THIS PRODUCT DOES NOT CONTAIN A CHEMICAL WHICH IS LISTED IN SECTION 313 AT OR ABOVE 'de minimis' CONCENTRATIONS.

CERCLA INFORMATION (40CFR 302.4): RELEASES OF THIS MATERIAL TO AIR, LAND, OR WATER ARE NOT REPORTABLE TO THE NATIONAL RESPONSE CENTER UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) OR TO STATE AND LOCAL EMERGENCY PLANNING COMMITTEES UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III. SECTION 304.

RCRA INFORMATION & WASTE CLASSIFICATION: WHEN A DECISION IS MADE TO DISCARD THIS MATERIAL, **AS SUPPLIED**, IT DOES NOT MEET RCRA'S CHARACTERISTIC DEFINITION OF IGNITABILITY, CORROSIVITY, OR REACTIVITY, AND IS NOT LISTED IN 40CFR 261.33.

THE TOXICITY CHARACTERISTIC (TC), HOWEVER, HAS NOT BEEN EVALUATED BY THE TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP).

UNITED STATES: CHEMICAL CONTROL LAW STATUS: ALL COMPONENTS OF THIS PRODUCT ARE IN COMPLIANCE WITH THE INVENTORY LISTING REQUIREMENTS OF THE U.S. TOXIC SUBSTANCES CONTROL ACT (TSCA) CHEMICAL SUBSTANCE INVENTORY.

CALIFORNIA PROPOSITION 65: THIS PRODUCT DOES NOT CONTAIN A COMPONENT OR COMPONENTS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

NFPA HAZARD RATING :		**SCALE :**
TOXICITY	1	4=EXTREME
FIRE	0	3=HIGH
REACTIVITY	0	2=MODERATE
SPECIAL	-	1=SLIGHT
		0=INSIGNIFICANT

SAFETY DATA SHEET

SECTION 16: OTHER INFORMATION

REVISED: **05/18/2017**

THE INFORMATION CONTAINED HEREIN RELATES ONLY TO THE SPECIFIC MATERIAL IDENTIFIED. BLAIR ADHESIVES BELIEVES THAT SUCH INFORMATION IS ACCURATE AND RELIABLE AS OF THE DATE OF THIS MSDS, BUT NO REPRESENTATION, GUARANTEE, OR WARRANTY, EXPRESS OR IMPLIED, IS MADE AS TO THE ACCURACY, RELIABILITY, OR COMPLETENESS OF THE INFORMATION. BLAIR ADHESIVES URGES PERSONS RECEIVING THIS INFORMATION TO MAKE THEIR OWN DETERMINATION AS TO THE INFORMATION'S SUITABILITY AND COMPLETENESS FOR THEIR PARTICULAR APPLICATION.

"BLOOD" PASTE 4

Blood Powder SDS

SDS Name: Blood Red Dye Blend

DyStar

Safety Data Sheet (SDS)
North American
Revision date:5/1/2015

SECTION 1: Identification

Product identifiers:

Product trade name:	Blood Red Dye Blend
Company product number:	26DA6787
Other means of identification:	Not Available

Recommended use of the chemical and restrictions on use:

Uses:	Cosmetics
Restrictions on use:	None identified

Details of the supplier:

Manufacturer/Supplier:	DyStar LP 9844-A Southern Pine Blvd Charlotte, NC, 28207 USA
Emergency telephone number:	Chemtrec (24 hours): USA: 1-800-424-9300; International: +001-703-527-3887.

SECTION 2: Hazard(s) identification

Information in accordance with 29 CFR 1910.1200 (Hazcom 2012) in effect on May 25, 2012:

Classification of the chemical in accordance with 29 CFR 1910.1200(d):

Combustible Dust (OSHA Defined)

Label elements in accordance with 29 CFR 1910.1200(f):

Hazard pictogram(s): Not Applicable

Signal word:
Warning

Hazard statements:
USH001 May form combustible dust concentrations in air.

Precautionary statements: Not Applicable

Supplemental information: Dermal contact may discolor the skin due to dye characteristics.

Notes: No Additional Information

Hazards not otherwise classified: No Additional Information

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

Mixture:

No Hazardous Components found under applicable regulations.

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits. Exact percentage values for components are proprietary in accordance with 29 CFR 1910.1200(i).

Page 1 / 7

SECTION 4: First-aid measures

Description of first aid measures:

General: If irritation or other symptoms occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

Eye contact: Any material that contacts the eye should be washed out immediately with water. Get medical attention if symptoms occur.

Skin contact: Wash the affected area thoroughly with plenty of soap and water. Get medical attention if symptoms occur.

Inhalation: If affected, remove to fresh air. Get medical attention if symptoms occur.

Ingestion: Get medical attention if symptoms occur.

Protection of first aid responders: Wear proper personal protective clothing and equipment.

Most important symptoms and effects, both acute and delayed: Irritation, Skin discoloration due to dye. Preexisting sensitization, skin and/or respiratory disorders or diseases may be aggravated. See section 11 for additional information.

Indication of any immediate medical attention and special treatment needed, if necessary: Treat symptomatically.

SECTION 5: Fire-fighting measures

NFPA flammability class: N/A (Combustible solid)

Extinguishing media:

Suitable: Carbon dioxide, foam, dry chemical, water.

Unsuitable: Avoid hose streams or any method which will create dust clouds.

Special hazards arising from the chemical:

Unusual fire/explosion hazards: Concentrated dust/air combinations may produce explosive conditions. As with all organic dusts, fine particles suspended in air in critical proportions and in the presence of an ignition source may ignite and/or explode. Dust may be sensitive to ignition by electrostatic discharge, electrical arcs, sparks, welding torches, cigarettes, open flame, or other significant heat sources. As a precaution, implement standard safety measures for handling finely divided organic powders. See Section 7 for suggested measures.

Hazardous combustion products: Irritating or toxic substances may be emitted upon burning, combustion or decomposition. See section 10 (10.6 Hazardous decomposition products) for additional information.

Special protective equipment and precautions for fire-fighters: Avoid hose streams or any method which will create dust clouds. Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: See Section 8 for recommendations on the use of personal protective equipment. If spilled in an enclosed area, ventilate. Avoid raising powdered material due to explosion hazard. Use spark-proof and explosion-proof equipment. If inhalation of dust cannot be avoided, wear an approved particulate respirator.

Environmental precautions: Do not flush product into public sewer, water systems or surface waters.

Methods and materials for containment and cleaning up: Contain spill. Wear proper personal protective clothing and equipment. Using care to avoid dust generation, vacuum or sweep into a closed container for reuse or disposal. Use approved industrial vacuum cleaner for removal. Avoid causing dust. Place into labeled, closed container; store in safe location to await disposal. Change contaminated clothing and launder before reuse.

SECTION 7: Handling and storage

Precautions for safe handling: As with any chemical product, use good laboratory/workplace procedures. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid eye contact. Avoid repeated or prolonged skin contact. Avoid drinking, tasting, swallowing or ingesting this product. Avoid routine inhalation of dust of any kind. Exercise care when emptying containers, sweeping, mixing or doing other tasks which can create dust. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area. As a precaution to control dust explosion potential, implement the following safety measures:Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). In general, dust of organic materials is a static charge generator which may be ignited by electrostatic discharge, electrical arcs, sparks, welding torches, cigarettes, open flame, or other significant heat sources. Use spark-proof tools and equipment. Bond, ground and properly vent conveyors, dust control devices and other transfer equipment. Prohibit flow of polymer, powder or dust through non-conductive ducts, vacuum hoses or pipes, etc.; only use grounded, electrically conductive transfer lines when pneumatically conveying product. Good housekeeping and controlling of dusts are necessary for safe handling of product. Prevent accumulation of dust (e.g., well-ventilated conditions, promptly vacuuming spills, cleaning overhead horizontal surfaces, etc.). A properly engineered explosion suppression system must be considered. See standards such as the National Fire Protection Association NFPA 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids"; NFPA 69, "Standard on Explosion Prevention Systems"; NFPA 68, "Standard on Explosion Protection by Deflagration Venting"; NFPA 77, "Recommended Practice on Static Electricity" and other standards as the need exists.

Conditions for safe storage, including any compatibilities: Store cool and dry, under well-ventilated conditions. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use.

SECTION 8: Exposure controls / personal protection

Control parameters:

Occupational exposure limits (OEL): No applicable exposure limits.

Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw dust away from workers to prevent routine inhalation. Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the SDS. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). Prohibit flow of powder or dust through non-conductive ducts, vacuum hoses, or pipes, etc. Bond, ground, and properly vent conveyors, dust control devices and other transfer equipment. (Ventilation guidelines/techniques may be found in publications such as Industrial Ventilation: American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH, 45240-1634, USA.) (http://www.acgih.org/home.htm).

Individual protection measures, such as personal protective equipment (PPE):

Eye/face protection: Wear eye protection.

Skin and body protection: Wear protective gloves. Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.

Respiratory protection: Respiratory protection is not needed with proper ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. If inhalation of dust cannot be avoided, wear an approved particulate respirator. Use respirator in accordance with manufacturer's use limitations and OSHA standard 1910.134 (29CFR).

Further information: Eyewash fountains and safety showers are recommended in the work area.

SECTION 9: Physical and chemical properties

Form:	Powder	**pH:**	Not Available
Appearance:	Brown, Orange	**Relative density:**	Not Available
Odor:	None	**Partition coefficient (n-octanol/water):**	Not Available

SDS Name: Blood Red Dye Blend

Odor threshold:	Not Available	**% Volatile by weight:**	Not Available
Solubility in water:	Soluble	**VOC:**	Not Applicable
Evaporation rate:	Not Available	**Boiling point °C:**	Not Applicable
Vapor pressure:	Not Available	**Boiling point °F:**	Not Applicable
Vapor density:	Not Available	**Flash point:**	Not Applicable
Viscosity:	Not Available	**Auto-ignition temperature:**	Not Available
Melting point/Freezing point:	Not Available	**Flammability (solid, gas):**	Not flammable (may form combustible dust-air mixtures)
Oxidizing properties:	Not oxidizing	**Flammability or explosive limits:**	**LFL/LEL** Not Available
Explosive properties:	Not explosive		**UFL/UEL** Not Available
Decomposition temperature:	Not Available		

Other information: Amounts specified are typical and do not represent a specification.

Dust combustibility data: YELLOW DYE COMPONENT: Particle size variation is considered a critical factor in regards to dust explosion hazard information. Results applicable as follows: sample particle size <75 um, <5% moisture content. Sample tested may not be typical of product.:

- Minimum explosive concentration: 100 g/m3
- Minimum Autoignition temperature (dust cloud): 570 °C
- Minimum Autoignition temperature (dust layer): 325 °C
- Maximum pressure of explosion: 7.9 bars-gauge
- Deflagration Index, Kst: 109 bar-m/sec
- Dust Hazard Class: 1 (weak)

SECTION 10: Stability and reactivity

Reactivity: None known.

Chemical stability: This product is stable.

Possibility of hazardous reactions: Hazardous polymerization will not occur.

Conditions to avoid: Avoid dust formation.

Incompatible materials: Avoid strong bases and oxidizing agents.

Hazardous decomposition products: Carbon dioxide, carbon monoxide, oxides of nitrogen, and oxides of sulfur.

SECTION 11: Toxicological information

Information on likely routes of exposure:

General: Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure.

Eyes: Solid particles on the eye (powder/dust) may cause pain and be accompanied by irritation.

Skin: Repeated or prolonged skin contact may cause irritation. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation: Dust inhalation may cause respiratory irritation.

Ingestion: Ingestion may cause irritation.

Symptoms/effects, acute and delayed: Irritation, Skin discoloration due to dye

Acute toxicity information: Not classified (based on available data, the classification criteria are not met). No toxicity studies have been conducted on this product. ATEmix (oral): >2000 mg/kg.

Skin corrosion/irritation: Not classified.

Serious eye damage/irritation: Not classified.

Respiratory or skin sensitization: Not classified.

Carcinogenicity: Not classified.

Carcinogenic status: The components of this mixture are not known to be listed or regulated by IARC, NTP, OSHA or ACGIH.

Germ cell mutagenicity: Not classified.

Reproductive toxicity: Not classified.

Specific target organ toxicity (STOT) - single exposure: Not classified.

Specific target organ toxicity (STOT) - repeated exposure: Not classified.

Aspiration hazard: Not classified (technical impossibility to obtain the data).

Other toxicity information: No additional information available.

SECTION 12: Ecological information

Ecotoxicity: No ecological testing has been conducted on this product.

Persistence and degradability: No specific information available.

Bioaccumulative potential: No specific information available.

Mobility in soil: No specific information available.

Other adverse effects: No additional information available.

SECTION 13: Disposal considerations

Although this product is not defined or designated as hazardous by current provisions of the Federal (EPA) Resource Conservation and Recovery Act (RCRA, 40CFR261), recognize that in appropriate dust/air ratio, dust cloud in air may have explosion potential. Incinerate or landfill waste in a properly permitted facility in accordance with federal, state and local regulations.

See Section 8 for recommendations on the use of personal protective equipment.

SECTION 14: Transport information

The information below is provided to assist in documentation. It may supplement the information on the package. The package in your possession may carry a different version of the label depending on the date of manufacture. Depending on inner packaging quantities and packaging instructions, it may be subject to specific regulatory exceptions.

UN number: N/A

UN proper shipping name:

Not regulated - See Bill of Lading for Details

Transport hazard class(es):

U.S. DOT hazard class: N/A
Canada TDG hazard class: N/A
Europe ADR/RID hazard class: N/A
IMDG Code (ocean) hazard class: N/A
ICAO/IATA (air) hazard class: N/A

A "N/A" listing for the hazard class indicates the product is not regulated for transport by that regulation.

Packing group: N/A

Environmental hazards:

Marine pollutant: Not Applicable

Hazardous substance (USA): Not Applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code: Not Applicable

Special precautions for user: Not Applicable

SECTION 15: Regulatory information

Safety, health and environment regulations/legislation specific for the product:

U.S. federal and state regulations/legislation:

This SDS has been prepared in accordance with the hazard criteria of the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

U.S. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Reportable Quantity (RQ):

Not Applicable

U.S. Superfund Amendments and Reauthorization Act (SARA) - SARA Section 313:

None Known

California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:
None known to be present or none in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:
None known to be present or none in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Canada regulations/legislation:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

Canadian Workplace Hazardous Material Information System (WHMIS) classification: Not controlled

Canadian Ingredient Disclosure List:

None known to be present or none in reportable amounts

Mexico regulations/legislation:

This SDS contains the information required by NOM-018-STPS-2000 Workplace Hazardous Chemical Substances Communication and Identification Standard.

Chemical inventories:

Regulation	Status
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	N
U.S. Toxic Substances Control Act (TSCA):	Y

A "Y" listing indicates all intentionally added components are either listed or are otherwise compliant with the regulation. A "N" listing indicates that for one or more components: 1) there is no listing on the public inventory; 2) no information is available; or 3) the component has not been reviewed.

SECTION 16: Other information

SDS Revision date: 5/1/2015

HMIS (Hazardous Materials Identification System) Ratings:

Health: 1 **Flammability:** 1 **Reactivity (Stability):** 0 **Personal Protection:** X

NFPA (National Fire Protection Association) Ratings:

Health: 1 **Flammability:** 1 **Instability:** 0

Key: 0=Insignificant; 1=Slight; 2=Moderate; 3=High; 4=Extreme. An asterisk appearing after the HMIS Health numerical rating denotes a chronic hazard.

Hazardous Materials Identification System (HMIS), National Paint and Coating Association, rating applies to product "as packaged" (i.e., ambient temperature). Ratings are based upon HMIS® III and NFPA 704 (2007). An asterisk appearing after the HMIS Health® III numerical rating

denotes a chronic hazard. National Fire Protection Association (NFPA) rating identifies the severity of hazards of material during a fire emergency (i.e., "on fire").

Legend:

ACGIH: American Conference of Governmental Industrial Hygienists
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)

Users Responsibility/Disclaimer of Liability:
As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local laws and local regulations remains the responsibility of the user.

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. It is your responsibility to develop appropriate work practice guidelines and employee instructional programs for your operation.

Safety Data Sheet Preparer:
Product Compliance Department
Emerald Performance Materials, LLC
2020 Front Street, Suite 100
Cuyahoga Falls, Ohio 44221
United States

Lithium Ion Batteries SDS

SECTION 1. CHEMICIAL PRODUCT AND COMPANY NAME

Lithium-Ion Rechargeable Battery Pack
BL1815N & BL1850
Symbol (S) at the bottom of the battery.

Safety Data Sheet

Complies with the OSHA Hazard Communication Standard : 29 CFR 1910 1200

Makita U.S.A., Inc. 14930-C Northam Street La Mirada, CA 90638	Prepared By :	Stan Rodrigues
	Date Revised:	2/11/2015

EMERGENCY CONTACT INFORMATION

Telephone Number for Information: MAKITA: 1-510-657-9881

Emergency Response

For Chemical Emergency
Spills, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada 1-800-424-9300

SECTION 2. HAZARD IDENTIFICATION:

Route(s) of Entry:	There is no hazard when the measures for handling and storage are followed.
Signs and Symptoms of Exposure:	In case of cell damage, possible release of dangerous substances and a flammable gas mixture.
OSHA Hazard Communication:	This material is not considered hazardous by the OSHA Hazard Communication Standard 29CFR 1910.1200.
Carcinogenicity (NTP):	Not listed
Carcinogenicity (IARC):	Not listed
Carcinogenicity (OSHA):	Not listed
Special hazards for human health and environment:	There is no hazard when the measures for handling and storage are followed. In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

SECTION 3. COMPOSITION, INFORMATION OR INGREDIENTS

CAS-No.	Chemical Name	Quantity
1307-96-6	Cobalt oxide	< 30 %
1313-13-9	Manganese dioxide	< 30 %
1313-99-1	Nickel oxide	< 30 %
7440-44-0	Carbon	< 30 %
	Electrolyte (*)	< 20 %
24937-79-9	Polyvinylidene fluoride (PVdF)	< 10 %
7429-90-5	Aluminum foil	2 - 10 %
7440-50-8	Copper foil	2 - 10 %
	Aluminum and inert materials	5 - 10 %
Full text of each relevant R phrase can be found in Section 16		

1

CONTINUED: SECTION 3. COMPOSITION, INFORMATION OR INGREDIENTS

For information purposes:	(*) Main ingredients: Lithium hexafluorophosphate, organic carbonates
Because of the cell structure the dangerous ingredients will not be available if used properly. During charge process a lithium graphite intercalation phase is formed.	
Mercury content:	Hg < 0.1mg/kg
Cadmium content:	Cd < 1mg/kg
Lead content:	Pb< 10mg/kg
Wh rating:	Under 100Wh
Anode (negative electrode):	Based on intercalation graphite
Cathode (positive electrode):	Based on lithiated metal oxide (Cobalt, Nickel, Manganese)

SECTION 4. FIRST AID MEASURE

General information:	The following first aid measures are required only in case of exposure to interior battery components after damage of the external battery casing. Undamaged, closed cells do not represent a danger to the health.
After inhalation:	Ensure of fresh air. Consult a physician.
After contact with skin:	In case of contact with skin wash off immediately with plenty of water. Consult a physician.
After contact with eyes:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical treatment by eye specialist
After ingestion:	Drink plenty of water. Call a physician immediately.

SECTION 5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Cold water and dry powder in large amount are applicable. Use metal fire extinction powder or dry sand if only few cells are involved.
Special hazards arising from the chemical:	May form hydrofluoric acid if electrolyte comes into contact with water. In case of fire, the formation of the following flue gases cannot be excluded: Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.
Protective equipment and precautions for firefighters:	Wear self-contained breathing apparatus and protective suit.
Additional information:	If possible, remove cell (s) from firefighting area. If heated above 125°C, cell (s) can explode/vent. Cell is not flammable but internal organic material will burn if the cell is incinerated.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective clothing. Avoid contact with skin, eyes and clothing. Avoid breathing fume and gas.
Environmental precautions:	Do not discharge into the drains/surface waters/groundwater. Methods for cleaning up/taking up Take up mechanically and send for disposal.

SECTION 7. HANDLING AND STORAGE

Handling	
Advice on safe handling:	Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble. Advice on protection against fire and explosion Keep away from open flames, hot surfaces and sources of ignition.
Storage	
Requirements for storage rooms and vessels:	Storage at room temperature (approx. 20°C) at approx. 20- 60% of the nominal capacity (OCV approx. 3.6 - 3.9 V/cell). Keep in closed original container.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ingredient	Risk Codes	Safety Description	Hazard	Exposure Controls/Personal Protection
Cobalt oxide	R22, R43, R50/53	S24; S37; S60; S61	Xn (Harmful)N (Dangerous for the environment)	0.1 mg/m3 (TWA)
Manganese (VI) oxide	R20/22	S25	Xn (Harmful)	**Airborne Exposure Limits:** - OSHA Permissible Exposure Limit (PEL): 5 mg/m3 Ceiling for manganese compounds as Mn - ACGIH Threshold Limit Value (TLV): 0.2 mg/m3 (TWA) for manganese, elemental and inorganic compounds as Mn
Nickel oxide	R43, R49, R53	S45, S53, S61	T(Toxic)	**Airborne Exposure Limits:** For Nickel, Metal and Insoluble Compounds, as Ni: - OSHA Permissible Exposure Limits (PEL) - 1 mg/m3 (TWA). For Nickel, Elemental / Metal: - ACGIH Threshold Limit Value (TLV) - 1.5 mg/m3 (TWA), A5 - Not suspected as a human carcinogen. For Nickel, Insoluble Compounds, as Ni: - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m3 (TWA), A1 - Confirmed human carcinogen
Carbon	R36/37/38 R36/37 R20, R10	S22; S24/25	F(Highly Flammable) Xn (Harmful) Xi (Irritant)	**Airborne Exposure Limits:** - OSHA Permissible Exposure Limits (PELs): activated carbon (graphite, synthetic). Total particulate = 15 mg/m3
Aluminum foil	R17, R15, R36/38, R10, R67, R65, R62, R51/53, R48/20, R38, R11,	S7/8, S43, S26, S62 S61, S36/37, S33, S29, S16, S9	F (Highly Flammable) Xn (Harmful) Xi (Irritant)	**Airborne Exposure Limits:** -OSHA Permissible Exposure Limit (PEL): 15 mg/m3 (TWA) total dust and 5 g/m3 (TWA) repairable fraction for Aluminum metal as Al -ACGIH Threshold Limit Value (TLV): 10 mg/m3 (TWA) Aluminum metal dusts

CONTINUED: SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ingredient	Risk Codes	Safety Description	Hazard	Exposure Controls/Personal Protection
Copper foil	R11 R36 R37 R38	S5, S26, S16, S61, S36/37	F (Highly Flammable) N(Dangerous for the environment) Xn (Harmful) Xi (Irritant)	Copper Dust and Mists, as Cu: - OSHA Permissible Exposure Limit (PEL) - 1 mg/m3 (TWA) - ACGIH Threshold Limit Value (TLV) - 1 mg/m3 (TWA) Copper Fume: - OSHA Permissible Exposure Limit (PEL) - 0.1 mg/m3 (TWA) - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m3 (TWA)
Polyvinylidene fluoride (PVdF)		S22;S24/25		

Additional advice on limit values:	During normal charging and discharging there is no release of product.
Occupational exposure controls:	No specific precautions necessary.
Protective and hygiene measures:	When using do not eat, drink or smoke. Wash hands before breaks and after work.
Respiratory protection:	No specific precautions necessary.
Hand protection:	No specific precautions necessary.
Eye protection:	No specific precautions necessary.
Skin protection:	No specific precautions necessary.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Form:	Solid
Color:	Various
Odor:	Odourless
Important health, safety and environmental information	
Test method	
pHValue:	n.a.
Flash point:	n.a.
Lower explosion limits:	n.a.
Vapour pressure:	n.a.
Density:	n.a.
Water solubility:	Insoluble
Ignition temperature:	n.a.

4

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	Keep away from open flames, hot surfaces and sources of ignition. Do not puncture, crush or incinerate.
Materials to avoid:	No materials to be especially mentioned.
Hazardous decomposition products:	In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.
Possibility of Hazardous Reactions:	Will not occur
Additional information:	No decomposition if stored and applied as directed.

SECTION 11. TOXICOLOGICAL INFORMATION

Empirical data on effects on humans:	If appropriately handled and if in accordance with the general hygienic rules, no damages to health have become known.

SECTION 12. ECOLOGICAL INFORMATION

Further information:	Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.

SECTION 13. DISPOSAL CONSIDERATIONS

Advice on disposal:	For recycling consult manufacturer.
Contaminated packaging:	Disposal in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION

- When a number of batteries are transported by ship, vehicle and railroad avoid high temperature and dew condensation.
- Avoid transportation which may cause damage of package.
- Lithium-ion batteries are not subject to dangerous goods regulation for the purpose of transportation by the International Maritime Dangerous Goods regulations (IMDG). For Lithium-ion batteries, the Watt-hour rating is no more than 20Wh /cell and 100Wh/ battery pack can be treated as "non-dangerous goods" by the United Nations Recommendations on the Transport of Dangerous Goods/Special Provision 188, provided that the products are prevented from being short-circuited with each other and are packaged in an appropriate condition which satisfies Packing Group II performance level.
- IATA (International Air Transport Association): Dangerous Goods Regulation
  Packing Instruction 965 (Lithium-ion or lithium polymer cells and batteries without electronic equipment)
- US Hazardous Materials Regulations 49 CFR (Code of Federal Regulations) Sections 173-185 Lithium batteries and cells.

Section II requirements apply to lithium-ion cells with a Watt-hour rating not exceeding 20 Wh and lithium-ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that within the allowance permitted in Section II, Table 965-11.

TABLE 965-II

Contents	Lithium-ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less	Lithium-ion cells with a Watt-hour rating of more than 2.7Wh but not more than 20Wh	Lithium-ion batteries with a Watt-hour rating of more than 2.7Wh but not more than 100Wh
Maximum number of cells / batteries per package	No limit	8 cells	2 Batteries

CONTINUED: SECTION 14. TRANSPORT INFORMATION:

Contents	Lithium-ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less	Lithium-ion cells with a Watt-hour rating of more than 2.7Wh but not more than 20Wh	Lithium-ion batteries with a Watt-hour rating of more than 2.7Wh but not more than 100Wh
Maximum net quantity per package	2.5 kg	N/A	N/A

Lithium-ion cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- Each cell and battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3;
  - cells and batteries must be manufactured under a quality management program;
  - for batteries, The Watt-hour rating must be marked on the outside of the battery case;
  - Each package must be capable of withstanding a 1.2m drop test in any orientation without:
    - damage to cells or batteries contained therein;
    - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
    - release of contents.
- Each package must be labeled with a lithium battery handling label.

Section IB requirements apply to lithium-ion cells with a Watt-hour rating not exceeding 20 Wh and lithium-ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II.

Quantities of lithium-ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II must be assigned to Class 9 and are subject to all of the applicable provisions of Regulation.

Even classified as lithium batteries packed with equipment (UN3481), lATA Dangerous Goods Regulations packing instruction 966 is applied.

Even classified as lithium batteries installed in equipment (UN3481), lATA Dangerous Goods Regulations packing instruction 967 is applied.

SECTION 15. REGULATORY INFORMATION

U.S. Regulations

National Inventory TSCA:	All of the components are listed on the TSCA inventory.
SARA:	To the best of our knowledge this product contains no toxic chemicals subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act (SARA/EPCRA) and the requirements of 40 CFR Part 372.

SECTION 16. OTHER INFORMATION

Hazardous Materials Information Label (HMIS)

Health:	0
Flammability:	0
Physical Hazard:	0

NFPA Hazard Ratings

Health:	0
Flammability:	0
Reactivity:	0
Unique Hazard:	

Full text of R-phrases referred to under Sections 2 and 3

6

CONTINUED: SECTION 16. OTHER INFORMATION

R10	Flammable.
R20/22	Harmful by inhalation and if swallowed.
R22	Harmful if swallowed.
R34	Causes burns.
R40	Limited evidence of a carcinogenic effect.
R43	May cause sensitization by skin contact.
R48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
R49	May cause cancer by inhalation.
R50	Very toxic to aquatic organisms.
R53	May cause long-term adverse effects in the aquatic environment

Further Information

Data of sections 4 to 8, as well as 10 to 12, do not necessarily refer to the use and the regular handling of the product (in this sense consult package leaflet and expert information), but to release of major amounts in case of accidents and irregularities. The information describes exclusively the safety requirements for the product (s) and is based on the present level of our knowledge. This data does not constitute a guarantee for the characteristics of the product(s) as defined by the legal warranty regulations. "(n.a. = not applicable; n.d. = not determined)"

The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.

Airway Lubricant SDS

SILICONE SOLUTIONS

Safety Data Sheet (SDS)
(Industrial Use Only)

1. Product and Company Identification

Product:
Product Name: SS-50 Silicone Oil
Intended Use: Sealant

Manufacturer/Supplier:
Silicone Solutions
338 Remington Road
Cuyahoga Falls, OH
Preparer: Casey Linx
Chemical Family: Silicone Rubber
Formula: SiO_2CH_3
Emergency Telephone Number: 330-920-3125

2. Hazards Identification

Hazard Classification:
This material's composition is minimally hazardous according to regulatory guidelines. *See Section 15 for hazard ratings.*

Label: None required.

Hazard Statements:
Physical: None known
Health:

Ingestion	None known.
Skin Contact	Manufacturing experience has shown that skin hazard is not applicable in this form.
Inhalation	None known.
Eye Contact	May cause mild eye irritation.
Medical Conditions Aggravated	None known.
Subchronic (target organ) Effects	None known.
Chronic Effects/Carcinogenity	This product or one of its ingredients that is present in 0.1% or more is NOT listed or is suspected as a carcinogen by NTP, IARC, or OSHA.
Principle Routes of Exposure	None known.

Precautionary Statements:
General: Obtain special instructions before use, and do not handle until all safety precautions have been read and understood.

Other Hazard Information:
- This product contains methylpolysiloxanes, which can generate formaldehyde upon exposure above 300 degrees centigrade in atmospheres that contain oxygen. Formaldehyde is a skin, eye, and throat irritant.

3. Composition/Information on Ingredients

Chemical Characterization:
Formula: SiO_2CH_3
Composition and Information on Ingredients: Non-hazardous components unless otherwise specified.

Component	CAS #	Approximate % Weight
Dimethylpolysiloxane	63148-62-9	100

4. First Aid Measures

General Information:
Ingestion: None known.
Skin: Wash with soap and water.
Inhalation: None known.
In case of eye contact: Flush with water for fifteen minutes and get medical attention.

Note to Physician: None known.

5. Firefighting Measures

Flammability Properties:
Flash Point: > 250°C or 482°F
Method: ISO 2592
Ignition Temperature: 395°C or 743°F
Flammable Limits in Air-Upper % : NA
Flammability Limits in Air-Lower % : NA
Sensitivity to Mechanical Impact: No
Sensitivity to Static Discharge: No

Extinguishing Media: All standard firefighting material.

Special Firefighting Procedures: None known.

6. Accidental Release Measures

Action to be taken if material is released or spilled: Scrape up and place in an inert material for disposal. *See Section 8 for protective equipment upon exposure and Section 7 for information on safe handling.*

7. Handling and Storage

Precautions to be taken during handling and storage: None required.

8. Exposure Controls/Personal Protection

Control Parameters:

Components with limit values that require monitoring at the workplace:

Component	CAS #	ACGIH TWA	TLV STEL	OSHA TWA	PEL STEL
Dimethylpolysiloxane	63148-62-9	NE	NE	NF	NE

Exposure Controls and Protection:

Engineering Controls: None known.
Respiratory Protection: None required.
Protective Gloves: None required.
Eye and Face Protection: None required.
Other Protective Equipment: None required.
Ventilation: None required.

9. Physical and Chemical Properties

Information on basic physical and chemical properties:

Boiling Point: NA
Vapor Pressure: NA
Vapor Density: NA
Freezing Point: NA
Melting Point: -55°C (-67°F)
Physical State: Liquid
Odor: Odorless.
% Volatile by Volume: < 1
Evaporation Rate: < 1
Density: 0.96 g/cm³
Acid/Alkalinity: Unknown.
pH: Approximately 7
VOC: NT
Solubility in Water: Insoluble.
Solubility in Organic Solvents: Partially soluble in toluene.

10. Stability and Reactivity

Chemical Stability:

Stability: Stable.

Reactivity:

Hazardous Polymerization: Will not occur.
Hazardous Thermal Decomposition/Combustion Products:

- Carbon Dioxide
- Carbon Monoxide
- Silicon Dioxide
- Formaldehyde

Conditions to Avoid: None known.

11. Toxicological Information

Product Information on Toxicological Effects:

Acute Oral LD50: Unknown.
Acute Dermal LD50: Unknown.
Acute Inhalation LC50: Unknown.
Ames Test: Unknown.

12. Ecological Information

Ecotoxicity:

Ecotoxicological Information: Unknown.
Chemical Fate Information: Unknown.

13. Disposal Considerations

Disposal Method: Disposal should be made in accordance with federal, state, and local considerations.

14. Transport Information

General:

DOT Shipping Name: NA
DOT Hazard Class: Not DOT regulated.
DOT Label: NA
UN/NA Label: NA
Placards: None.
IATA: NA
IMO IMDG-code: NA
European Class:
RID (OCTI): NA
ADR (ECE): NA
RAR (IATA): NA

15. Regulatory Information

Regulatory Status and Applicable Laws and Regulations:

SARA Section 302: None found.
SARA (311, 312) Hazard Class: None.
SARA (313) Chemicals: None.
CPSC Classification: NA
WHMIS Hazard Class: None.
Export Schedule:
B/HTSUS: 3910.00 Silicones in primary form.
ECCN: EAR99
California Proposition 65: None.
TSCA Inventory Status: All components of this product are listed (or exempt) on the EPA TSCA inventory.

Hazard Rating Systems:

HMIS (scale 0-4):

- Health = 0
- Flammability = 0
- Reactivity = 0

NFPA (scale 0-4):

- Health = 0
- Flammability = 0
- Reactivity = 0

16. Other Information

Revision Date: 06/20/2013
SDS Preparer: Casey Linx

This product or its components are on the European inventory (EINECS) of existing commercial chemicals. This data is offered in good faith as typical values and not as a product satisfaction. No warranty, either expressed or implied, is made. The recommended handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific content of the intended use.

Abbreviations and Acronyms:

OSHA: Occupational Safety and Health Administration
ACGIH: American Conference of Governmental Industrial Hygienists
LD50: Lethal Dose, 50 percent
LC50: Lethal Concentration, 50 percent
DOT: US Department of Transportation
IATA: International Air Transport Association
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)

SAFETY DATA SHEET: Gamsol
REVISED: 8/1/2015

SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name:	Gamsol
Product Description:	Odorless Mineral Spirits (OMS)
Intended Use:	Artists' oil painting solvent. Intended for thinning oil colors, thinning oil painting mediums, grounds and varnishes, and for general brush clean-up.

COMPANY

Company Name:	Gamblin Artists Colors
Company Address:	323 SE Division Pl. Portland, OR 97202 USA
Company Phone:	503-235-1945
Emergency Phone:	Local Emergency Room

SECTION 2: HAZARDS IDENTIFICATION

GHS LABELING

GHS Classification:	Flammable liquid	Category 4
	Aspiration toxicant	Category 1

GHS Pictogram(s):

Signal Word: Danger

HAZARDS

Hazard Statements:

H227	Combustible liquid
H304	May be fatal if swallowed and enters airways

Precautionary Statements:

P210	Keep away from flames and hot surfaces. -- No smoking
P280	Wear protective gloves and eye / face protection

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331	Do NOT induce vomiting
P370 + P378	In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish
P403 + P235	Store in a well-ventilated place. Keep cool
P405	Store locked up
P501	Dispose of contents and container in accordance with local regulations

Physical/Chemical Hazards:
Material can accumulate static charges which may cause an ignition. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Combustible.

Health Hazards:
Repeated exposure may cause skin dryness or cracking. May be irritating to the eyes, nose, throat, and lungs.

Environmental Hazards:
No significant hazards

NFPA Hazard ID:	Health: 1	Flammability: 2	Reactivity: 0
HMIS Hazard ID:	Health: 1[1]	Flammability: 2	Reactivity: 0

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

This material is defined as a complex substance.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Chemical Name	CAS#	Concentration (%)[2]	GHS Hazard Codes
Naphtha (petroleum), hydrotreated heavy	64742-48-9	100%	H227, H304

SECTION 4: FIRST AID MEASURES

Eyes:	Flush thoroughly with water. If irritation occurs, get medical assistance.
Skin:	Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.
Inhalation:	Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation,

[1] All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume Concentration values may vary.
[2] As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Ingestion: Seek immediate medical attention. Do not induce vomiting.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: If ingested material may be aspirated into the lungs and cause chemical pneumonia. Treat appropriately.

SECTION 5: FIRE FIGHTING MEASURES

FIRE FIGHTING

Appropriate Extinguishing Media:
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media:
Straight Streams of Water

Special Fire Fighting Procedures:
Combustible. Evacuate area. Prevent runoff from fire control or dilution From entering streams, sewers, or drinking water supplies. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products:
Oxides of carbon, Smoke, Fume, Incomplete combustion products.

Unusual Fire Hazards: Combustible.

FLAMMABILITY PROPERTIES

Flash Point [Method]: 62°C 144°F [ASTM D-93]

Flammable Limits (Approximate volume % in air):
LEL: 0.7 UEL: 5.3

Autoignition Temperature:
335°C 635°F

SECTION 6: ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

General:
In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

General:
Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information.

See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders:

Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill:

Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill:

Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Note:

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted.
Local regulations may prescribe or limit action to be taken.

SECTION 7: HANDLING AND STORAGE

HANDLING

General:

Avoid contact with skin. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or

National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: [Ambient]
Transport Temperature: [Ambient]
Transport Pressure: [Ambient]
Static Accumulator:

This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

General:

The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

Storage Temperature: [Ambient]
Storage Pressure: [Ambient]
Suitable Containers/Packing:

Tankers; Tank Trucks; Railcars; Barges; Drums

Suitable Materials and Coatings (Chemical Compatibility):

Inorganic Zinc Coatings; Epoxy Phenolics; Teflon; Neoprene; Stainless Steel; Carbon Steel

Unsuitable Materials and Coatings:

Vinyl Coatings; Natural Rubber; Butyl Rubber; Ethylene-proplyene-diene monomer (EPDM)

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure Limits/Standards:

Substance Name	Form	Limit / Standard			Source
NAPHTHA (PETROLEUM), HYDROTREATED HEAVY	N/A	TWA	400 mg/m3	100 ppm	OSHA Z1
NAPHTHA (PETROLEUM), HYDROTREATED HEAVY	Vapor	RCP - TWA	1200 mg/m3	171 ppm	Manufacturer

Note: Exposure limits are not additive. Limits/standards shown for guidance only. Follow applicable regulations. No biological limits allocated.

ENGINEERING CONTROLS

Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

Note: The level of protection and types of controls necessary will vary depending upon potential exposure conditions.

PERSONAL PROTECTION

Note: Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection:

If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include: Half-face filter respirator. For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection:

Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include: If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection:

If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection:

Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include: If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures:

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

NOTE: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State:	Liquid or gel
Form:	Clear
Color:	Colorless
Odor:	Odorless
Odor Threshold:	N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.765
Density (at 15 ºC): 764 kg/m³ (6.38 lbs/gal, 0.76 kg/dm³)
Flammability (Solid, Gas): N/A
Flash Point [Method]: 62°C (144°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 5.3
Autoignition Temperature: 335°C (635°F)
Boiling Point / Range: 189°C (372°F) - 209°C (408°F)
Decomposition Temperature: N/D
Vapor Density (Air = 1): 5.6 at 101 kPa
Vapor Pressure: 0.041 kPa (0.31 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): 0.09
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 1.56 cSt (1.56 mm2/sec) at 40 °C | 2.02 cSt (2.02 mm2/sec) at 25°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/D
Pour Point: -69°C (-92°F)
Molecular Weight: 162
Hygroscopic: No
Coefficient of Thermal Expansion: 0.00078 V/VDEGC

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

HAZARD CLASS	CONCLUSION/REMARKS
Inhalation	
Acute Toxicity: (Rat) 8 hour(s) LC50 > 5000 mg/m3 (Vapor)	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Tests equivalent or similar to OECD Guideline 471 473 474 476 478 479

Carcinogenicity: Data available.	Not expected to cause cancer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 453
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 421 422
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 408 413 422

OTHER INFORMATION

For the product itself:

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION

Ecotoxicity: Not expected to be harmful to aquatic organisms.
Not expected to demonstrate chronic toxicity to aquatic organisms.

PERSISTENCE AND MOBILITY

Biodegradation: Expected to be inherently biodegradable.
Hydrolysis: Transformation due to hydrolysis is not expected to be significant.
Photolysis: Transformation due to photolysis is not expected to be significant.
Atmospheric: Expected to degrade rapidly in air.

OTHER ECOLOGICAL INFORMATION

VOC (EPA Method 24): 6.401 lbs/gal

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	96 hour(s)	Oncorhynchus mykiss	LL0 1000 mg/l: data for similar materials
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	EL0 1000 mg/l: data for similar materials

Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	EL0 1000 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 mg/l: data for the material
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 1000 mg/l: data for similar materials

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results
Water	Ready Biodegradability	28 day(s)	% Degraded 31.3 : similar material

SECTION 13: DISPOSAL CONSIDERATIONS

NOTE: Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at the time of disposal.

Waste Disposal: Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container: Empty containers may contain residue and can be dangerous.
Do not attempt to clean container without proper instructions.
Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations.
DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14: TRANSPORT INFORMATION

LAND (DOT)

Proper Shipping Name: Petroleum distillates, N.O.S.
Hazard Class: Combustible liquid

ID Number:	1268
Packing Group:	III
ERG Number:	128
Label(s):	None
Transport Doc. Name:	UN1268, PETROLEUM DISTILLATES, N.O.S., COMBUSTIBLE LIQUID, PG III
Note:	This material is not regulated under 49 CFR in a container of 119 gallon capacity or less when transported solely by land, as long as the material is not a hazardous waste, a marine pollutant, or specifically listed as a hazardous substance.

LAND (TDG)

Not Regulated for Land Transport

SEA (IMDG)

Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA)

Not Regulated for Air Transport

SECTION 15: REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD

This material is considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.
Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

EPCRA SECTION 302

This material contains no extremely hazardous substances.

CERCLA

This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLA petroleum exclusion applies for this product. Contact local authorities to determine if other reporting requirements apply.

SARA (311/312) REPORTABLE HAZARD CATEGORIES

Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY

This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below: None

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16: OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

The information and recommendations contained herein are, to the best of Gamblin's knowledge and belief, accurate and reliable, but it is not warranted to be. You can contact Gamblin to ensure that this document is the most current available. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use and it is the user's responsibility to carefully read the product label and follow instructions for safe use of the product.