

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" 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:

NFPA COMPLIANCE	NFPA 1801, 2013 Edition
WATER/DUST INGRESS	International Standard CEI, IEC 529, IP67 Classification
DIRECT FLAME/HEAT EXPOSURE	NFPA 1801-2013 Edition
RADIO FREQUENCY INTERFERENCE	IEC 61000-6-3, IEC 61000-6-2, FCC Part 15
ROLLOVER (TRUCK CHARGER)	Simulated NFPA 1901-12, 1.7
NON-EXPLOSIVE RATING	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
10. Integrated video transmitter (optional)

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



*Because every life has a **purpose...***

EVOLUTION 6000 Plus TIC Product Specs

IV. Specific Requirements

1. EVOLUTION 6000 Plus TIC

SENSOR: TYPE ARRAY SIZE SPECTRAL RESPONSE NETD DYNAMIC RANGE VIDEO STANDARD FRAME RATE VIDEO OUTPUT	Uncooled vanadium oxide microbolometer focal plane array detector 320X240 7.0-14.0 microns ≤78mK (.078°C) max. ≤40mK (.040°C) typ. (in High Sensitivity), ≤234mK (.234°C) (in Low Sensitivity) -40° to 320°F (-40° to 160°C) (in High Sensitivity), -40°F to 1112°F, (-40°C to 600°C) (in Low Sensitivity) BT-656 digital 60 Hz .mv4 (.mpeg4)
MECHANICAL: DIMENSIONS BASE WEIGHT MATERIALS OUTER HOUSING RUBBER BUMPERS DISPLAY COVER BUOYANCY	7.3" x 4.8" x 11.6" (185 mm x 122 mm x 295 mm) 42.4 oz. (2.65 lbs/1.2 kg) Outer case and bumper materials pass NFPA 1801, 2013 Edition direct flame and heat exposure tests Polyphenylsulfone Flame-retardant silicone UV-stabilized polycarbonate with NFPA anti-scratch coating Camera floats in water
ELECTRICAL: POWER SUPPLY POWER CONSUMPTION USB PORTS DISPLAY	Supplied by integral battery pack <6 W nominal 1 configuration port (E6000, E6000+), 1 configuration, 1 video/image download port (E6000X) 3.5" LCD backlit display
ENVIRONMENTAL AMBIENT TEMP: 80° C, 176° F 120° C, 248° F 260° C, 500° F -30° C, -22° F -40° C, -40° F	OPERATING TIME: > 30 minutes > 20 minutes > 6 minutes > 40 minutes > 25 minutes
WATER/DUST INGRESS:	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
IMPACT/DROP:	Will survive 6-ft (2-m) drop at any angle with no operational defaults or physical compromise of outer housing
RFI/EMC:	TIC should not interfere with standard firefighter frequency bands at power levels found in hand-held (3-5W) and vehicle-mounted systems (~100W). 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 30V/m. TIC must meet RFI emissions and susceptibility of IEC
OPTICAL: LENS FIELD OF VIEW FOCUS DIGITAL ZOOM	9mm, F1.25 48° horizontal, 37° vertical Optimal 3 ft to ∞ (1m to ∞) 2X and 4X
BATTERY STATUS: 4 GREEN 3 GREEN 2 YELLOW 1 RED 1 RED (FLASHING) SHUTTER INDICATOR LOW SENSITIVITY INDICATOR	Total battery capacity will be indicated in viewing area with row of 4 LEDs, functioning as follows: 75% to 100% capacity 50% to 75% capacity 25% to 50% capacity Less than 25% capacity Less than 5 minutes remaining On-screen indicator appearing as small block in upper left display corner when camera shutters indicates that area re-scan is necessary. On-screen indicator appearing as green triangle in upper left display indicates activities when TIC is in Low Sensitivity
OVER-TEMPERATURE WARNING: NOT LIT FLASHING RED	On-screen red triangle in display's upper center TIC is within operational thermal limits TIC has exceeded recommended operational thermal limits

2. Rechargeable Lithium-Ion Battery Pack

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

3. Stand-Alone Battery Charger

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

4. EVOLUTION 6000 Series TIC Vehicle-Mounted Charger

FUNCTIONALITY:	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												
BATTERY CHARGE TIME:	4 hours nominal, trickle maintenance charge												
POWER SUPPLY:	12-24 VDC												
VIBRATION:	Vehicle-mounted charger must safely charge TIC while in a moving vehicle												
ROLLOVER:	Vehicle-mounted charger must meet rollover requirements identified in NFPA 1901-12, 1.7												
LED INDICATORS:	<table border="0"> <tr> <td>CAMERA CHARGING INDICATOR</td> <td>On camera front panel</td> </tr> <tr> <td> RED</td> <td>Charging</td> </tr> <tr> <td> GREEN</td> <td>Complete</td> </tr> <tr> <td>SPARE BATTERY CHARGING INDICATOR</td> <td>On charger</td> </tr> <tr> <td> RED</td> <td>Charging</td> </tr> <tr> <td> GREEN</td> <td>Complete</td> </tr> </table>	CAMERA CHARGING INDICATOR	On camera front panel	RED	Charging	GREEN	Complete	SPARE BATTERY CHARGING INDICATOR	On charger	RED	Charging	GREEN	Complete
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DIMENSIONS:	10.375" L, 5.75" W, 6" H (264mm x 146mm x 152mm)												

5. Attachments and Carrying Options

CARABINER:	Each TIC shall come equipped with 3 carabiner attachment points and carabiner for securing TIC to tool belt or other gear
WRIST STRAP/BUNKER CLIP:	Optional wrist strap/bunker clip attachment is available, constructed of fire- and heat-resistant materials
SHOULDER STRAP:	Optional flame- and heat-resistant shoulder strap is available, includes emergency release clip
RETRACTABLE LANYARD:	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

CONTENTS:	Case will hold as minimum: TIC, 2 lithium-ion battery packs, manual, carrying attachments, and stand-alone battery charger assembly
WATER/DUST INGRESS:	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
IMPACT/DROP:	Dropped 3 consecutive times onto concrete from 3 ft (1m) at any angle with no operational defects or physical compromise of case or contents

7. Operation and Instruction Manual

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

8. Direct Temperature Measurement

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

9. Heat Seeker PLUS Indicator

INSTALLATION:	Integrated inside TIC without add-on devices
DEVICE:	Measurement taken from FPA
READOUT:	Graduated color (yellow to orange to red) of portions of scheme that are above 275°F, (135°C)-yellow, 297°F (147°C)-red, in High Sensitivity, or 842°F (450°C)-yellow, 914°F, (490°C)-red, in Low Sensitivity mode

10. User-Selectable Palettes

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

11. Magnetic Compass

INSTALLATION:	Integrated inside TIC without add-on devices
ACCURACY:	±10°

12. Flashlight

INSTALLATION:	Integrated inside TIC without add-on devices
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13. Laser Pointer

INSTALLATION:	Integrated inside TIC without add-on devices
EFFECTIVE DISTANCE:	200 ft (61m)

14. Distance Range Finder

INSTALLATION:	Integrated inside TIC without add-on devices
EFFECTIVE DISTANCE:	16-210 ft (5-70m)
ACCURACY:	±3 ft (1m)

15. Wireless Video Transmitter

INSTALLATION:	Integrated inside TIC without add-on devices
EFFECTIVE RANGE:	3280 ft (1000m), line of sight
AVAILABLE CHANNELS:	2 channels
TRANSMISSION FREQUENCIES:	2.458GHz, 2.474GHz (North America)

Note: This bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.



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