

# HAMILTON

## ODO Cap S2 / S2P

Operating Instructions



### **Hamilton Warranty**

Please refer to the General Terms of Sales (GTS).

### **Important Note**

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# 1 General Information

## 1.1 Intended Use

The ODO Cap S2 and the ODO Cap S2P together with the VisiFerm SU sensors are intended for the measurement of dissolved oxygen (DO) and oxygen in gas phase in a single-use container.

The ODO Cap S2 is intended to be used where a stable connection to the VisiFerm SU is needed. The VisiFerm is then screwed into the ODO Cap S2. The ODO Cap S2P is intended to be used where the VisiFerm SU is positioned by gravitation only (vertical position).

Both ODO Cap's are designated as "ODO Cap S2 / S2P" in this manual.

If the sensor is used in contact with gaseous or liquid organic solvents, the resulting measurement accuracy in this application must be separately checked and validated by the customer.

The ODO Cap S2 (REF 10077858) and the ODO Cap S2P (REF 10190357) are a single-use (SU) sensor caps for integration into a SU container. Do not reuse the caps. Please find the technical data on the Specification Sheet on [www.hamiltoncompany.com](http://www.hamiltoncompany.com).

## 1.2 About these Operating Instructions

These Operating Instructions are designed to support the integration, operation and qualification of the Hamilton ODO Cap Sx built-in in the SU container together with VisiFerm DO SU sensors. ODO Cap S0, ODO Cap S2, and ODO Cap S3 are referred in this document as "ODO Cap Sx". VisiFerm SU RS485-ECS sensors are referred as "VisiFerm SU".

To achieve this, it will describe the features of the Hamilton ODO Cap Sx and its operation with the VisiFerm SU. Both, the mechanical connection to the single-use container and the VisiFerm SU are described detailed in this manual. After reading this manual the system manufacturer should be capable of installing ODO Cap S2 ODO Cap S2 / S2P.



**Warning!** Essential information for avoiding personal injury or damage to equipment.



**Caution!** Alerts the user to the possibility of a problem with the device associated with its use or misuse, such as device malfunction, device failure, damage to the device, or damage to other property.



**Notice:** Emphasizes information of particular importance.

## 2 Liability

The liability of Hamilton Bonaduz AG is detailed in the document «General Terms and Conditions of Sale and Delivery».

Hamilton is expressly not liable for direct or indirect losses arising from use of the sensors. It must in particular be insured in this conjunction that malfunctions can occur on account of the inherently limited useful life of sensors contingent upon their relevant applications. The user is responsible for the calibration, maintenance and regular replacement of the sensors. In the case of critical sensor applications, Hamilton recommends using back-up measuring points in order to avoid consequential damages. The user is responsible for taking suitable precautions in the event of a sensor failure.



**Notice:** The ODO Cap S2 / S2P together with the VisiFerm SU sensor is not intended and specified as a safety device. A SIL (Safety Integrity Level) certification is not available. It is in the sole responsibility of the user to validate the ODO Cap S2 / S2P according the safety requirements of his application.

## 3 Safety Precautions and Hazards



**Warning!** Read the following safety instructions carefully before installing and operating the ODO Cap S2 / S2P.

### 3.1 General Precautions

For safe and correct use of ODO Cap S2 / S2P2, it is essential that both operating and service personnel follow generally accepted safety procedures as well as the safety instructions given in this chapter.

The specification given in the «Specification Sheet» (available on [www.hamiltoncompany.com](http://www.hamiltoncompany.com)) as regards temperature, pressure etc. may under no circumstances be exceeded. Inappropriate use or misuse can be dangerous.

The lifetime of the ODO Cap S2 / S2P highly depends on the specific conditions of the application. Temperature, pressure, chemicals used may accelerate the ageing of both the sensor and its ODO Cap.

The ODO Cap S2 / S2P shall not be repaired and must be disposed after use.

If the conditions described in these Operating Instructions are not adhered to or if there is any inappropriate interference with the equipment, all of our manufacturer's warranties become obsolete.

Necessary precautions should be taken when transporting the ODO Cap S2 / S2P. For shipment the sensor should be sent back in the original packaging.

## 3.2 Operation of ODO Cap S2 / S2P

When cleaning, installing and using the Operation of ODO Cap S2 / S2P in process environment suitable protective clothing, safety glasses and protective gloves must be worn, particularly when dealing with a malfunction where the risk of contamination from spilled liquids exists. Installation and maintenance of sensors must be performed only by trained personnel.

-  **Caution!** Make sure that:
- The thread, O-ring and sealing surfaces are not damaged when installing the ODO Cap S2 / S2P into the container. Even when all required safety measures have been complied with, potential risks still exist with respect to leaks or mechanical damage to the SU container. Wherever there are seals, gases or liquids may leak out undetected.
  - No process medium can be accidentally spilled before removing the sensor from its measurement setup.

 **Notice:** Make sure that no air or gas bubbles sticks to the sensitive part of the sensor. As a consequence, the measurement value could be unstable.

 **Warning!** Do not apply excessive forces while connecting or disconnecting the VisiFerm SU to avoid damage. Do not put stress on the system by vibration, bending or torsion.

Cross sensitivities and resistances of ODO Cap S2 / S2P: Measurement not influenced by Carbon Dioxide.

If the sensor is used in contact with gaseous or liquid organic solvents, the resulting measurement accuracy in this application must be separately checked and validated by the customer.

Before use, verify that the sensor is properly configured for your application.

Failure to observe and carry out the maintenance procedures may impair the reliability and correct functioning of the measurement system.

## 3.3 Chemical, Radioactive or Biological Hazard Precautions

Selection of the appropriate safety level and implementation of the required safety measures for working with ODO Cap S2 / S2P is the sole responsibility of the system manufacturer.

If working with hazardous liquids observe and carry out the maintenance procedures, paying particular attention to cleaning and decontamination. If ODO Cap S2 / S2P becomes contaminated with biohazardous, radioactive or chemical material, it should be cleaned. Failure to observe and carry out the maintenance procedures may impair the reliability and correct functioning of the measuring module.

## 4 Product Description

Optimal yields in bio-processes are only obtained with the use of extensive process control systems, especially the precise monitoring of dissolved oxygen value. The VisiFerm SU in combination with the ODO Cap S2 /S2P was developed for a broad range oxygen content from 0 – 300 %sat. With the micro transmitter, the VisiFerm SU enable direct communication to the process control system via 4–20 mA standard signal or digital Modbus. With the transmitter integrated, the VisiFerm SU provides more reliable measurements directly to your process control system.



Figure 1: ODO Cap S2 / S2P and example product label

The ODO Cap S2 / S2P for the optical measurement of dissolved oxygen (oDO) is a SU cap for VisiFerm SU sensors. It can be integrated into a SU container from manufacturers of SU equipment.

The VisiFerm SU stores all relevant sensor data, including calibration and diagnostic information, simplifying calibration and maintenance. Wireless communication with the optional Arc Wi Adapter BT may be used for monitoring, configuration and calibration, and saves time without compromising the quality of the wired connection.

The VisiFerm SU used with the ODO Cap S2 / S2P is compatible with all other components of the Hamilton Arc family, including a complete family of intelligent sensors (pH, ORP, dissolved carbon dioxide, cell density and conductivity) and accessories. Reusable and single-use sensors can work on the same system. Additional wireless sensor diagnostics functionality is enabled by the ArcAir™ App running on mobile devices (e.g. Hamilton's Arc View Mobile) and computers.

Further information to the measurement setup can be found in the Operating Instructions of the VisiFerm SU (REF 111000051 and RF 10163540) at [www.hamiltoncompany.com](http://www.hamiltoncompany.com).

### Key benefits include:

- Hamilton's proven optical DO technology, available in a single-use format minimizes contamination and leakage risk
- Reusable electronic, detachable from the ODO Cap S2 / S2P
- No separate transmitter needed
- Simple maintenance with robust industrial design
- Direct digital Modbus or analog communication to the PCS system via 4–20 mA standard signal
- Full online wireless option via Bluetooth for easy monitoring, configuration and calibration

# 5 Installation

## 5.1 Unpacking and Cleaning



**Notice:** Products are produced and packed under clean room conditions (ISO 14644 - Class 7).



**Caution!** Do not cut open the plastic film with a sharp object to avoid damaging the product.

The ODO Cap S2 / S2P is double bagged. The outer bag contains the product label as well as the inner bag containing the ODO Cap S2 / S2P with the optical measurement spot ready for installation.



Figure 2: ODO Cap S2 / S2P within the packaging

It is recommended to remove the outer bag before entering the airlock. Make sure that you do not damage the inner bag or the product. Remove the inner bag before the product enters the clean room. If needed, follow below cleaning and/or decontamination procedure:

1. Soak lint-free cloth with alcohol (isopropanol or ethanol – 70% to 80% concentration).
2. Gently wipe the surface of the treated item. Make sure not to damage the product.
3. Repeat step 1 and 2 with a new cloth.
4. Air dry the remaining alcohol on the Conducell-P prior to integrating it into a container.



**Caution!** Please check the sealing surface of the counterpart of the ODO Cap S2 / S2P as well as the O-ring for defects. In case of any defect (e.g. scratches, voids or else) discard the part to avoid any leakage.

## 5.2 Installation in the single-use container

The ODO Cap S2 / S2P has been tested with a plastic counterpart having the dimensions according to the specification drawing SZC10077858 respectively SZC10190357.

Since the thread of the ODO Cap S2 / S2P is left-handed, install the cap by turning counter clockwise. Use a socket with wrench size 15 mm and apply a torque of 1.5 Nm +/- 0.1 Nm. Avoid damage of the ODO Cap S2 / S2P.

Make sure to mount the ODO Cap S2 / S2P according to the product drawing (see drawing SZC10077858 respectively SZC10190357 and Figure 3). Check that in the built in situation the temperature reading of the VisiFerm SU does not differ more than 2 °C from the media. In case the difference is higher, use manual temperature input for proper temperature compensation of the measurement signal.



**Caution!** To use the ODO Cap S2 / S2P with other setups of the counterpart, integrity testing must be performed separately.



**Notice:** The product specification for this product as published on [www.hamiltoncompany.com](http://www.hamiltoncompany.com) is only valid in the setup mentioned in this Operating Instructions. Setups deviating from this needs to be verified separately.

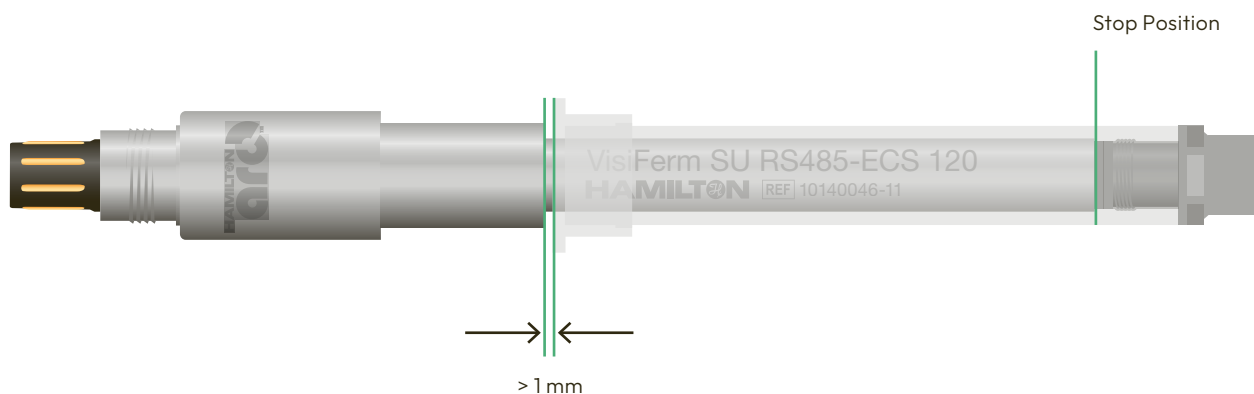


Figure 3: Installation setup of the ODO Cap S2 / S2P

## 6 Operation



**Caution!** Only use the sensor within the specifications ([www.hamiltoncompany.com](http://www.hamiltoncompany.com)). Failure to do so may lead to damages or measurement failure.

### Connecting the VisiFerm SU to the ODO Cap S2

To ensure a safe and reliable measurement, the user must be advised to screw in the VisiFerm SU until stop position (maximum torque 0.1 Nm). Even when attaching the cable to the VisiFerm SU, do not exceed the defined torque. To avoid over-torque, always hold the cable on the connector with one hand and tighten the screw nut with the other hand. Do not twist the VisiFerm SU. If you over-torque the thread, the function of the system remains unimpaired. However, the position of the VisiFerm in the ODO Cap S2 may not be stable anymore.

To avoid electrostatic damage, it is recommended to install the VisiFerm SU with the safety cap protecting the connector prior to connecting the cable. Furthermore, the user should not touch the contacts.

#### Connecting the VisiFerm DO SU to the ODO Cap S2P

To ensure a safe and reliable measurement, the user must be advised to position the VisiFerm DO SU until stop position. Even when attaching the cable to the VisiFerm DO SU and operation, the VisiFerm must stay at the stop position. To avoid electrostatic damage, it is recommended to install the VisiFerm DO SU with the safety cap protecting the connector prior to connecting the cable. Furthermore, the user should not touch the contacts.



**Notice:** Do not use O-rings on the VisiFerm DO SU.



**Caution!** Ensure that the user position the VisiFerm within the ODO Cap S2 / S2P correctly and do not move the VisiFerm SU while operation.

Further information about the operation can be found in the Operating Instructions of the VisiFerm DO SU (REF 111000051 and REF 10163540) at [www.hamiltoncompany.com](http://www.hamiltoncompany.com).

## 7 Troubleshooting

The ODO Cap S2 / S2P is designed for single-use application. No maintenance measures are required. Make sure that the user transfers the calibration values from the product label (see figure 1) to the VisiFerm DO SU Arc (by using ArcAir™ or with the PLC – Programmable Logic Controller – if integrated). For the analog ECS interface, the user must execute a one-point calibration within the transmitter respectively controller. If a problem persists even after attempted correction, contact Hamilton Customer Support. Please refer to the contact information provided in this Operating Instructions.

## 8 Disposal

The ODO Cap S2 / S2P is a SU device that has to be disposed at the end of the process together with the SU bag. The disposal of the ODO Cap S2 / S2P in the SU bag is in the responsibility of the user according to the guideline of the system supplier while considering local recycling regulation. If the process requires decontamination, the ODO Cap S2 / S2P must be decontaminated prior to disposal.

## 9 Ordering Information

### 9.1 VisiFerm DO SU



| REF         | Description               |
|-------------|---------------------------|
| 10078255    | VisiFerm DO SU Arc 120 C  |
| 10087920    | VisiFerm DO SU Arc 225 C  |
| 10116427    | VisiFerm DO SU ECS 120    |
| 10116428    | VisiFerm DO SU ECS 225    |
| 10140046-11 | VisiFerm SU RS485-ECS 120 |
| 10140046-12 | VisiFerm SU RS485-ECS 225 |
| 10140046-13 | VisiFerm SU RS485-ECS 325 |
| 10140046-14 | VisiFerm SU RS485-ECS 425 |

9.2 SU ODO Cap



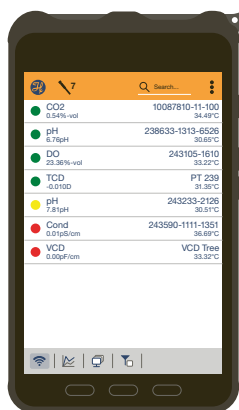
| Ref                                                                                                                                | Description | Wetted Material                                               |
|------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------|
| 10077858                                                                                                                           | ODO Cap S2  | PA (cycloaliphatic polyamide), VMQ (silicone elastomer), EPDM |
| 10190357                                                                                                                           | ODO Cap S2P | PA (cycloaliphatic polyamide), VMQ (silicone elastomer), EPDM |
| The Hamilton ODO Cap S2 / S2P kit are optical dissolved oxygen sensor caps that can be integrated into single-use rigid container. |             |                                                               |



| Ref                                                                                                                | Description | Wetted Material                                               |
|--------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------|
| 10113953                                                                                                           | ODO Cap S3  | PA (cycloaliphatic polyamide), VMQ (silicone elastomer), EPDM |
| The Hamilton ODO Cap S3 kit is an optical dissolved oxygen sensor cap that can be integrated into single-use bags. |             |                                                               |

## 9.3 Parts and Accessories

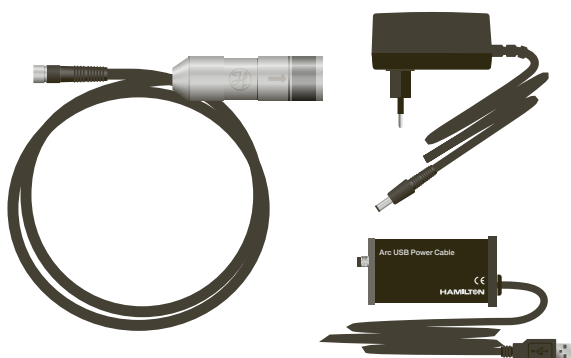
### Arc View Mobile Basic/Advanced for none Ex environment



| REF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Product Name                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 10071111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Arc View Mobile Basic for non-Ex environment    |
| Description: The pre-configured Arc View Mobile, Hamilton's mobile solution for monitoring measurement values, calibrating Arc sensors and configuring various parameters with the unified user interface for pH, DO, Conductivity and ORP. The Arc View Mobile is based on the Samsung Galaxy Tab Active tablet and comes pre-configured with the ArcAir basic, app blocker application, power supply cable, instruction manual and Hamilton quick guide.                                                                                                 |                                                 |
| 10071113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Arc View Mobile Advanced for non-Ex environment |
| Description: The pre-configured Arc View Mobile, Hamilton's mobile solution for monitoring measurement values, calibrating Arc sensors and configuring various parameters with the unified user interface for pH, DO, Conductivity and ORP. The Arc View Mobile is based on the Samsung Galaxy Tab Active tablet and comes pre-configured with the ArcAir advanced application, including features for CFR 21 Part 11 and Eudralex Volume 4 Annex 11 compliance, app blocker application, power supply cable, instruction manual and Hamilton quick guide. |                                                 |

### Arc USB power cable: USB/VP8 or USB/M12-8 Pole Connector

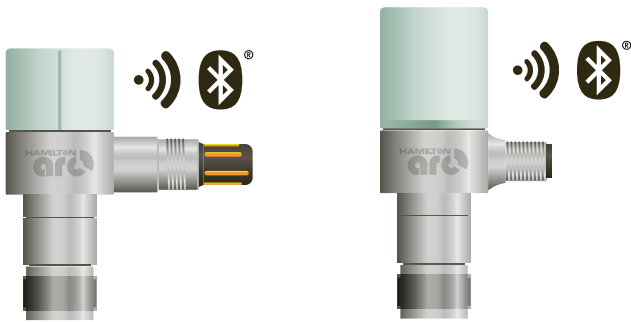
The Arc USB power cable provides power supply for the Arc Module and Arc Wi Adapter (see page 12) and enables digital communication to ArcAir installed on a computer.



| REF       | Product Name                                                                 |
|-----------|------------------------------------------------------------------------------|
| 243490-01 | Arc USB Power Cable with VP8 connector (for the Arc Wi 1G Adapter BT)        |
| 243490-02 | Arc USB Power Cable with M12 8-pole connector (for the Arc Wi 2G Adapter BT) |

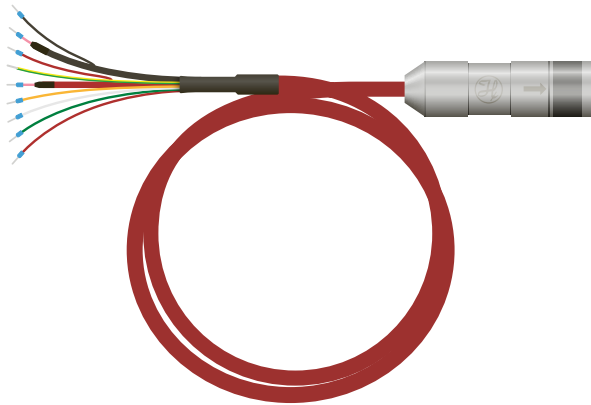
### Arc Wi 1G/2G Adapter BT

The Arc Wi 1G BT Adapter enables wireless communication between the Arc sensors and mobile devices via Bluetooth®. The Arc Wi 2G BT Adapter is used to convert Modbus to 4-20 mA signals and to enable Bluetooth® communication for sensor configuration and monitoring.



| REF    | Description          |
|--------|----------------------|
| 243460 | Arc Wi 1G Adapter BT |
| 243470 | Arc Wi 2G Adapter BT |

### Sensor Data Cable VP8



| REF    | Description           | Length |
|--------|-----------------------|--------|
| 355263 | Sensor Data Cable VP8 | 1 m    |
| 355264 | Sensor Data Cable VP8 | 3 m    |
| 355265 | Sensor Data Cable VP8 | 5 m    |
| 355266 | Sensor Data Cable VP8 | 10 m   |
| 355267 | Sensor Data Cable VP8 | 15 m   |
| 355268 | Sensor Data Cable VP8 | 20 m   |

### Data Cable VP8 / M12



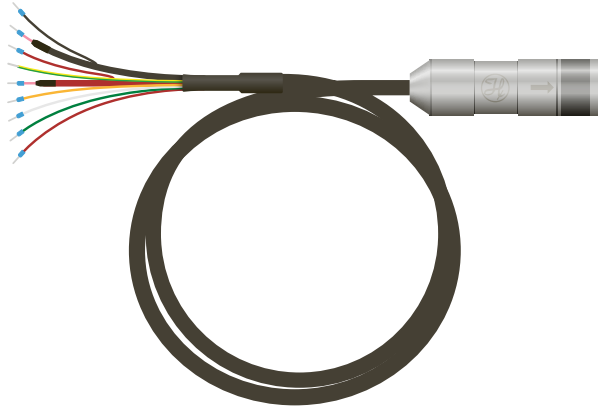
| REF      | Description          | Length |
|----------|----------------------|--------|
| 10070910 | Data Cable VP8 / M12 | 1 m    |
| 10071905 | Data Cable VP8 / M12 | 3 m    |
| 10067844 | Data Cable VP8 / M12 | 5 m    |
| 10067846 | Data Cable VP8 / M12 | 10 m   |

### Power Cable VP8 / AMP



| REF    | Description                | Length |
|--------|----------------------------|--------|
| 355298 | Power Cable VP8 / AMP      | 1 m    |
| 355258 | Power Cable VP8 / Binder   | 4 m    |
| 355297 | Power Cable VP8 / BNC      | 1 m    |
| 355296 | Power Cable VP8 / BNC      | 3 m    |
| 355245 | Power Cable VP8 / Lemo     | 2.5 m  |
| 355194 | Power Cable VP8 / Open End | 1 m    |

### Sensor Cable VP8 (for use in ECS mode)



| REF    | Description      | Length |
|--------|------------------|--------|
| 355217 | Sensor Cable VP8 | 1 m    |
| 355218 | Sensor Cable VP8 | 3 m    |
| 355219 | Sensor Cable VP8 | 5 m    |
| 355220 | Sensor Cable VP8 | 10 m   |
| 355221 | Sensor Cable VP8 | 15 m   |
| 355222 | Sensor Cable VP8 | 20 m   |

### VisiFerm T82 / D4-Power Adapter



| REF       | Description                     |
|-----------|---------------------------------|
| 242413-XX | VisiFerm T82 / D4-Power Adapter |

## 9.4 Services

Hamilton service engineers provide customers with on-site services. Hamilton offers a wide range of services from technical support to initial operation, qualification, and maintenance of the sensors.

Various tailored services are offered especially for OEM customers. Experienced service engineers ensure an optimal and professional service.

In order to find your local service support please visit: [www.hamiltoncompany.com/process-analytics/support](http://www.hamiltoncompany.com/process-analytics/support)

### Overview of service offers



Online service



Technical support



Initial operation/calibration



Qualification IQ/OQ



Service contract



Maintenance



User training



Repair



Application support

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[illegible]

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