



PRODUCT SPECIFICATION FOR THE EVOLUTION[®] 5000 TIC

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I. Purpose:

To establish minimum standards for MSA's Evolution 5000 Thermal Imaging Camera (TIC) and Truck Mounted Charging System. The Evolution 5000 TIC is designed to be a tool for firefighters and first response emergency personnel and 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 160x120 vanadium oxide microbolometer focal plane array sensor. The Evolution 5000 TIC displays black and white representations of the scene on a 3.5 diagonal LCD display. Its design is optimized for firefighters in its ergonomic design and ease of incorporation with firefighting gear. It features a dual handle design for easy handoff and handling and a high impact, heat resistant housing that ensures that the TIC will withstand the rigors of the firefighting environment. It is further protected by a rubber bumper system that provides additional protection from extremely harsh environments. The TIC shall be tested and comply with the following standards:

Water/Dust Ingress	International Standard CEI, IEC 529, IP 67 Classification
Direct Flame/Heat Exposure	Simulated NFPA 1981-1997 Ed., NFPA 1982-1998 Ed.
Vibration	MIL-STD-810E Category 1 Loose Cargo Transport
Radio Frequency Interference	CE/EN 50081-2:1992, EN 50082-2: 1992, FCC Part 15
Rollover (Truck Charger)	Simulated NFPA 1901-12, 1.7

III. Component Parts:

The product shall consist of the following component parts. TICs and accessories can be purchased in standard configurations or custom configurations via the Assemble-To-Order system.

1. Evolution 5000 Thermal Imaging Camera
2. Lithium Ion Battery Packs
3. Stand alone battery charger with wall plug and cigarette lighter adapter.
4. Vehicle mounted charging system.
5. Attachments- caribiner, wrist strap, shoulder strap, and retractable lanyard.
6. Video out connector
7. Tripod attachment
8. Carrying Case
9. Manual
10. Optional Direct Temperature Measurement
11. Optional Heat-Seeker Indicator



IV. Specific Requirements

1. Evolution 5000 TIC

SENSOR

Type:	Uncooled Vanadium Oxide Microbolometer Focal Plane Array Detector
Array Size:	160x120
Spectral Response:	8-14 microns
NETD:	≤50MK nominal (≤389MK in Low Sensitivity)
Dynamic Range:	Normal mode -40° to 275°F (-40° to 135°C) in Low Sensitivity -40°F to 932°F (-40°C to 500°C) Nominal
Video standard:	16 bit real time analog
Frame rate:	30 Hz
Video output:	NTSC

MECHANICAL

Dimensions:	10.8" x 8.1" x 4.4" (275mm x 205mm x 112mm)
Base Weight:	45 oz. (2.8 Lbs)
Materials:	Outer Case and bumper materials pass simulated NFPA 1981:1997 edition direct flame and heat exposure tests.
Outer housing:	Bayer PCPET Makroblend
Rubber Bumpers:	FR Neoprene
Display cover:	Heat and scratch resistant polycarbonate

ELECTRICAL

Power Supply:	Supplied by an integral battery pack
Power Consumption:	<6 W nominal
Video Output:	RS-170 a standard SMA connector is included under the display for direct connection to a remote video source. An SMA to BNC adapter is included.
Display:	3.5" LCD backlit display

ENVIRONMENTAL

Thermal Tolerance:	The Evolution 5000 TIC is designed to have the following temperature tolerances.
Ambient Temp.:	Operating Time
80°C, 176° F:	> 30 minutes
120°C, 248° F:	> 10 minutes
260°C, 500° F:	> 5 minutes
-30°C:	> 40 minutes
-40°C:	> 25 minutes

Water/Dust Ingress: The TIC shall resist the ingress of dust and water and must conform to International Standard CEI IEC 529; Degrees of Protection Provided by Enclosures (IP Code); IP-67 classification.

Impact/Drop: Dropped 3 consecutive times onto concrete from 6' at any angle with no operational defaults or physical compromise of the outer housing.

Vibration: The TIC and components housed in the carrying case shall be resistant to vibration and must conform to MIL-STD-810E, Category 3, loose cargo transport.

RFI/EMC: The 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 the TIC to the point where navigation with the TIC is compromised when the TIC is subjected to RF interference of 80 MHz to 1 GHz at 30V/m. The TIC must meet RFI emissions and susceptibility of CE/EN.

OPTICAL

Lens:	8.5mm, F1.2
Field of View:	55° horizontal, 41° vertical
Focus:	Optimal 3' to ∞ (1m to ∞)

WARNINGS/INDICATORS

TIC Status	There will be one green LED to indicate the TIC status. It will function as follows:
Green:	TIC in normal mode and functioning correctly
Flashing Green:	TIC in standby mode and functioning correctly

BATTERY STATUS

Total battery capacity will be indicated in the viewing area with a row of 3 LEDs. They will function as follows:	
Green:	Full Battery Capacity
Yellow:	Marginal Battery Capacity
Red:	Battery Warn – Lit for 15 min. before shutdown
Flashing Red:	Battery Shutdown – Flashes 60 sec. before shutdown
Shutter Indicator:	On screen indicator which appears as a small block in the upper left corner of the display when the camera shutters, indicating that a re-scan of the area is necessary.
Low Sensitivity Indicator:	On-screen indicator which appears as the letter “L” in the lower left portion of the screen. This indicates activities when the TIC is in Low Sensitivity (Firefighting) mode.

OVERTEMPERATURE WARNING

There will be one red LED to indicate the TIC's over-temperature status. It will function as follows:

Not Lit:	TIC is within operational thermal limits
Flashing Red:	TIC has exceeded recommended operational thermal limits

2. Rechargeable Lithium Ion Battery Pack

Battery Type:	Rechargeable Lithium Ion battery pack
Battery Location:	Inside the handle
Battery Weight:	3.2 oz.
Operating Time:	2 hours

3. Stand-Alone Battery Charger

Battery Charge Time:	2 hours nominal
Power Supply:	110 VAC (220VAC optional) 12 VDC Cigarette adapter included

4. Evolution 5000 Truck Mounted Charger

Functionality:	The optional truck mounted charger will charge the TIC and one spare battery while properly installed in the vehicle. Each truck charger will come with a mounting kit for installation on the vehicle. The charger will draw less than 1.5 amps of power.
Battery Charge Time:	3 hours nominal, trickle maintenance charge.
Power Supply:	12-24 VDC
Vibration:	The truck mounted charger must safely charge the TIC while in a moving vehicle – reference MIL-STD-810E — vibration resistance.
Rollover:	The truck mounted charger must meet the rollover requirements identified in NFPA 1901-12-1.7
LED Indicators:	The truck mounted charger user interface will consist of 3 LEDs: 1 LED for each battery (inside the TIC and one spare) and 1 LED for the system status. They will operate as follows:
Battery Status:	Not Lit - Battery not present
Flashing Green-Slow:	Charge pending
Flashing Green-Fast:	Charge in process
Green:	Battery fully charged
Red:	Fault, Lost signal to battery
System Status:	Not Lit - System Fault
Green:	Power On, System Operational
Dimensions:	10 3/8" L, 5 3/4" W, 6" H

5. Attachments and Carrying Options

- Caribiner: Each TIC shall come equipped with a caribiner attachment for securing the TIC to a tool belt or other gear.
- Wrist Strap/Bunker Clip: An optional Wrist strap/Bunker clip attachment is available. This will be made of fire and heat resistant materials.
- Shoulder Strap: An optional flame and heat resistant shoulder strap is available. It will include an emergency release clip.
- Retractable Lanyard: An optional retractable lanyard for use with the TIC/caribiner assembly is available. Retraction line is to be made of a Kevlar core material. Housing to be heat resistant.

6. Video Connector

All TICs shall come standard with an SMA video out connector. An SMA to BNC cable is also included.

7. Tripod Mounting

A tripod mounting attachment shall be available as an option. Tripods are available as optional equipment.

8. Carrying Case

- Contents: Case will hold, as a minimum, the TIC, two lithium ion battery packs, manual, carrying attachments, stand-alone battery charger assembly, tripod mount, and SMA to BNC adapter cable.
- Water/Dust Ingress: The Case shall resist the ingress of dust and water and must conform to International Standard CEI IEC 529; Degrees of Protection Provided by Enclosures (IP Code); IP-54 classification.
- Impact / Drop: Dropped 3 consecutive times onto concrete from 3' (1m) at any angle with no operational defaults or physical compromise of the case or contents

9. Operation and Instruction Manual

10. Optional Direct Temperature Measurement

- Installation: Integrated inside of the TIC without any add-on devices. Capability can be included at time of purchase or added at to the base camera by MSA Repair and Service Center.
- Device: Measurement Taken from FPA
- Range: 32°F to 300°F (0° to 150°) in normal mode, 32°F to 1000° (0° to 500°C) in low sensitivity
- Tick Marks: 100°F to 200°F (50°C to 100°C) in normal mode, 250°F, 500°F, 750°F in low sensitivity
- Accuracy: ± 27°F (15°C) or ±10% which ever is greater. For temperatures greater than 435°F (225°C) ± 20%
- Readout: Thermometer style bar indicator in fahrenheit or celsius available.

11. Optional Heat-Seeker Indicator

- Installation: Integrated inside of the TIC without any add-on devices. Capability can be included at time of purchase or added at to the base camera by MSA Repair and Service Center.
- Device: Measurement Taken from FPA
- Readout: Yellow to Red colorization of portions of a scheme that are above 275°F (135°C)-yellow, 288°F (142°C)-red, in normal mode, or 842°F (450°C)-yellow, 887°F (475°C)-red, in low sensitivity mode

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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