



## Velocity Of Detonation Measuring Instrument

### Guide & Manual

DESIGNED & MANUFACTURED BY

**Kontinitro**

Swiss Manufacturer of Detonating Velocity Measuring  
Instruments for Explosives and Propellants Since 1936

## MEASURING METHOD AND PRINCIPLE OF OPERATION

The **Explomet 2™** has 5 independent timers measuring the time intervals between the illumination of 6 fiber optic cables.

It is not necessary to respect an order to connect the optical fibers either on the explosive or the Explomet 2.

The instrument can record from 1 to 5 V.O.D measurements at a time depending on the number of optical fibers used from 2 to 6.

The Explomet 2 operates in one of the following modes:

**1: Velocity and Time:** the first optic fiber to be illuminated gives the starting signal: start and the last fiber to be illuminated gives the stop signal: stop. The Explomet 2 measures the time intervals in micro seconds between the illumination of two consecutive optic fibers and calculates the Velocity of Detonation (V.O.D) in meter per second [m/s].

**2: Time Only:** The optic fibers are illuminated randomly. The Explomet 2 measures the time intervals (in microseconds) between the illumination of the first and the second fiber, then between the second and the third fiber, and so on until a maximum of 6 optical fibers.

## SPECIFICATIONS

### *Dimension:*

- **Explomet 2**  
130 x 184 x 50-80 [mm]
- **Explorer Transport Case (OPTIONAL)**  
Outside Diameter: 360 x 460 x 160 [mm]

### *Weight:*

- Explomet 2: 0.85 [kg],
- Explomet 2 with case and material: 5.5 [kg]

### *Autonomy:*

- 11h hours on rechargeable Lithium Ion batteries 18650
- AC/DC adapter/charger for 220-230V/50Hz or 110V/60Hz or car charger/adaptor or alligator clips. Average batteries charging time: 4 hours

### *Operating range:*

- Distance between two optical fibers on the explosive: from 50 [mm] to 9999 [mm]
- Detonating velocity up to 15'000 [m/s]
- Time interval measurement: 10 nanoseconds to 10.7 seconds

## QUICK VIEW

THE EXPLOMET 2 IS AN ELECTRONIC TIME COUNTER WHICH CAN MEASURE THE VELOCITY OF DETONATION OF ANY EXPLOSIVE OR PROPELLANT UP TO 15'000 [M/S]. THIS MEASURING INSTRUMENT IS TRIGGERED BY THE LIGHT EMITTED DURING THE EXPLOSION AND TRANSMITTED BY MEANS OF PLASTIC OPTIC FIBER PLACED INTO THE EXPLOSIVE.

### APPLICATION AREAS:

- CIVIL ENGINEERING
- MILITARY ENGINEERING
- AEROSPACE ENGINEERING
- PHYSICS
- CHEMISTRY

### KONTINITRO SA

15A ROUTE DE LOËX  
1213 ONEX  
GENEVA  
SWITZERLAND

*Timers:*

- 5 synchronous timers

*Operating temperature:*

- -10 to 50°C

*Accuracy:*

+/- 10 nanoseconds [ns]

*Fiber Optic:*

ESKA™ SK-40 Simplex Plastic Optical Fiber Cable

Core Ø: 1mm, Outer Ø: 2.2mm



- 📄 [Simplex POF 1-2.2mm Characteristics: Download Available at the Top of Plastic Optic Fiber & Connectors Page on our Website](#)
- 📄 [SK-40 POF Core Characteristics: Download Available at the Top of Plastic Optic Fiber & Connectors Page on our Website](#)

*File Type:*

Text file (.txt) can be read with all programs reading txt files (Word, Excel, Notepad, Open Office, Text Edit, Pages, Numbers, etc.).

## LIST OF PROVIDED EQUIPMENT

- **Explomet 2™**



- **(OPTIONAL) 1 High-Strength Shock-Proof Peli 1500 Case**

- Made of polypropylene copolymer
- Waterproof, resistant to chemicals, moisture and dust
- Resistant to harsh temperatures (-33°C / +90°C)
- **Contains all the items listed below except the plastic optic fiber spool**



- **6 Small Fiber Optic Cables**

- Six plastic optic fiber with a length of 15 [m] each for your V.O.D measurements
- Read carefully the instructions on pages 8 to 10 for the preparation and installation of your optical fibers. **The quality and accuracy of your results depends in part on how your optical fibers are prepared and installed on the explosive or propellant.**

- **1 Spool (MOQ 100 [m]) of Plastic Optic Fiber Cable**

- The optical fiber of the spool is the same as proposed on page 3: Plastic Optic Fiber Simplex 1-2.2 [mm]
- The minimum quantity is 100 [m] but we recommend 300 [m] for safety reasons and a more convenient use.



- **1 Ledlenser™ P5 Flashlight:**

- With your flashlight, you can:
  - Simulate an explosion by illuminating the optical fiber, one after the other.
  - Test the light transmission quality of your optical fibers (maximum length of 300 [m]). Tested in our offices.
- Max light output 140 Lumen
- Max Runtime 4 hours
- Impact resistant
- Water resistant
- Hand strap & pouch



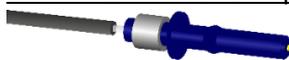
- **20 Optical Connectors: 10x HFBR-4501Z with Crimp Ring (Grey) and 10x HFBR-4511Z with Crimp Ring (Blue)**

- Optical connectors are essential for connecting the plastic optical fibers to the optical sensors of the Explomet 2.

☰ [HFBR-4501Z with Crimp Ring \(Grey\) on Page 3 of the AVAGO Catalog](#)



☰ [HFBR-4511Z with Crimp Ring \(Blue\) on Page 3 of the AVAGO Catalog](#)



○ **2 Optical Adapters: 1x HFBR-4505Z (Grey) & 1x HFBR-4515Z (Blue)**

- The optical adapters allow perfect connection between two optical connectors to transmit the light generated by the explosion to the Explomet 2 without loss of light signal

☰ HFBR-4505Z (Grey) on page 3, 8 & 9 of the AVAGO Catalog



☰ HFBR-4515Z (Blue) on page 3, 8 & 9 of the AVAGO Catalog



○ **1 AFBR-4594Z Polishing Kit**

- The polishing kit Includes:
  - 1x Polishing fixture for two optical fibers
  - 5x Sheets of 600 grits abrasive paper
  - 5x 3 [μm] Mipox Made in Japan ink lapping film

☰ Please refer to pages 5 and 6 of the AVAGO catalog for the use of the polishing kit



○ **1 Fiber Optic Cable Stripping Tool**

- Strip the jacket of your optical fibers without breaking or scratching it.



○ **1 Crimping Tool**

- Use the 178 (Broadcom Avago HFBR connectors) or 151 (Siemens ST-1.0 connectors) aperture to fix the optical connectors to the optical fibers through their crimp ring as indicated on the attached BROADCOM / AVAGO document.



- **1 Folding Meter Swiss Made C€**

- 1 [m] Folding meter to measure the distance between your plastic optical fibers:  
See Mode **1. Velocity and Time** on pages 9 to 11.



- **1 Permanent Paint Marker Edding 750 White**

- Use the permanent marker to mark on the explosive cartridge where to fix (plug) the optical fibers.



- **1 Victorinox Climber Swiss Army Knife**

- Use the punch to make a 2 [mm] hole in the explosive cartridge to insert the optical fibers
- Use the small blade to slice fiber optically cleanly
- Use the large blade to cut off the portion of the optical fiber that has been damaged after the explosion
- If you do not have your fiber optic cable stripping tool you can use the scissors and the cable stripper that is under the can opener.



- **1 Universal Extra Power Tesa Tape**

- Use tape to hold the optical fibers fixed perpendicularly in the explosive cartridge



- **1 Car charger cable**

- The car charger is supplied with the connection designed for the Explomet 2



- **1 Plug car charger adapter**

- 110V to 220/230V to DC 12V
- Connect the car charger cable to the adapter, then charge the Explomet 2 to the power outlet



- **1 Battery Charger Ansmann AC48**

- The charger is supplied with the connection for the Explomet 2 and the AC/DC adapter for your electric socket system



- **1 USB to SD Card reader/writer**

- High speed USB 2.0 & micro USB 2.0
- Compatible with all version of SD/HC, Micro SD cards



- **1 SD card SanDisc 32 GB**

- **Do not use an SD card with a capacity greater than 32 GB.**
- Formatted.
- All data received by the Explomet 2 are automatically saved to the SD card



## OPERATING INSTRUCTIONS

### BATTERY CHARGING

Before the first use of the Explomet 2, charge the batteries using one of the following charging options:

- 1) Car charger cable
- 2) Charger Ansmann AC48

Charging time is about 4 hours.

### OPTICAL FIBER PREPARATION

Follow the instruction on the attached BROADCOM / AVAGO document to prepare the cable terminations and connectors

- ☰ **Avago HFBR Characteristics & Guide: Download Available at the Bottom of Plastic Optic Fiber & Connectors Page on our Website**

To check the proper transmission of light through the optical cable from the test area to the Explomet 2 you can simulate a measure with the supplied Ledlenser flashlight.

**We recommend protecting the last meters of the optical fiber plugged into the explosive with a 3 [mm] diameter P.V.C. pipe. This insure a better immunity against parasitic light at explosion's time and will also reduce the amount of optical fiber destroyed at each measure.**

We also recommend the use of our:

- ☰ **Reinforced Duplex POF 1-2.2mm Characteristics: Download Available at the Top of Plastic Optic Fiber & Connectors Page on our Website**
- ☰ **Reinforced 6 Channels POF 1-2.2mm Characteristics: Download Available at the Top of Plastic Optic Fiber & Connectors Page on our Website**

For the preparation of the optic fiber:

- Cut the needed length of fiber optic
- Fix an optical connector at one end, see description on:
  - ☰ **Avago HFBR Characteristics & Guide: Download Available at the Bottom of Plastic Optic Fiber & Connectors Page on our Website**
- With your Swiss knife, cut straight the other end of the optical fiber
- connect the necessary optical fibers (from 2 to 6) to the Explomet 2. Either directly or through one of the following reusable optical cables:
  1. DUPLEX CABLE (2 channels = 1 V.O.D measurement)
  2. SURFACE CABLE (6 channels = 5 V.O.D measurements)
- It is not necessary to respect an order to connect the optical fibers either on the explosive or the Explomet 2.

## OPTICAL FIBER INSTALLATION

Important to know before you start:

- The quality and accuracy of your results depends in part on how your optical fibers are prepared and installed on the explosive or propellant.
- Ensure that the length of your optical fibers is more or less equal. Too big a difference in length (for example: 30 [m]) can contribute to distorting your V.O.D measurement.
- It is not necessary to respect an order to connect the optical fibers either on the explosive or the Explomet 2.
- For Dynamites, Water gels Explosives or Cartridges Explosives, respect a minimum distance of three times the diameter of the cartridge between the primer and the 1<sup>st</sup> optic fiber.
- We recommend protecting the unused optical receivers of the Explomet 2 with the supplied grey plastic caps avoid any stray light.

### EQUIPMENT FOR THE MEASUREMENT OF DETONATION VELOCITY OF AN EXPLOSIVE WITH THE EXPLOMET 2 AND ITS OPTICAL FIBERS

- ▣ Explomet 2
- ▣ From 2 to 6 Optical Fiber equipped with connectors
- ▣ Folding Meter
- ▣ White marker Edding 750
- ▣ Swiss Knife
- ▣ Universal Extra Power Tape

#### Example

V.O.D measurement of an emulsion explosive cartridge (50[mm] diameter, 1000[mm] length) on a test area.

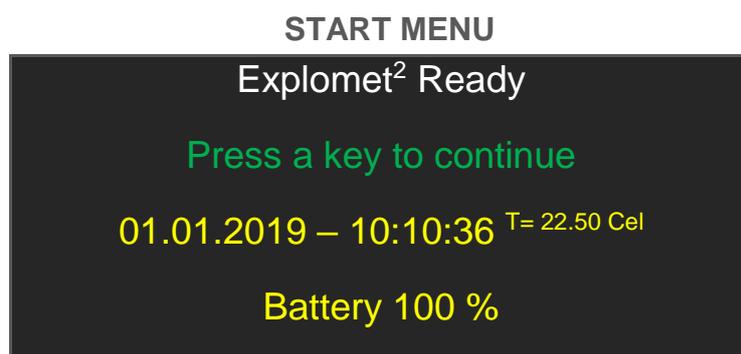
1. Position your explosive cartridge flat on the ground on the test area.
2. Choose at which end you will insert your primer. For example, on the **left**.
3. Measure the diameter of the cartridge using your folding meter and multiply by 3. For example, the diameter of your explosive is 50 [mm], multiplied by 3 that makes **150 [mm]**.
4. From the **left end** of your explosive, measure **~150 [mm]**. This will mark the point where you insert your 1<sup>st</sup> optical fiber.
5. To do this, with your white marker, draw a mark at ~150 [mm] on the explosive.
6. Use the punch of your Swiss Army Knife to drill a small 2[mm] hole at the place of your mark to insert the optical fiber into your explosive. Insert the fiber about 10 to 20 [mm] perpendicular to the explosive.

7. For added security, attach the optical fiber to the explosive using your tape.
8. Choose a segment with a minimum length of 50 [mm] from the 1<sup>st</sup> fiber and mark the distance again with your red marker. This gives you where to insert your 2<sup>nd</sup> optical fiber.
9. Measure the distance between fiber 1 and 2. For example: 225 [mm]. You will need to report this distance on the Explomet 2 when entering the data in mode **1. Velocity and time.**
10. If necessary, insert other optical fibers and proceed in the same way as before (points 8 and 9).
11. Connect the necessary optical fibers (from 2 to 6) to the Explomet 2. Either directly or through one of the following **reusable optical cables**:
  - DUPLEX CABLE (2 channels = 1 V.O.D measurement)
  - SURFACE CABLE (6 channels = 5 V.O.D measurements)
12. It is not necessary to respect an order to connect the optical fibers either on the explosive or the Explomet 2.
13. For further operation with the Explomet 2, see page 11, **1.Velocity and Time** Mode

## EXPLOMET 2 MANUAL

### TURN ON THE EXPLOMET 2™

The Explomet 2 is menu driven. Press the number on the keypad to access the required menu.



Start menu with date, time (24:00), temperature of the instrument (T=) and its power reserve in %.

Press a key

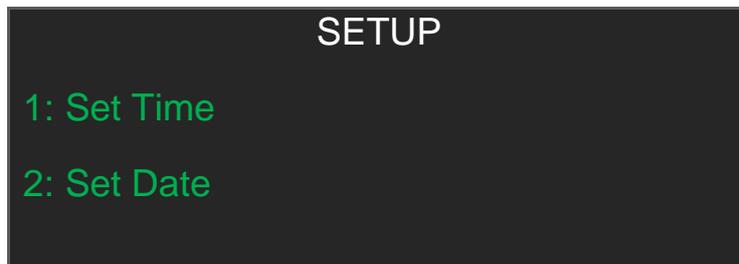
## SETUP

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To start using the Explomet 2, you must first set the time and date. This will be your reference for all your VOD tests

Press **3: Setup**



Press **1: Set Time**

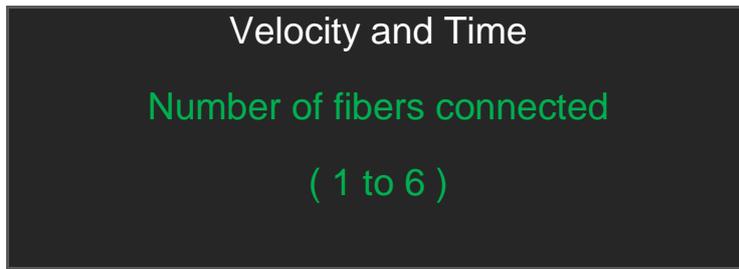
Please follow the instructions and do the same for the date **2: Set Date**. Go back to the **MAIN MENU**.

## VELOCITY AND TIME MEASURE

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Press **1: Velocity and time**

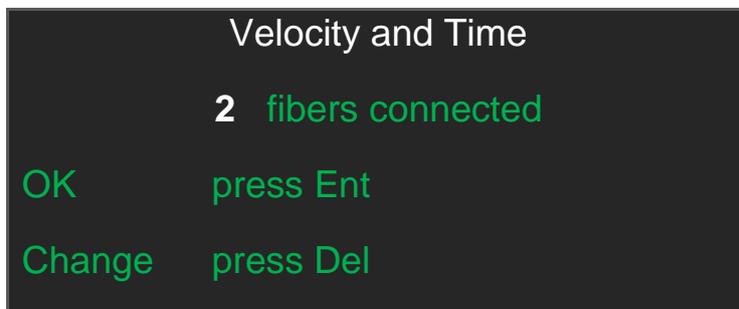


V.O.D Measure # 1: This is the sequential number given to this measure

**Enter number of optic fibers (2, 3, 4, 5 or 6):** Enter the number of optic fibers that you will use for your V.O.D measurement.

The instrument accepts from 2 to 6 fibers

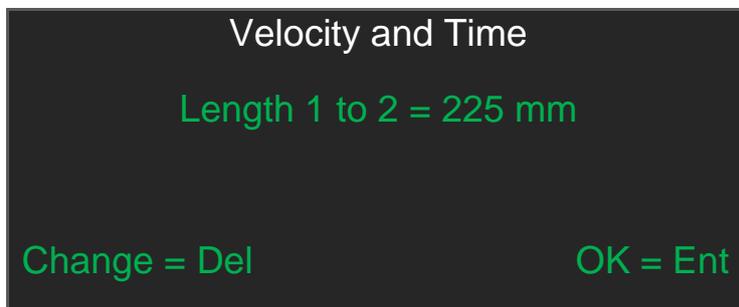
For measure # 1 we choose **2** fibers



If you want the instrument to display the V.O.D, enter in [mm] (maximum 9999 [mm]) the **very precisely** measured distance between the 1<sup>st</sup> and 2<sup>nd</sup> fiber on the explosive. We recommend using the **meter** supplied with your hardware or a **digital caliper** for high accuracy measurement.

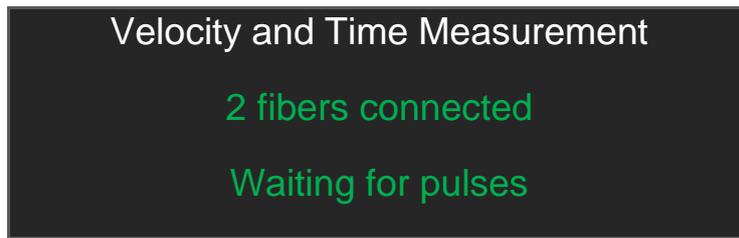
Enter the length, measured on the explosive, on the Explomet 2. See example on page 10.

For example: **225 [mm]**



Press **Enter**

Use the **Del** key to delete incorrect data and start again.



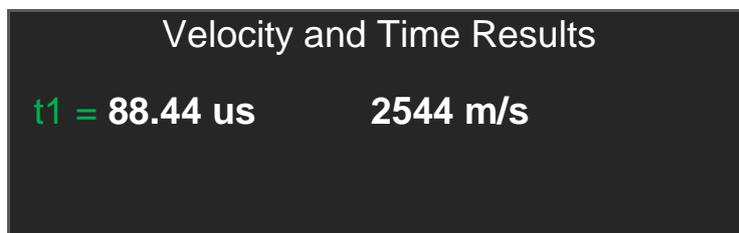
Velocity and Time Measurement

2 fibers connected

Waiting for pulses

The Explomet 2 is waiting to receive the data. It will not shut down or go into sleep mode.

When you are ready, fire the explosive and collect your data. All data is automatically saved on the SD card. the SD card is a black box for the Explomet 2.



Velocity and Time Results

t1 = 88.44 us      2544 m/s

Here is the result of your V.O.D measure # 1

To start a new V.O.D measurement, turn off and on the Explomet 2

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TIME ONLY MEASURE

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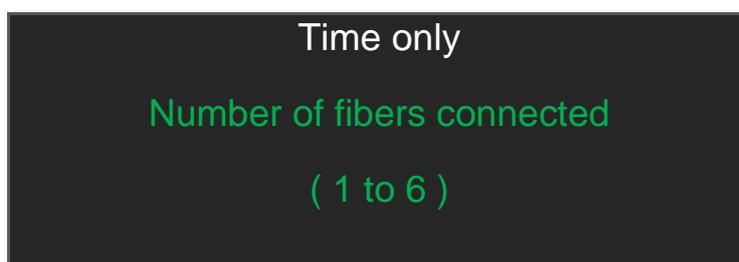
MAIN MENU

1: Velocity and time

2: Time only

3: Setup

Press **2: Time only**



Time only

Number of fibers connected

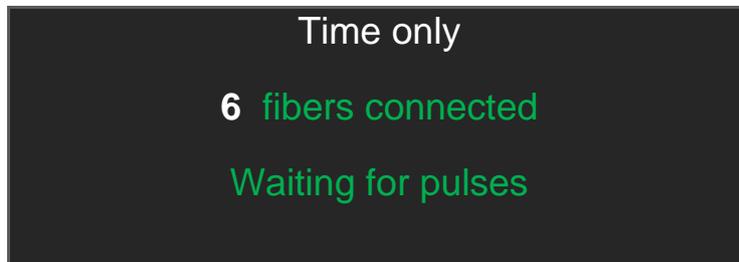
( 1 to 6 )

V.O.D Measure # 2: This is the sequential number given to this measure

**Enter number of optic fibers (2, 3, 4, 5 or 6):** Enter the number of fibers that you will use for your V.O.D measurement.

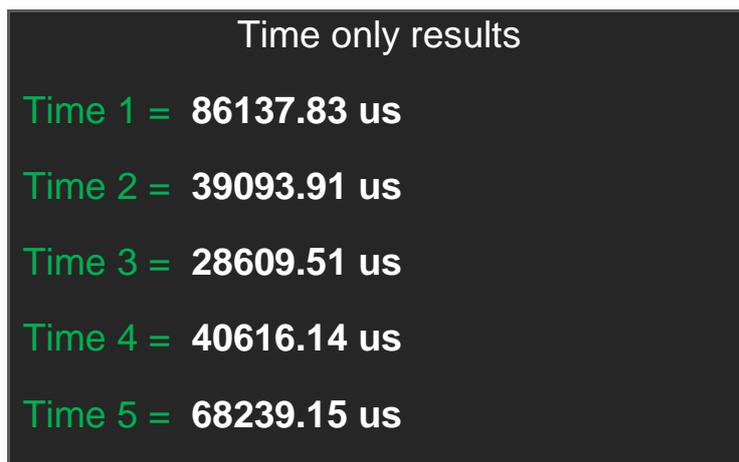
The instrument accepts from 2 to 6 fibers

For measure # 2 we choose 6 fibers



The Explomet 2 is waiting to receive the data. It will not shut down or go into sleep mode.

When you are ready, fire the explosive and collect your data. All data is automatically saved on the SD card. the SD card is a black box for the Explomet 2.



Here is the result of your V.O.D measure # 2

To start a new V.O.D measurement, turn off and on the Explomet 2

## **READING DATA**

Insert your SD card directly into your computer or using the USB-SD card reader.

All your measurements made with the Explomet 2 are recorded systematically and appear chronologically by dates and by hours.

Your text files (.txt) can be read by most programs (Word, Excel, Notepad, Open Office, Text Edit, Pages, Numbers, etc.) on operating systems, Mac, Windows, Linux.

## BATTERY CHARGER

Use only the Ansmann AC48 or car charger cable and its adapter supplied with the Explomet 2 to ensure the proper operation of your device.

## CALIBRATION

The Explomet 2 is calibrated only once during its manufacture and this for the duration of its use which is on average of fifteen years. Nevertheless, we remain at your disposal for any verification of your device and can issue a certificate of V.O.D/Calibration to guarantee the perfect functioning of your measuring instrument.

## GENERAL

As the Explomet 2 uses microelectronic technology, do not expose it to humidity, dust and preserve it from shocks. Be sure to close the optical receptors with the supplied grey plastic caps.

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## Swiss Made

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### HEAD & TECHNICAL OFFICES

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**Plastic Optic Fiber Characteristics**

| <b>SIMPLEX</b>   |                                 |  |             |                |
|--|---------------------------------|--|-------------|----------------|
| <b>POF 1 / 2.2 [mm] Structure</b>  |                                 |  |             |                |
| <b>Product</b>   |                                 | <b>Specification</b>                           |             |                |
| <b>Description</b>   |                                 | <i>Minimum</i>                                 | <i>Type</i> | <i>Maximum</i> |
| <b>Optical Fiber</b><br><b>ESKA™ SK-40</b><br><b>Mitsubishi™</b>   | <i>Core Material</i>            | Polymethylmethacrylate Resin                   |             |                |
|  | <i>Clad Material</i>            | Fluorinated Polymer                            |             |                |
|  | <i>Core Reflective Index</i>    | -----  | 1.49        | -----          |
|  | <i>Clad Reflective Index</i>    | -----  | 1.41        | -----          |
|  | <i>Reflective Index Profile</i> | Step index                                     |             |                |
|  | <i>Numerical Aperture (NA)</i>  | -----  | 0.5         | -----          |
|  | <i>Core Diameter [μm]</i>       | 920 μm   | 980 μm      | 1'040 μm       |
|  | <i>Clad Diameter [μm]</i>       | 940 μm   | 1000 μm     | 1'060 μm       |
|  | <i>Core Number</i>              | <b>1</b>                                       |             |                |
| <b>Jacket</b>  | <i>Inner Jacket Material</i>    | Polyethylene                                   |             |                |
|  | <i>Inner diameter [mm]</i>      | 2.13 mm  | 2.20 mm     | 2.27 mm        |
|  | <i>Jacket Color</i>             | Black  |             |                |
| <i>Approximative Weight</i>  |                                 | 4.00 [g/m]                                     |             |                |
| <i>Indication of UL Style Number</i>   |                                 | None   |             |                |
| Fiber Length on Spool [m]<br><br>Spool measurements [10cm x 30cm x 30cm] for more details see the "Spools Characteristics" Document.       |                                 | 100m, 150m, 200m, 250m, 300m, 350m, 400m, 450m |             |                |
| Fiber Length on Spool [m]<br><br>Spool measurements [19.5cm x 39.5cm x 39.5cm] for more details see the "Spools Characteristics" Document. |                                 | 1'000m, 1'100m, 1'200m, etc. until 2'600m      |             |                |

| <b>SIMPLEX</b>                      |  |   |                      |             |                |
|-------------------------------------|--|---|----------------------|-------------|----------------|
| <b>POF 1 / 2.2 [mm] Performance</b> |  |   |                      |             |                |
| <b>Product</b>                      |  |   | <b>Specification</b> |             |                |
| <b>Description</b>                  |  |   | <i>Minimum</i>       | <i>Type</i> | <i>Maximum</i> |
| <b>Maximum Rating</b>               | <i>Storage Temperature [°C]</i>                | No Physical Change  | -55                  | -----       | 70             |
|                                     | <i>Operation temperature [°C]</i>              | No Deterioration in Optical Properties                              | -55                  | -----       | 70             |
|                                     | <i>Operation Temperature under 95% RH [°C]</i> | No Deterioration in Optical Properties                              | -----                | -----       | 65             |
| <b>Transmission Loss</b>            | <i>Attenuation (Collimated light) [dB/km]</i>  | <b>650 [nm]</b><br>(Ta = 25 °C)                                     | -----                | -----       | 160            |
|                                     |  | <b>650 [nm]</b><br>(Ta = operation temp)                            | -----                | -----       | 170            |
|                                     |  | <b>660 [nm]</b><br>(Ta = operation temp)                            | -----                | -----       | 265            |
|                                     | <i>Bandwidth</i>                               | Launch NA > Fiber NA  | 40 MHz.50m           | -----       | -----          |
| <b>Mechanical Characteristics</b>   | <i>Minimum Bending Radius</i>                  | (Ta: Operation temp.)   | -----                | 25          | -----          |
|                                     | <i>Repeated Bending Endurance [Times]</i>      | Loss Increment ≤1dB<br>90° 25mmR,<br>Dead Weight: 500g              | 10'000               | -----       | -----          |
|                                     | <i>Tensile Strength [N]</i>                    | Tensile Force at 5% Elongation in Conformity to the JIS C 6861      | 70                   | -----       | -----          |
|                                     | <i>Twisting Endurance [Times]</i>              | Loss Increment ≤1dB<br>Sample Length: 1[m],<br>Tensile Force 4.9[N] | 5                    | -----       | -----          |
|                                     | <i>Impact Endurance [N.m]</i>                  | Loss Increment ≤1dB<br>in Conformity to the JIS C 6861              | 0.4                  | -----       | -----          |

All tests are carried out under temperature of 25 °C unless otherwise specified.

## Plastic Optic Fiber Characteristics

| <b>DUPLEX</b>   |                                 |  |             |                |
|---|---------------------------------|--|-------------|----------------|
| <b>2x POF 1 / 2.2 [mm] Structure</b>  |                                 |  |             |                |
| <b>Product</b>  |                                 | <b>Specification</b>   |             |                |
| <b>Description</b>  |                                 | <i>Minimum</i>   | <i>Type</i> | <i>Maximum</i> |
| <b>Optical Fiber</b><br><b>ESKA™ SK-40</b><br><b>Mitsubishi™</b>  | <i>Core Material</i>            | Polymethylmethacrylate Resin   |             |                |
|   | <i>Clad Material</i>            | Fluorinated Polymer  |             |                |
|   | <i>Core Reflective Index</i>    | -----  | 1.49        | -----          |
|   | <i>Clad Reflective Index</i>    | -----  | 1.41        | -----          |
|   | <i>Reflective Index Profile</i> | Step index   |             |                |
|   | <i>Numerical Aperture (NA)</i>  | -----  | 0.5         | -----          |
|   | <i>Core Diameter [μm]</i>       | 920 μm   | 980 μm      | 1'040 μm       |
|   | <i>Clad Diameter [μm]</i>       | 940 μm   | 1000 μm     | 1'060 μm       |
|   | <i>Core Number</i>              | <b>2</b>   |             |                |
| <b>POF Jacket</b>   | <i>Inner Jacket Material</i>    | Polyethylene   |             |                |
|   | <i>Inner diameter [mm]</i>      | 2.13 mm  | 2.20 mm     | 2.27 mm        |
|   | <i>Jacket Color</i>             | Black  |             |                |
| <b>Reinforced Jacket</b>  | <i>Jacket Material</i>          | Super Eska Polyethylene Buffered & Polyvinyl Chloride Sheeted Fiber Cord |             |                |
|   | <i>Outer Diameter</i>           | 5.8 mm   | 6.00        | 6.2            |
|   | <i>Jacket Color</i>             | Black (Yellow Fiber Cord)  |             |                |
| <i>Approximative Weight</i>   |                                 | 38.00 [g/m]  |             |                |
| <i>Indication of UL Style Number</i>  |                                 | None   |             |                |
| Fiber Length on Spool [m]   |                                 | 20m, 25m   |             |                |
| <b>25m</b> Wickelboy Spool measurements [4.5 cm x 30cm x 15cm] for more details see the "Spool Characteristics" Document. |                                 |  |             |                |
| Fiber Length on Spool [m]   |                                 | 30m, 35m, etc. until 150m  |             |                |
| <b>450m</b> Spool measurements [10cm x 30cm x 30cm] for more details see the "Spool Characteristics" Document.            |                                 |  |             |                |
| Fiber Length on Spool [m]   |                                 | 150m, 160m, etc. until 500m  |             |                |
| <b>2600m</b> Spool measurements [19.5cm x 39.5cm x 39.5cm] for more details see the "Spool Characteristics" Document.     |                                 |  |             |                |

**DUPLEX**

**2x POF 1 / 2.2 [mm] Performance**

| Product<br>Description     |   | Specification   |            |         |       |
|----------------------------|---|---|------------|---------|-------|
|                            |   | Minimum   | Type       | Maximum |       |
| Maximum Rating             | Storage Temperature [°C]                | No Physical Change  | -55        | -----   | 70    |
|                            | Operation temperature [°C]              | No Deterioration in Optical Properties                              | -55        | -----   | 70    |
|                            | Operation Temperature under 95% RH [°C] | No Deterioration in Optical Properties                              | -----      | -----   | 65    |
| Transmission Loss          | Attenuation (Collimated light) [dB/km]  | 650 [nm]<br>(Ta = 25 °C)  | -----      | -----   | 160   |
|                            |   | 650 [nm]<br>(Ta = operation temp)                                   | -----      | -----   | 170   |
|                            |   | 660 [nm]<br>(Ta = operation temp)                                   | -----      | -----   | 265   |
|                            | Bandwidth                               | Launch NA > Fiber NA  | 40 MHz.50m | -----   | ----- |
| Mechanical Characteristics | Minimum Bending Radius                  | (Ta: Operation temp.)   | -----      | 25      | ----- |
|                            | Repeated Bending Endurance [Times]      | Loss Increment ≤1dB<br>90° 25mmR,<br>Dead Weight: 500g              | 10'000     | -----   | ----- |
|                            | Tensile Strength [N]                    | Tensile Force at 5% Elongation in Conformity to the JIS C 6861      | 70         | -----   | ----- |
|                            | Twisting Endurance [Times]              | Loss Increment ≤1dB<br>Sample Length: 1[m],<br>Tensile Force 4.9[N] | 5          | -----   | ----- |
|                            | Impact Endurance [N.m]                  | Loss Increment ≤1dB in Conformity to the JIS C 6861                 | 0.4        | -----   | ----- |

All tests are carried out under temperature of 25 °C unless otherwise specified.

**Plastic Optic Fiber Characteristics**

| <b>6 CHANNELS (Specially Designed for Explomet 2 &amp; Explomet-fo-2000)</b> |                                 |                              |             |          |
|--|---------------------------------|------------------------------|-------------|----------|
| <b>6x POF 1 / 2.2 [mm] Structure</b>   |                                 |                              |             |          |
| <b>Product</b>   |                                 | <b>Specification</b>         |             |          |
| <b>Description</b>   |                                 | <i>Minimum</i>               | <i>Type</i> |          |
|  |                                 | <i>Maximum</i>               |             |          |
| <b>Optical Fiber<br/>ESKA™ SK-40<br/>Mitsubishi™</b>                         | <i>Core Material</i>            | Polymethylmethacrylate Resin |             |          |
|  | <i>Clad Material</i>            | Fluorinated Polymer          |             |          |
|  | <i>Core Reflective Index</i>    | -----                        | 1.49        | -----    |
|  | <i>Clad Reflective Index</i>    | -----                        | 1.41        | -----    |
|  | <i>Reflective Index Profile</i> | Step index                   |             |          |
|  | <i>Numerical Aperture (NA)</i>  | -----                        | 0.5         | -----    |
|  | <i>Core Diameter [μm]</i>       | 920 μm                       | 980 μm      | 1'040 μm |
|  | <i>Clad Diameter [μm]</i>       | 940 μm                       | 1000 μm     | 1'060 μm |
|  | <i>Number Core</i>              | <b>6</b>                     |             |          |
| <b>POF Jacket</b>  | <i>Inner Jacket Material</i>    | Polyethylene                 |             |          |
|  | <i>Inner diameter [mm]</i>      | 2.13 mm                      | 2.20 mm     | 2.27 mm  |
|  | <i>Jacket Color</i>             | Black                        |             |          |
| <b>Reinforced Jacket</b>   | <i>Jacket Material</i>          | Reinforced PVC Tube          |             |          |
|  | <i>Outer Diameter</i>           | 9.8mm                        | 10.00       | 10.2     |
|  | <i>Jacket Color</i>             | Red or Yellow                |             |          |
| <i>Approximative Weight</i>  |                                 | 44.00 [g/m]                  |             |          |
| <i>Indication of UL Style Number</i>   |                                 | None                         |             |          |
| 6 Channels POF Cable   |                                 | 26m (Red), 51m (Yellow)      |             |          |

**6 CHANNELS (Specially Designed for Explomet 2 & Explomet-fo-2000)**

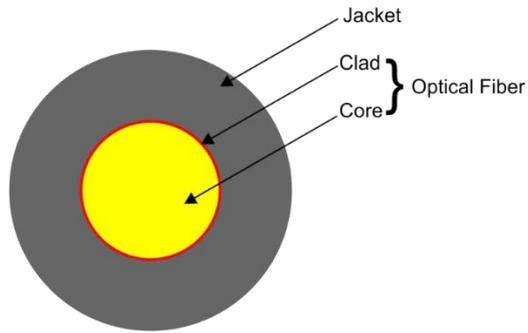
**6x POF 1 / 2.2 [mm] Performance**

| Product Description               |   | Specification  |            |         |       |
|-----------------------------------|---|--|------------|---------|-------|
|                                   |   | Minimum  | Type       | Maximum |       |
| <b>Maximum Rating</b>             | Storage Temperature °C                  | No Physical Change   | -55        | -----   | 70    |
|                                   | Operation temperature [°C]              | No Deterioration in Optical Properties                         | -55        | -----   | 70    |
|                                   | Operation Temperature under 95% RH [°C] | No Deterioration in Optical Properties                         | -----      | -----   | 65    |
| <b>Transmission Loss</b>          | Attenuation (Collimated light) [dB/km]  | 650 [nm]<br>(Ta = 25 °C)                                       | -----      | -----   | 160   |
|                                   |   | 650 [nm]<br>(Ta = operation temp)                              | -----      | -----   | 170   |
|                                   |   | 660 [nm]<br>(Ta = operation temp)                              | -----      | -----   | 265   |
|                                   | Bandwidth                               | Launch NA > Fiber NA   | 40 MHz.50m | -----   | ----- |
| <b>Mechanical Characteristics</b> | Minimum Bending Radius                  | (Ta: Operation temp.)  | -----      | 25      | ----- |
|                                   | Repeated Bending Endurance [Times]      | Loss Increment ≤1dB 90° 25mmR,<br>Dead Weight: 500g            | 10'000     | -----   | ----- |
|                                   | Tensile Strength [N]                    | Tensile Force at 5% Elongation in Conformity to the JIS C 6861 | 70         | -----   | ----- |
|                                   | Twisting Endurance [Times]              | Loss Increment ≤1dB Sample Length: 1[m], Tensile Force 4.9[N]  | 5          | -----   | ----- |
|                                   | Impact Endurance [N.m]                  | Loss Increment ≤1dB in Conformity to the JIS C 6861            | 0.4        | -----   | ----- |

All tests are carried out under temperature of 25 °C unless otherwise specified

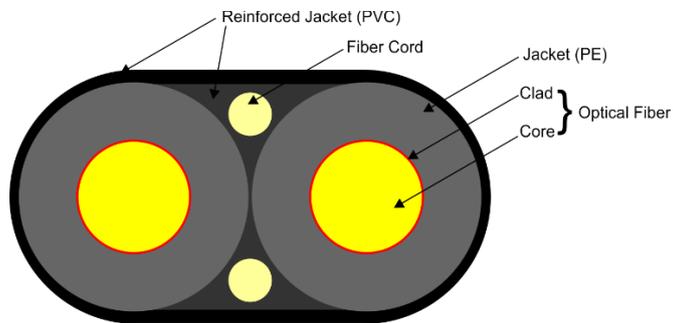
### Cross Section of Simplex POF

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### Cross Section of Duplex POF

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### Cross Section of 6 Channels POF Cable

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