

# EVOLUTION® 6000 Plus Thermal Imaging Camera

## Product Specification



### I. Purpose

To establish minimum standards for the MSA EVOLUTION 6000 Thermal Imaging Camera (TIC) and EVOLUTION 6000 TIC battery charging systems. EVOLUTION 6000 TICs are tools for firefighters and first response emergency personnel that are used for search and rescue, fire scene size-up, overhaul, location of victims, and advanced firefighting and first response applications.

### II. Type

The thermal imaging camera covered by this specification shall be of the type incorporating a 320X240 vanadium oxide microbolometer focal plane array sensor. EVOLUTION 6000 Series TIC displays black and white scene representations on a 3.5" (89 mm) diagonal LCD display. Design is optimized for firefighters in ergonomic design and ease of incorporation with firefighting gear. TIC features dual-handle design for easy handoff and handling, and high-impact, heat-resistant housing to ensure that the TIC will withstand rigors of firefighting environments. The TIC is further protected by a rubber bumper system to provide additional protection from extremely harsh environments. The TIC shall be tested to and comply with the following standards:

<b>NFPA COMPLIANCE</b>	NFPA 1801-2021 Edition
<b>WATER/DUST INGRESS</b>	International Standard CEI, IEC 529, IP67 Classification
<b>DIRECT FLAME/HEAT EXPOSURE</b>	NFPA 1801-2021 Edition
<b>RADIO FREQUENCY INTERFERENCE</b>	IEC 61000-6-3, IEC 61000-6-2, FCC Part 15
<b>ROLLOVER (TRUCK CHARGER)</b>	Simulated NFPA 1901-12, 1.7
<b>NON-EXPLOSIVE RATING</b>	ANSI/UL 12.12.01 (Class I, Div. 2, Groups C and D)

### III. Component Parts

The product shall consist of the following component parts. TICs, kits, and accessories can be purchased individually.

1. EVOLUTION 6000 Plus Thermal Imaging Camera
2. Direct temperature measurement
3. Heat Seeker PLUS Indicator
4. 2X and 4X digital zoom
5. Six user-selectable color palettes
6. Flashlight
7. Laser pointer
8. Distance range finder (optional)
9. Magnetic compass

#### Components below are sold in kit format and/or individually:

11. Lithium-ion battery packs
12. Desktop/vehicle cupholder dual battery charger with wall plug and cigarette lighter adapter
13. Truck-mounted charging system
14. Attachments: carabiner, wrist strap, shoulder strap, retractable lanyard
15. Carrying case



**WHEN YOU GO IN, WE GO IN WITH YOU.**

# EVOLUTION 6000 Plus TIC Product Specs

## IV. Specific Requirements

### 1. EVOLUTION 6000 Plus TIC

<b>SENSOR</b>	
TYPE	Uncooled vanadium oxide microbolometer focal plane array detector
ARRAY SIZE	320x240
SPECTRAL RESPONSE	7.0-14.0 microns
NETD	<b>High Sensitivity:</b> ≤78 mK (0.078°C) max. ≤40 mK (0.040°C) typ.; <b>Low Sensitivity:</b> ≤234 mK (0.234°C)
DYNAMIC RANGE	<b>High Sensitivity:</b> -40° to 320°F (-40° to 160°C); <b>Low Sensitivity:</b> -40°F to 1112°F, (-40°C to 600°C)
VIDEO STANDARD	BT-656 digital
FRAME RATE	60 Hz
VIDEO OUTPUT	.mv4 (.mpeg4)
<b>MECHANICAL</b>	
DIMENSIONS	7.3" x 4.8" x 11.6" (185 mm x 122 mm x 295 mm)
BASE WEIGHT	42.4 oz. (2.65 lb. / 1.2 kg)
MATERIALS	Outer case and bumper materials pass NFPA 1801, 2021 Edition direct flame and heat exposure tests
OUTER HOUSING	Polyphenylsulfone
RUBBER BUMPERS	Flame-retardant silicone
DISPLAY COVER	UV-stabilized polycarbonate with NFPA anti-scratch coating
BUOYANCY	Camera floats in water
<b>ELECTRICAL</b>	
POWER SUPPLY	Supplied by integral battery pack
POWER CONSUMPTION	<6 W nominal
USB PORTS	1 configuration port (E6000, E6000+), 1 configuration, 1 video/image download port (E6000X)
DISPLAY	3.5" (89 mm) LCD backlit display
<b>ENVIRONMENTAL</b>	
<b>AMBIENT TEMP</b>	<b>OPERATING TIME</b>
80°C, 176°F	> 30 minutes
120°C, 248°F	> 20 minutes
260°C, 500°F	> 6 minutes
-30°C, -22°F	> 40 minutes
-40°C, -40°F	> 25 minutes
<b>WATER/DUST INGRESS</b>	TIC shall resist dust and water and must conform to International Standard CEI IEC 529; Degrees of Protection Provided by Enclosures (IP Code); IP67 classification
<b>IMPACT/DROP</b>	Will survive 6 ft. (2 m) drop at any angle with no operational defaults or physical compromise of outer housing
<b>RFI/EMC</b>	TIC should not interfere with standard firefighter frequency bands at power levels found in hand-held (3-5 W) and vehicle-mounted systems (-100 W). Communication/electronic devices cannot affect TIC to the point where navigation is compromised when TIC is subjected to RF interference of 80 MHz to 1 GHz at 30 V/m. TIC must meet RFI emissions and susceptibility of IEC
<b>OPTICAL</b>	
LENS	9 mm, F1.25
FIELD OF VIEW	48° horizontal, 37° vertical
FOCUS	Optimal 3 ft. to ∞ (1 m to ∞)
DIGITAL ZOOM	2X and 4X
<b>BATTERY STATUS:</b>	<i>Total battery capacity will be indicated in viewing area with row of 4 LEDs, functioning as follows:</i>
4 GREEN	75% to 100% capacity
3 GREEN	50% to 75% capacity
2 YELLOW	25% to 50% capacity
1 RED	Less than 25% capacity
1 RED (FLASHING)	Less than 5 minutes remaining
SHUTTER INDICATOR	On-screen indicator appearing as small block in upper left display corner when camera shutters indicates that area re-scan is necessary.
LOW SENSITIVITY INDICATOR	On-screen indicator appearing as green triangle in upper left display indicates activities when TIC is in Low Sensitivity
<b>OVER-TEMPERATURE WARNING</b>	<i>On-screen red triangle in display's upper center</i>
NOT LIT	TIC is within operational thermal limits
FLASHING RED	TIC has exceeded recommended operational thermal limits

## 2. Rechargeable Lithium-Ion Battery Pack

<b>BATTERY TYPE</b>	Rechargeable lithium-ion battery pack
<b>BATTERY LOCATION</b>	Inside handle
<b>BATTERY WEIGHT</b>	3.2 oz. (90.7 g)
<b>OPERATING TIME</b>	3.5 hours nominal, 4 hours maximum

## 3. Stand-Alone Battery Charger

<b>FUNCTIONALITY</b>	Stand-alone battery charger will charge two batteries simultaneously. Charger design allows for desktop or vehicle cup holder use
<b>BATTERY CHARGE TIME</b>	4 hours nominal, trickle maintenance charge
<b>POWER SUPPLY</b>	110/240 VAC 50/60 Hz power supply 12 VDC cigarette adapter included

## 4. EVOLUTION 6000 Series TIC Vehicle-Mounted Charger

<b>FUNCTIONALITY</b>	Optional vehicle-mounted charger will charge TIC and 1 spare battery when properly installed. Each vehicle charger includes installation/mounting kit. Charger will draw less than 1.5 amps of power.
<b>BATTERY CHARGE TIME</b>	4 hours nominal, trickle maintenance charge
<b>POWER SUPPLY</b>	12-24 VDC
<b>VIBRATION</b>	Vehicle-mounted charger must safely charge TIC while in a moving vehicle
<b>ROLLOVER</b>	Vehicle-mounted charger must meet rollover requirements identified in NFPA 1901-12-1.7
<b>LED INDICATORS</b>	
CAMERA CHARGING INDICATOR	On camera front panel
RED	Charging
GREEN	Complete
SPARE BATTERY CHARGING INDICATOR	On charger
RED	Charging
GREEN	Complete
<b>DIMENSIONS</b>	10.375" L, 5.75" W, 6" H (264 mm x 146 mm x 152 mm)

## 5. Attachments and Carrying Options

<b>CARABINER</b>	Each TIC shall come equipped with 3 carabiner attachment points and carabiner for securing TIC to tool belt or other gear
<b>WRIST STRAP/BUNKER CLIP</b>	Optional wrist strap/bunker clip attachment is available, constructed of fire- and heat-resistant materials
<b>SHOULDER STRAP</b>	Optional flame- and heat-resistant shoulder strap is available, includes emergency release clip
<b>RETRACTABLE LANYARD</b>	Optional retractable lanyard for use with TIC/carabiner assembly is available. Retraction line is to be made of Kevlar core material, housing is to be heat-resistant

## 6. Carrying Case

<b>CONTENTS</b>	Case will hold as minimum: TIC, 2 lithium-ion battery packs, manual, carrying attachments, and stand-alone battery charger assembly
<b>WATER/DUST INGRESS</b>	Case shall resist dust and water ingress and must conform to International Standard CEI IEC 529; Degrees of Protection Provided by Enclosures (IP Code); IP54 classification
<b>IMPACT/DROP</b>	Dropped 3 consecutive times onto concrete from 3 ft. (1 m) at any angle with no operational defects or physical compromise of case or contents

## 7. Operation and Instruction Manual

<b>USER INSTRUCTIONS</b>	Comprehensive manual includes all aspects of use, care and camera maintenance
<b>QUICK-START GUIDE</b>	Easy reference card covers basic camera operation
<b>TRAINING VIDEO</b>	Online video training includes camera use, care and maintenance, with available certification

### 8. Direct Temperature Measurement

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
<b>DEVICE</b>	Measurement taken from FPA
<b>RANGE</b>	
HIGH SENSITIVITY	-40° to 320°F (-40° to 160°C)
LOW SENSITIVITY	-40°F to 1112°F, (-40°C to 600°C)
<b>TICK MARKS</b>	
HIGH SENSITIVITY	75°F, 150°F and 225°F (24°C, 65°C and 107°C)
LOW SENSITIVITY	250°F, 500°F and 750°F (120°C, 260°C and 399°C)
<b>ACCURACY</b>	±18°F (10°C) or ±10% whichever is greater. For temperatures greater than 435°F (225°C) ±20%
<b>READOUT</b>	Thermometer-style bar indicator in Fahrenheit or Celsius Digital temperature feature displays approximate number value of object temperatures located in spotter

### 9. Heat Seeker PLUS Indicator

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
<b>DEVICE</b>	Measurement taken from FPA
<b>READOUT</b>	Graduated color (yellow to orange to red) of portions of scene that are above:
HIGH SENSITIVITY	<b>Yellow:</b> 275°F, (135°C); <b>Red:</b> 297°F (147°C)
LOW SENSITIVITY	<b>Yellow:</b> 842°F (450°C); <b>Red:</b> 914°F, (490°C)

### 10. User-Selectable Palettes

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
<b>DEVICE</b>	User-selectable palette offers six options: white hot, black hot, and color options fire and ice, ironbow, rain, search & rescue

### 11. Magnetic Compass

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
<b>ACCURACY</b>	±10°

### 12. Flashlight

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
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### 13. Laser Pointer

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
<b>EFFECTIVE DISTANCE</b>	200 ft. (61 m)

### 14. Distance Range Finder

<b>INSTALLATION</b>	Integrated inside TIC without add-on devices
<b>EFFECTIVE DISTANCE</b>	16-210 ft. (5-70 m)
<b>ACCURACY</b>	±3 ft. (1 m)



Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice. MSA is a registered trademark of MSA Technology, LLC in the US, Europe, and other Countries. For all other trademarks visit <https://us.msasafety.com/Trademarks>.

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