Risultati LDAR

RISULTATI PROGRAMMA LDAR 2014

Esso Italiana S.r.l. RAFFINERIA D'AUGUSTA

La Raffineria di Augusta ha iniziato e completato il primo censimento delle sorgenti di emissione fuggitive accessibili e non, nell'anno 2012.

Nel anno 2014 ha eseguito i controlli LDAR secondo quanto illustrato nella relazione tecnica inviata ad ISPRA, e per conoscenza al Ministero dell'Ambiente, entro 6 mesi dal rilascio dell'AIA come richiesto dal Parere Istruttorio e seguendo, laddove possibile, quanto riportato all'interno del Piano di Monitoraggio e Controllo allegato al Decreto AIA stesso.

I risultati di seguito elencati sono quindi stati realizzati effetuando un controllo del 25% circa della raffineria con metodo LDAR e un 75% circa con metodo OGI.

Impianto	Numero Totale delle Sorgenti	Sorgenti Misurate con LDAR	Sorgenti Misurate con OGI	Sorgenti non misurate
ALKILAZIONE	26182	67	26115	0
CENTRALE	6240	5390	850	0
CANDELA	3337	0	3337	0
CIRCUITO IDROGENO	2243	1645	0	598
FCCU	21496	21	21475	0
HF1	9321	3	9318	0
LPGS	2052	0	2052	0
LUBE1	22089	32	22057	0
LUBE2	42580	5	42573	2
OFFSITES	92940	49864	42676	400
PSU	2714	2481	233	0
R1	4715	0	4715	0
R4	8904	8018	886	0
R5	11601	29	11572	0
SCANFINER	9978	9007	971	0
SPENTA1	665	410	255	0
ZOLFO1	1173	953	220	0
ZOLFO2	306	216	90	0
T4	9272	2	9270	0
T5	18359	3	18356	0
VPS2	6583	0	6583	0
TOTALE	302750	78146	223604	1000

Tutte le sorgenti accessibili, sono così suddivise:

- Connessioni   110762
- Tenute Compressori   41
- Flange   129347
- Appendici aperte   4576
- Potenziali Appendici aperte   1102
- Altre tenute   63
- Tenute pompa   699
- Dischi di Rottura   1
- Valvole di rilascio   192
- Steli di valvole di controllo   1897
- Punti di campionamento   271
- Steli valvole   53799
- Totale   302750

Il report del contrattore relativo al censimento delle sorgenti individuate è disponibile in raffineria.

Le apparecchiature utilizzate per l'analisi delle sorgenti di Raffineria sono in appendice a questo documento.

Il primo ciclo di analisi LDAR/OGI è stato effettuato durante i primi 6 mesi dell'anno da Gennaio a Giugno 2014.
Nel mese di Novembre 2014 è stata poi rieffettuata una analisi addizionale di tutta la raffineria sempre con la stessa divisione delle sorgenti analizzate.

Di seguito vengono riportate le percentuali di componenti fuori soglia rispetto al totale ispezionato:

>10000ppmv   0.05%
10000 – 1001ppmv   0.11%
<1000ppmv   0.35%

Le riparazioni fattibili con impianto in marcia sono state effettuate durante il corso dell'anno 2014. I dettagli delle singole riparazioni sono disponibili presso gli archivi della Raffineria. Allo stesso modo i valori del rumore di fondo riscontrato nei singoli impianti è disponibile presso gli archivi della Raffineria.

APPENDICE

The only portable, intrinsically safe, dual Flame Ionization Detector (FID) and Photo Ionization Detector (PID) analyzer

Thermo Scientific TVA-1000B Toxic Vapor Analyzer

Key Features

- Simultaneous FID/PID or Single FID detector(s)

- U.S. Environmental Protection Agency Method 21 compliant

- Detects organic and inorganic compounds

- Multiple sampling probe options

The Thermo Scientific TVA-1000B Toxic Vapor Analyzer is the only over- the-shoulder portable vapor analyzer that offers both Flame Ionization Detection (FID) and Photo Ionization Detection (PID) in a single, easy-to-use instrument.

A variety of organic vapors can be measured, by the FID, over a wide dynamic range (0-50,000 ppm), monitoring some compounds that PID will not detect. The FID operates by breaking hydrocarbon bonds and is not limited by a high ionization potential of the molecule. In addition, the FID is unaffected by ambient CO, CO_2, or humidity leading to very stable measurements

With PID detection, the user can monitor for organic compounds and detect many inorganic compounds simultaneously. Some compounds detected by PID are ammonia, carbon disulfide, carbon tetrachloride, formaldehyde and hydrogen sulfide. The PID also has the advantage of not requiring fuel or oxygen operate.

Dual detection offers a single user interface, reduced weight of the unit, and elimination of the expense of purchasing and maintaining two separate analyzers.

The TVA-1000B analyzer has optional equipment including: a standard probe, an enhanced probe, and the ThermoConnect software that enables users of the TVA-1000B instrument to transfer, display, analyze and configure data using a computer.

Thermo
SCIENTIFIC

Product Specifications

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific air quality products.

Thermo Scientific TVA-1000B Toxic Vapor Analyzer

Safety Certifications	FM (Class 1, Div. 1, Groups A,B,C & D Hazardous Location, Temp. Class T4)
Datalogging	Onboard
Probe Display	Bar graph & 4-digit LCD (standard); 6 lines x 20 characters (enhanced)
Dynamic Range	0.5-2,000 ppm (PID) isobutylene; 0.5-50,000 ppm (FID) methane
Linear Range	0.5-500 ppm (PID) isobutylene; 0.5-10,000 ppm (FID) methane
Response Time	3.5 seconds
Minimum Detectable Limit	100 ppb benzene (PID); 300 ppb hexane (FID) (laboratory conditions)
Alarms	Low, high, STEL
Sample Flow Rate	1000 cc (normal)
Power	Rechargeable NiCd battery
Logging Capacity	850-27,000 points mode specific
Fuel	None required (PID); 99.99% hydrogen (FID)
Portable Operation Time	8 hours (with reference operating conditions)
Approximate Mass	5.8 kg (13 pounds)
Nominal Dimensions	13.5 x 10.3 x 3.2 inches (343 x 262 x 81 mm)
Analog Output	0-2 Vdc (non-calibrated)
Repeatability	+/- 1% (PID); +/- 2% (FID)
Accuracy	FID= 25% of reading or 2.5ppm, whichever is greater from 1.0 to 10000ppm; PID= 25% of reading or 2.5ppm, whichever is greater from 0.5 to 500ppm
Auto Ranging	Yes
Diagnostics	Yes
Available Options	Carrying case, charcoal filter, FID calibration kit, PID/FID calibration kit

Probe Options

Standard Probe

Display measurement values on a 4-character LCD screen, with measurement units displayed as %, ppm, or ppb. Additionally a bar graph indicator provides an indication of concentration level. Function keys allow selection of analyzer functions

Enhanced Probe

Originally designed for Fugitive Emission monitoring, the enhanced probe has a larger screen area than the standard probe. This provides a display of up to 6 lines x 20 characters, plus a double height concentration value. It presents all the same information as the standard probe and has menu-driven access to many of the analyzer functions, allowing them to be easily initiated and/or changed at the probe.

TVA-1000B Analyzer Standard Probe

Air Quality Instruments
Esso Augusta

27 Forge Parkway
Franklin, MA 02038 USA

(866) 282-0430
(508) 520-0430   149
(508) 520-1460 fax

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MiniRAE 3000

Portable Handheld VOC Monitor

The MiniRAE 3000 is the most advanced handheld volatile organic compound (VOC) monitor on the market. Its photoionization detector's (PID) extended range of 0 to 15,000 ppm makes it an ideal instrument for applications from industrial hygiene to leak detection and HazMat.

The RF modem allows real-time data transmissions with a base controller located up to 500 feet away from the MiniRAE 3000 (or two miles with optional RAELink3 portable modem). A personal computer can be used as the base station for a MiniRAE 3000 system. The standard ProRAE Remote software is capable of monitoring the input of up to 64 remotely located monitors, including MiniRAE 3000, AreaRAE, etc.

Key Features

- **Proven PID technology**
  The patented sensor provides the following unique features:
  - 3-second response time
  - Extended range up to 15,000 ppm with improved linearity
  - Humidity compensation with integral humidity and temperature sensors
- **Real-time wireless data transmission** with built-in RF modem or Bluetooth
- **Designed for simple service** Easy access to lamp and sensor in seconds without tools
- **Big graphic display for easy overview** of gas type, Correction Factor and concentration
- **Field-interchangeable battery pack** replaced in seconds without tools
- **Integrated flashlight** for better view in dark conditions
- **User-friendly screens**, including dataplot chart view
- **Integrated RAE Systems Correction Factors** list for more than 200 compounds to measure more chemicals than any other PID
- **Multi-language support** with 12 languages encoded
- **Rugged housing** withstands use in harsh environments
  - IP67 waterproof design for easy cleaning and decontamination in water
  - Strong protective removable rubber boot

Additional Advantages

- View real-time sensor data and alarm status at headquarters or command center
- Automatic lamp type recognition
- Duty-cycling™ lamp and sensor auto-cleaning technology
- Tough, flexible inlet Flexi-Probe™
- 3 large keys operable with 3 layers of gloves
- Strong, built-in sample pump draws up to 100 feet (30m) horizontally or vertically
- Loud, 95dB audible alarm
- Bright red flashing visual alarm
- Interchangeable drop-in Lithium-Ion and alkaline battery packs
- Charging cradle doubles as an external battery charger
- Compatible with AutoRAE™ calibration station
- ProRAE Remote software simultaneously controls and displays readings for up to 64 remote detectors
- License-free, ISM band RF transmission with communication range up to 500 feet (2 miles with optional RAELink3 modem)
- Optional RAELink3 modem provides GPS capability to track and display readings from remote detectors and provide up to 2 miles' long-distance transmission
- Datalogging with up to 6 months of data at one-minute intervals
- 3-year 10.6 eV lamp warranty

Wireless

AutoRAE Compatible

ISO 9001 CERTIFIED

150 ATEX

CSPus

RAE SYSTEMS

Specifications*

Detector Specifications

Size	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
Weight	26 oz (738 g)
Sensors	Photoionization sensor with standard 10.6 eV or optional 9.8 eV or 11.7 eV lamps
Battery	· Rechargeable, external field-replaceable Lithium-Ion battery pack · Alkaline battery adapter
Operating Hours	16 hours of operation (12 hours with alkaline battery)
Display Graphic	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
Keypad	1 operation and 2 programming keys, 1 flashlight on/off
Direct Readout	Instantaneous reading · VOCs as ppm by volume · High values · STEL and TWA · Battery and shutdown voltage · Date, time, temperature
Alarms	95dB at 12" (30 cm) buzzer and flashing red LED to indicate exceeded preset limits · High: 3 beeps and flashes per second · Low: 2 beeps and flashes per second · STEL and TWA: 1 beep and flash per second · Alarms latching with manual override or automatic reset · Additional diagnostic alarm and display message for low battery and pump stall
EMI/RFI	Highly resistant to EMI/RFI. Compliant with EMC directive (2004/108/EC); R & TTE directive (1999/5/EC)
IP Rating	· IP67 unit off and without flexible probe · IP65 unit running
Datalogging	Standard 6 months at one-minute intervals
Calibration	Two-point or three-point calibration for zero and span. Calibration memory for 8 calibration gases, alarm limits, span values and calibration dates
Sampling Pump	· Internal, integrated flow rate at 500 cc/mn · Sample from 100' (30m) horizontally and vertically
Low Flow Alarm	· Auto pump shutoff at low-flow condition
Communication	· Download data and upload instrument set-up from PC through charging cradle or optional Bluetooth™ · Wireless data transmission through built-in RF modem
Frequency	902 to 928 MHz (license-free), 2.400 to 2.4835 GHz (license-free), 433 MHz, 869 MHz
RF Range	Up to 500' (152m; 900 MHz, 433 Mhz, 869 Mhz), extendable with RAELink3 Repeater to 2 miles (3.2km)
Hazard Area Approval	· US and Canada: c[ ]us, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D · Europe: ATEX II 2G EEx ia IIC T4
Temperature	-4° to 122° F (-20° to 50° C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachments	Durable bright yellow rubber boot
Warranty	3 years for 10.6 eV lamp, 1 year for pump, battery, sensor and instrument

*Specifications are subject to change

Sensor Specifications

Gas Monitor	Range	Resolution	Response Time T90
VOCs	0 to 999.9 ppm	0.1 ppm	< 3 s
	1000 to 15,000 ppm	1 ppm	< 3 s

Monitor only includes:

· MiniRAE 3000 Monitor, Model PGM-7320
· Wireless communication module built in, as specified
· Datalogging with ProRAE Studio Package for Windows™ 98, 2000, NT, ME & XP
· Charging/download adapter
· RAE UV lamp, as specified
· Flex-I-Probe™
· External filter
· Rubber boot
· Alkaline battery adapter
· Lamp-cleaning kit
· Tool kit
· Operation CD-ROM
· Operation & Maintenance manual
· Soft leather case

Monitor with accessories kit adds:

· Hard transport case with pre-cut foam padding
· Charging/download cradle
· 5 Porous metal filters and O-rings
· Organic vapor zeroing kit
· Gas outlet port adapter and tubing

Optional calibration kit adds:

· 100 ppm isobutylene calibration gas, 34L
· Calibration regulator and flow controller

Optional Guaranteed Cost of Ownership Program:

· 4-year repair and replacement guarantee
· Annual maintenance service

www.raesystems.com

DS-1016-02

02/11/2013

VRAE

Hand-Held 5-Gas Surveyor

The VRAE is a powerful, pumped, one-to five-gas monitor that monitors combustibles in the percent by volume range regardless of oxygen levels. The VRAE is capable of monitoring either combustibles, oxygen, and three toxic gases or combustibles and four toxic gases. Its durable Nickel-Metal-Hydride batteries, powerful internal pump and rugged frame make it ideal for leak detection and site surveys.

Key Features

- Toxic sensors include CO, H_2S, SO_2, NO, NO_2, Cl_2, NH_3, HCN, PH_3
- Large alarm-activated backlit LCD display
- Visual alarm with flashing LED
- Large keys usable with gloved hand
- Rigid inlet probe
- 10 hours continuous operation
- Sample collection port
- Optional 16,000 data points downloadable to PC
- Strong protective rubber boot
- Protected from interference by portable radios (RFI)
- Internal sample draw pump for quick response and remote sampling
- Smart battery charging with status indication and LED indicator
- Snap-in rechargeable NiMH or alkaline battery pack
- 48 built-in Correction Factors for LEL sensor
- 4 toxic sensor version available

Applications

- Confined Space Entry
- Refineries and petrochemical plants including offshore drilling and plant shut downs
- Waste water treatment plants
- Shipyard and maritime
- Landfill operations
- Trenches, silos, railcars
- Food processing, refrigeration, decomposition, process off gasing, poultry farms
- Cable vaults, transformer stations
- Fire departments

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RAE SYSTEMS

Specifications*

Detector Specifications

Size	8.3" L x 3.0" W x 1.9" H (21 cm x 7.6 cm x 4.9 cm)
Weight	20 oz with battery pack (568 g)
Sensors	• Catalytic sensor for combustible gas • Thermal conductivity sensor for percentage volume combustible gas • Electrochemical sensors for oxygen and toxic gases
Battery	Rechargeable, snap-in, field replaceable 4.8V, 1.1 Ah NIMH battery pack, 4 AA battery adapter
Operating Hours	10 hours continuous operation
Display	2-line, 16-digit LCD with LED back light automatically turns on in dim light or alarm condition
Keypads	1 operation and 2 programming keys
Direct Readout	Instantaneous reading (up to 5 values) • Oxygen as percentage by volume • Combustible gas as percentage by volume or percentage of lower explosive limit (LEL)
Alarms	90 dB buzzer and flashing red LED to indicate exceeded preset alarms: • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Alarms latching with manual override or automatic reset • Additional diagnostic alarm and display message for low battery and pump stall
Datalogging	Optional 16,000 points (53 hours, 5 channels at one minute intervals) download to PC with serial number of unit, user ID, site ID and calibration date
Calibration	Two-point field calibration of zero and span gas
Sampling Pump	• Internal pump, flow rate 400 cc/minute • Automatic shut off at low flow condition
Hazardous Area Approval	US: UL, cUL, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D, Hazardous Locations T3C rating
Temperature	-4° F to 113° F (-20° C to 45° C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachment	Durable rubber boot and wrist strap
Warranty	Lifetime on non-consuming components (per RAE Systems Standard Warranty), 2 years for O₂, LEL, CO and H₂S sensors, 1 year for all other sensors, 1 year pump, 1 year battery

*Specifications are subject to change

Sensor Specifications

Gas Monitor	Range	Extended Range	Resolution
Combustible	0 to 100% LEL		1%
	0 to 100% VOL		1%
Oxygen	0 to 30.0%		0.1%
Carbon Monoxide	0 to 500 ppm	1500 ppm	1 ppm
Hydrogen Sulfide	0 to 100 ppm	500 ppm	1 ppm
Sulfur Dioxide	0 to 20.0 ppm	150 ppm	0.1ppm
Nitric Oxide	0 to 250 ppm	1000 ppm	1ppm
Nitrogen Dioxide	0 to 30.0 ppm	150 ppm	0.1 ppm
Chlorine	0 to 10.0 ppm	30 ppm	0.1 ppm
Hydrogen Cyanide	0 to 100 ppm	100 ppm	1 ppm
Ammonia	0 to 50 ppm	200 ppm	1 ppm
Phosphine	0 to 5.0 ppm	20 ppm	0.1 ppm

Monitor only includes:
- Monitor as specified
- Sensors as specified
- Filter and O-ring pack
- 5" Inlet probe
- Gas outlet port adapter
- Operation and maintenance manual
- Rubber boot with belt clip
- Alkaline battery adapter
- Rechargeable units additionally include:
  - Nickel-Metal-Hydride (NiMH) battery
  - 120 or 230 V AC/DC wall adapter (if specified)

Monitor with accessories kit also includes:
- Hard transport case with pre-cut foam padding
- 15' (5m) Tygon® tubing
- Tool kit

Optional calibration kit also includes:
- Four-gas mix in a 34L cylinder (50% LEL, 20.9% O₂, 25 ppm H₂S, 50 ppm CO)
- Calibration regulator (male) and tubing

Datalogging Monitors also include:
- Software ProRAE Suite Package for Windows® 98, 2000, NT and XP
- Computer interface cable

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EyeCGas™

OPGAL
Beyond the Visible

Gas leak detection equipment is vital to keeping your employees, environment and product safe. Find leaks of methane and volatile organic compounds (VOC) as soon as possible.
Save time searching for fugitive gas leaks.
Feel confident about your fugitive gas leak searches.

High sensitivity to a spectrum invisible to the human eye makes EyeCGas™ a critical tool in fugitive gas leak detection.
Even at a distance, a user will easily see the exact location of a leak.

Field Productivity.
Robust, rugged and intrinsically safe certified, simplifying and broadening opportunities for use inside the facility limits without the need of a hot work permit, allowing video and audio recording while maintaining intrinsic safety.

No more guesswork.
The EyeCGas™ includes a digital CCD camera for fast recognition of the components being inspected or leaking, also available for video recording.

Powerful but simple.
The EyeCGas™ allows the inspection of vast areas in a plant with an automated and simple user interface, visualizing the infrared image on a large color LCD.

Specialized.
EyeCGas™ is an Infrared Camera specially designed for the Petrochemical and Gas & Oil market requirements for GAS detection and Smart LDAR compliance.

EyeCGas™ :
A design formed by the demands of the industry

- Specially designed for the applicative market of natural gas, oil and petrochemical industries, taking into consideration the requirements of the users.
- Very sensitive and detects smaller leaks than the existing optical imagers' portable solutions.
- Intrinsically safe certified, allowing the inspection at hazardous places in the plants.
- Implements an internal video and audio recording device.
- Features a large color LCD display for image and text display.
- Rugged and durable by design to be used as a tool in the field.

OPGAL seeing beyond the visible for a clean global environment.
OPGAL Optronic Industries, a leading global manufacturer, leverages more than 28 years of field-proven thermal imaging experience and excellence in the design and development of IR engines & cameras. The EyeCGas™ camera brings to the natural gas and petrochemical markets, Opgal's cutting edge technology at its best.

Opgal Thermal Imaging Camera for petrochemical and oil & gas industries

Imaging Performance	
Thermal Imager	
Thermal Sensitivity	20mK@ 25°C
F #	1.1
Field of View	18° with 30 mm lens
Focus near	<0.5m
Focusing	Manual
Digital Zoom	x2, x4
Digital Video Camera	
Embedded Digital Camera	VGA, fixed focus, for situational awareness
Detector	
Type	Cooled High Sensitivity , 320x240 pixels
Spectral range	3-5µm
Power Input	
Voltage	12 VDC
Power consumption	14.4 W
Battery Life	4 hours continuous
Physical Characteristics	
Weight (with battery and lens)	2.5 kg (5.5 lbs.)
Color	Grey and Black
Size in (LxHxW)	9" x 4.3" x 5.1" (230 x 110 x 130)mm
Interface	Tripod mounting UNC 1/4", rotation safe
Display	
Display Unit	3.5" Color LCD 640x480
Environmental Conditions	
Operating temperature range	-20°C to + 60°C
Storage temperature range	-40° to + 70°C
Temperature and Humidity	IEC 60068-2-30 Temp. +25°C / +40°C Humidity 95% RH
EMC/ EMI	FCC 47 CFR part 15 subpart B - Radiated Emissions EN 610000-6-4 : 2007 class A - Radiated Emissions EN 610000-6-2 : 2005 class A - Immunity to Electrostatic Discharge (ESD) EN 610000-6-2 :2005 class A - Radiated Immunity to RFE EN 610000-6-2: 2005 class A - Radiated Immunity to Power Frequency magnetic field
Vibration	2.4 GRMS Random Vibration - Mil Std 810F 514.5
Water and Dust Protection	IP65 - Blowing Dust test - MIL-STD-810F, Method 510.4, Procedure I IP65 - Jetting Water
HALT - High Accelerated Life Test	Vibration level: Max temp : 55 deg, Min temp : -20 deg
Intrinsic Safety (MET) ⟨Ex⟩	UL1604, Electrical Equipment for Use in Class I and II, Division 2, and Class III (Classified) Locations. CSA C22.2 No. 213-M1987, Non Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations. ATEX II 3G Ex nL IIC T6
Environmental Conditions when Packed in Carrying Case	
Free Fall (Drop) Test	ASTM-D 4169-06 Schedule A
Loose cargo vibration Test	ASTM-D 4169-08 Schedule F Test method D999
Vibration	ASTM-D 4169-08 Schedule F Test method D999
Gas Leak Detection Performance	
Operation features	Auto Mode and Enhanced Mode
Designed for detection of	Ethylene, 1-Hexane, Propanal, 1,3-Butadiene, 1-Butene, Methane, Propylene 1-pentene, Styrene, Toluene, Acetic acid, Xylene, 1,2-dimethyl-Benzene, Isobutylene , Isoprene, Benzene, Ethyl benzene, Ethylene oxide, Hexane, Methanol, Propylene oxide, Propylene, Ethane, Octane, Heptane, Isopropyl alcohol, MEK Methyl Ethyl Ketone 2-butanone, Propane, Butane, Pentane
Digital Video and Audio Recording	
Video and Audio recording	Digital recorder build-in with connection to PC via USB 2.
Storage Capacity	Up to 6 hours of MPEG4/H.264 video and audio recording in a 4 Gbyte SD card (Built in)
Others Features	
Connectivity	Bluetooth, USB 2
Supplied Accessories	
	Battery Set (3), Tri Battery Charger, USB Cable, Headset, Neck strap, Glare Shield, Carrying Case

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