

Milwaukee Mi 455 – Free & Total Sulphur Dioxide Minititrator – Instruction Manual

This visual manual is an integral part of the operating manual, supplied with the Mi455. It contains some practical visual tips which can be helpful when using the instrument. Please read carefully the operating manual before using the instrument.

Have a nice view !!!

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Specifications



- **Range:** 0 to 400 ppm
- **Resolution:** 1 ppm
- **Accuracy:** 5% of reading
- **Sample Volume:** 50 ml

- **Method:** Ripper titrimetric method
- **Principle:** Equivalence point redox titration

- **Power supply:** 220 V / 50 Hz
- **Dimensions:** 208x214x163 cm
(8,2 x 8,4 x 6,4")

- **Weight:** 2,2 kg (77,6 oz)

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Front Panel



1. Display
2. PUMP - To start/stop the pump
3. STIR – to start/stop the stirrer while in measurement or purge mode
4. CAL – to enter pump calibration mode
5. START/STOP – To start/stop titration or pump calibration
6. Power switch

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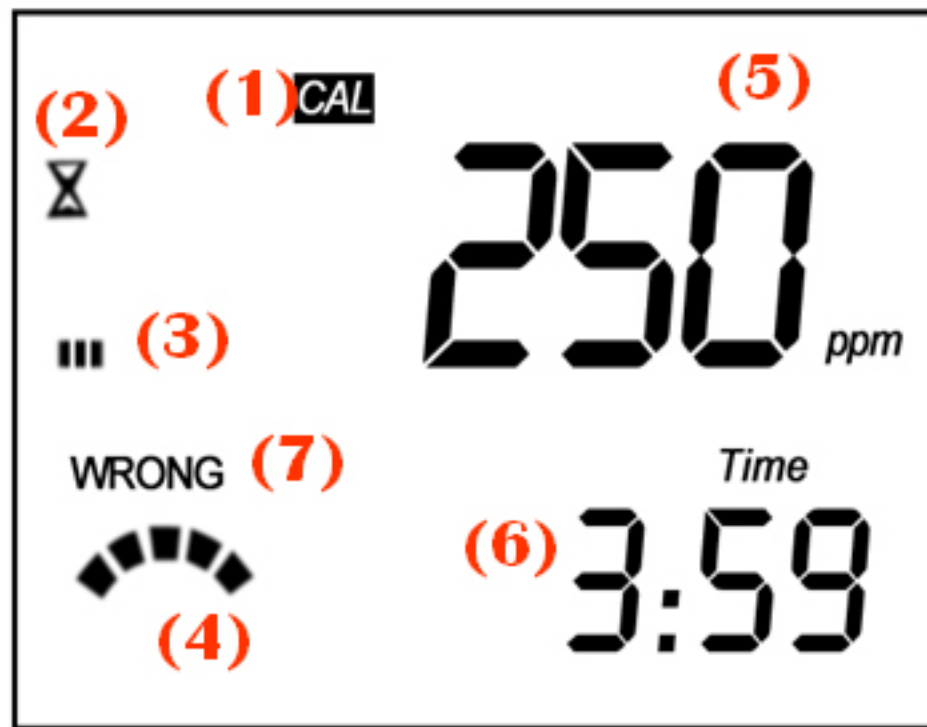
Rear Panel



1. Peristaltic pump
2. BNC electrode connector
3. Power cable connector
4. Fuse holder
5. Titrant tube
6. Titrant bottle
7. ORP electrode

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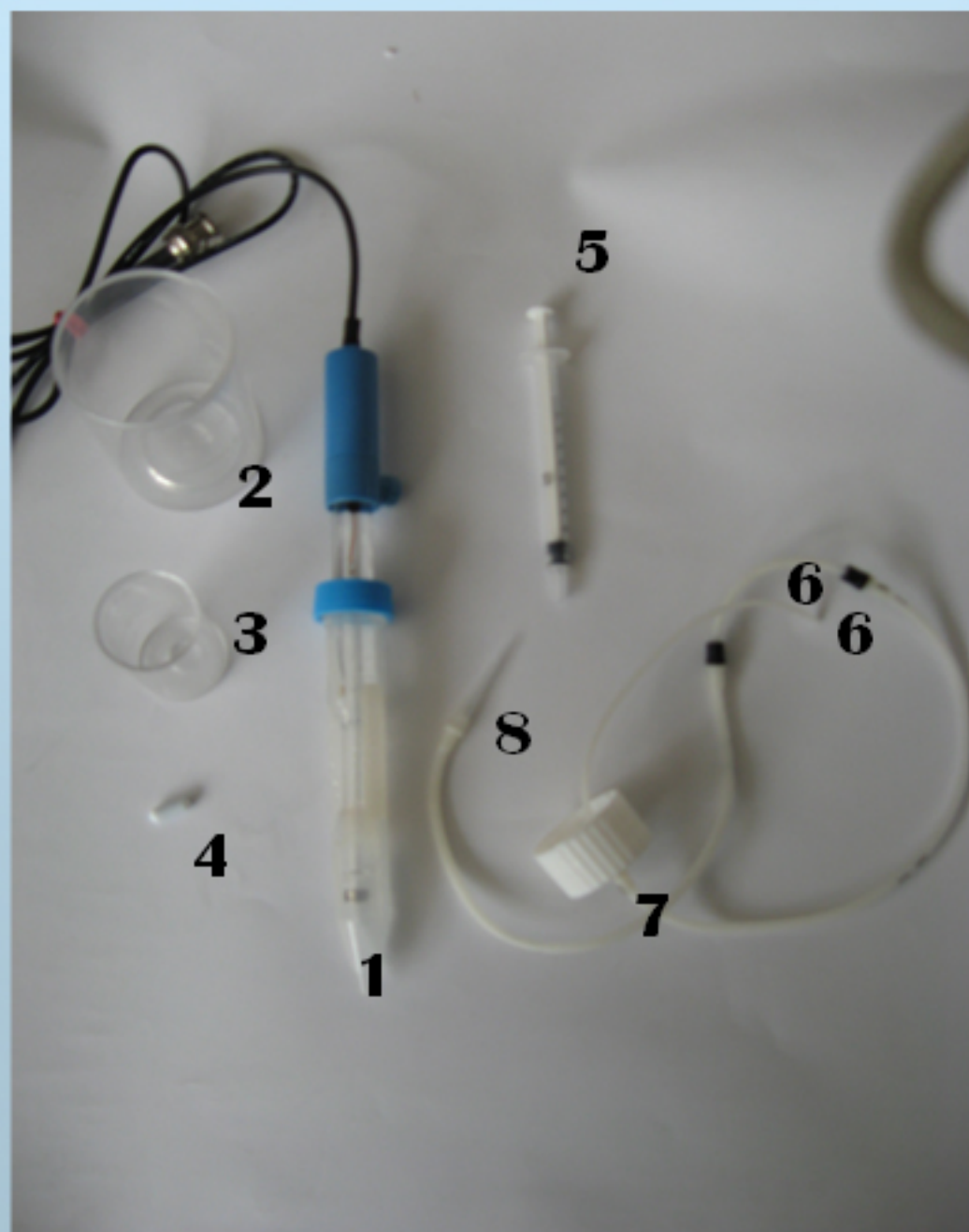
Display



- (1) Calibration mode indicator
- (2) Hourglass icon
- (3) Stirrer indicator
- (4) Pump indicator
- (5) Main display
- (6) Secondary display/Timer indicator
- (7) Error message

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The meter is supplied with the following accessories:



1. ORP electrode MA924B/1
2. Beaker 100 ml (x2)
3. Beaker 25 ml (x2)
4. Stir bar
5. 1 ml syringe
6. Pump tube
7. Cap for titrant bottle
8. Tip for pump tube

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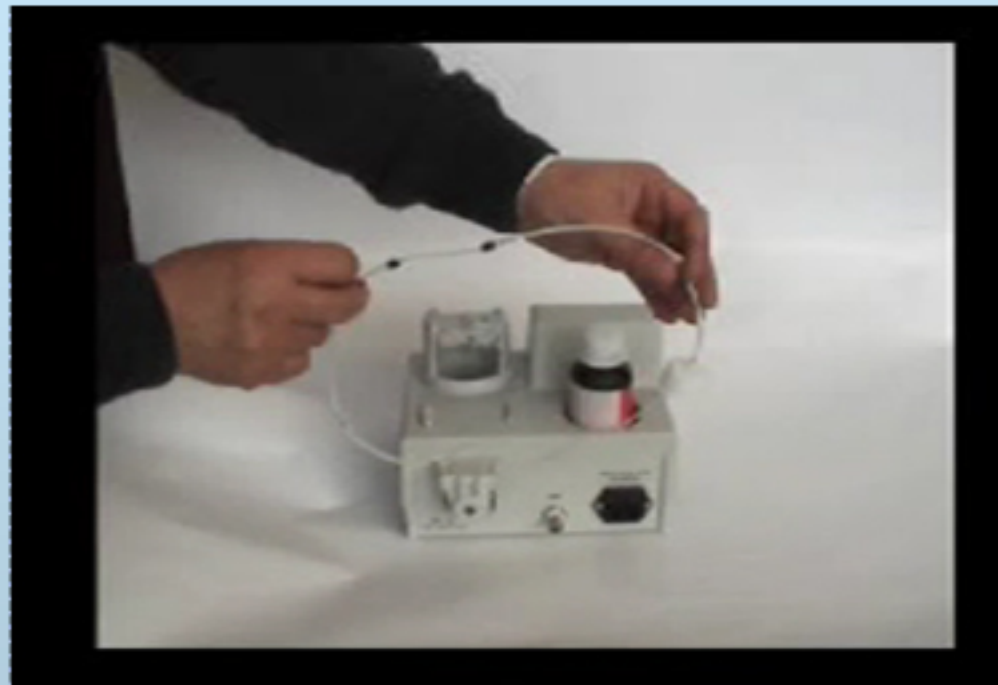
The meter is supplied with the following reagents/solutions:



1. Mi555-001- SO₂ Calibration standard (500 ml)
2. Mi555-002 - Titrant solution (100 ml)
3. Mi555-003 - Alkaline reagent for Total SO₂ determination (100 ml)
4. Mi555-004 – Acid reagent for Total SO₂ determination (100 ml)
5. Mi555-005 – Acid reagent for Free SO₂ determination (100 ml)
6. Mi555-006 –Stabilizer reagent (20 pcs)

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Connect tubing to the pump



**Click on the frame above
to activate video**

To mount the peristaltic tube follow the next steps:

- 1/ Position the first peristaltic pump fitting ring on its location
- 2/ Stretch the tube around the peristaltic pump cylinders
- 3/ Fix the second peristaltic pump fitting ring on its location
- 4/ Attach the tube to the titrant bottle (Mi555-002) and position the titrant tip on to the central hole of the electrode holder.

See video 1

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Attach titrant cap to the bottle:



**Click on the frame above
to activate video**

- 1/ Place the cap of the peristaltic tube on the titrant bottle Mi555-002.
- 2/ Screw the bottle on to the cap and put it in to place.
- 3/ Press the PUMP button.
- 4/ Purge the peristaltic pump until drops of the titrant appear on the dosing tip.
- 5/ Make sure no air bubbles are in the tube or tip.

See video 2

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Set up ORP Electrode



**Click on the frame above
to activate video**

- Connect the ORP electrode to the BNC connector, located in the rear part of the instrument.
- Open the refill cap on top of the ORP electrode.
- Take off to protective vial, the ORP electrode.
- Place the ORP electrode on the electrode holder.

See video 3

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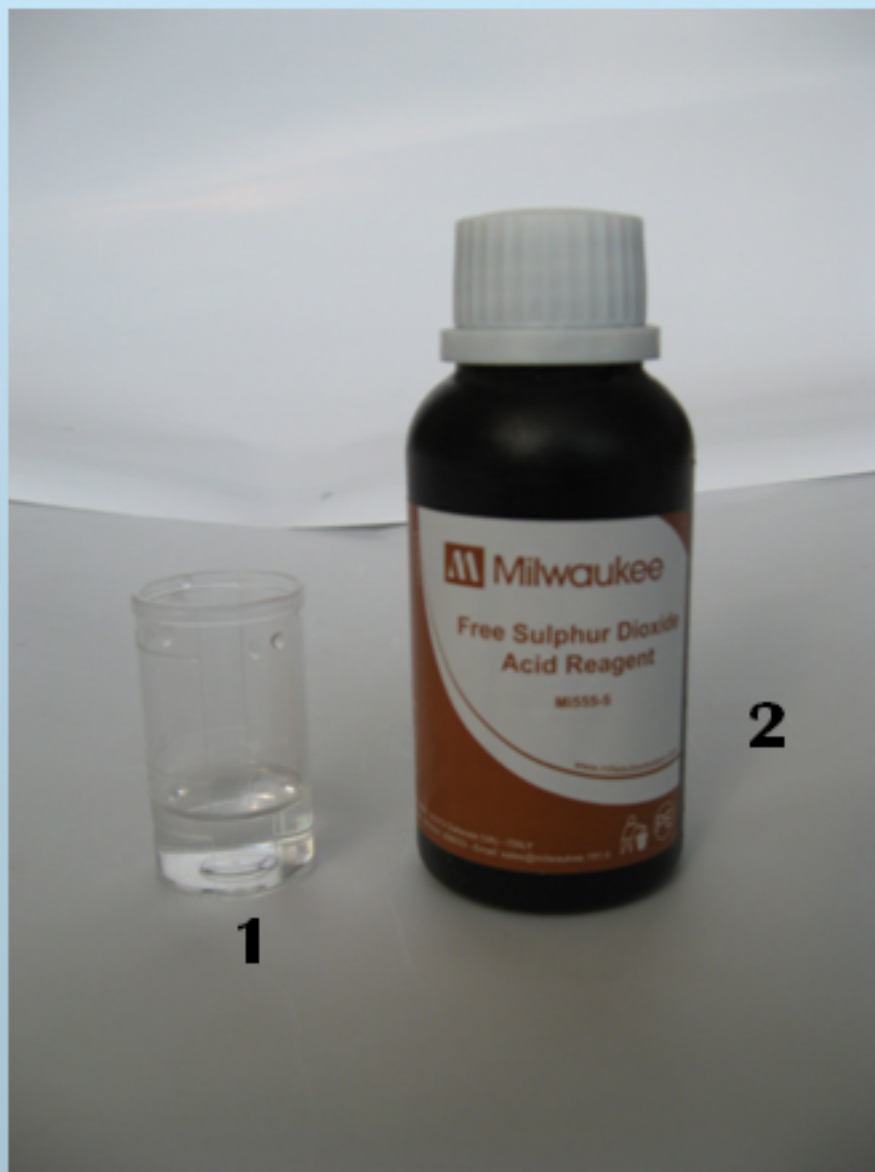
Pump Calibration procedure (1)



- Fill the 100 ml (1) beaker up to 50 ml mark with Mi555-001 Standard (2)

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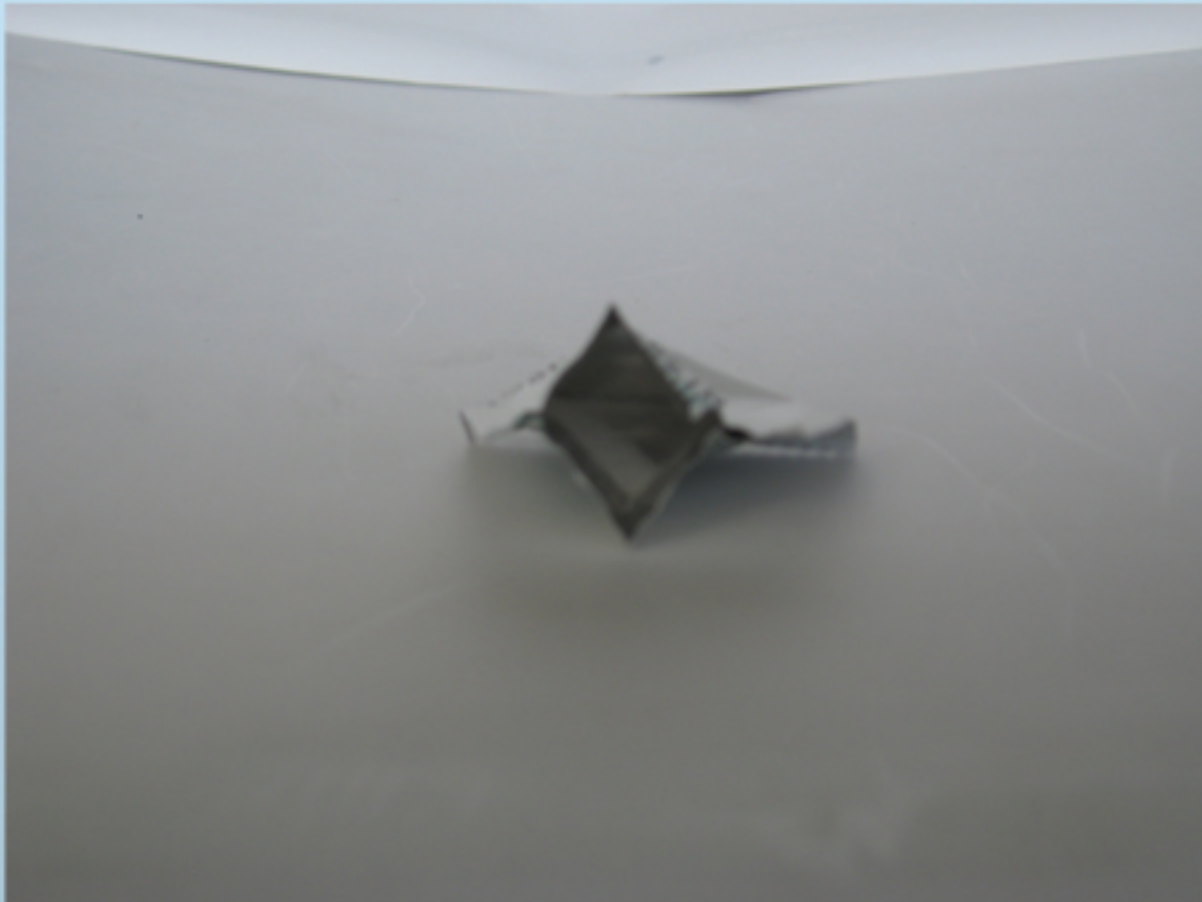
Pump Calibration procedure (2)



- Fill the 25 ml beaker up to the 5 ml mark with the Mi 555-005 Acid reagent

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Pump Calibration procedure (3)



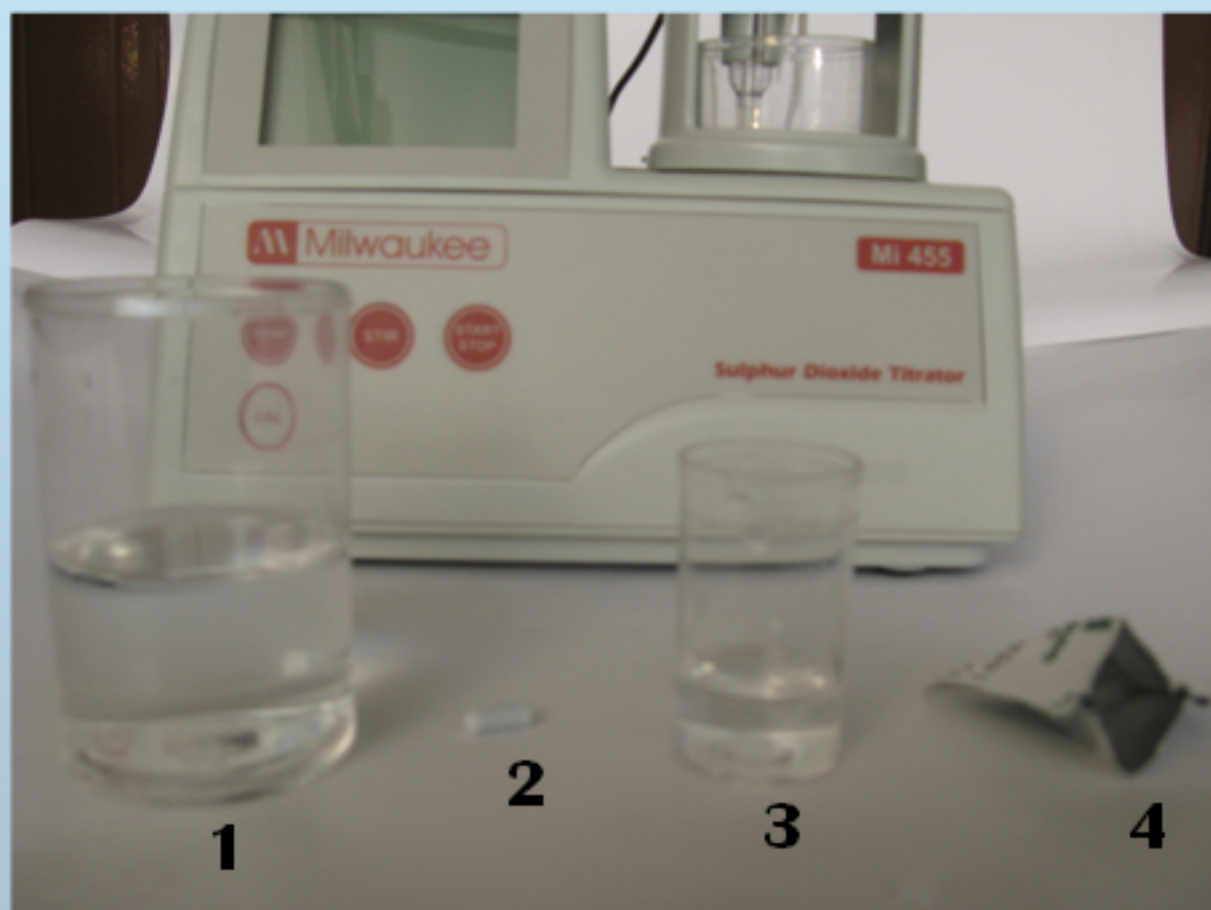
- Open one powder sachet of the stabilizer (Mi 555-006)

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Pump Calibration procedure (4)

Arrange in sequence:

- 1/ 100 ml beaker with Mi555-001 Standard
- 2/ Stir bar
- 3/ 25 ml beaker with the Mi 555-005 Acid reagent
- 4/ Powder sachet stabilizer Mi 555-006



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Pump Calibration procedure (5)



Click on the frame above
to activate video

Place in to 100 ml beaker with the
 SO_2 standard the following sequece:

- 1/ the 5 ml of Mi 555-005 Acid reagent
- 2/ the powder sachet stabilizer Mi 555-006
- 3/ the stir bar

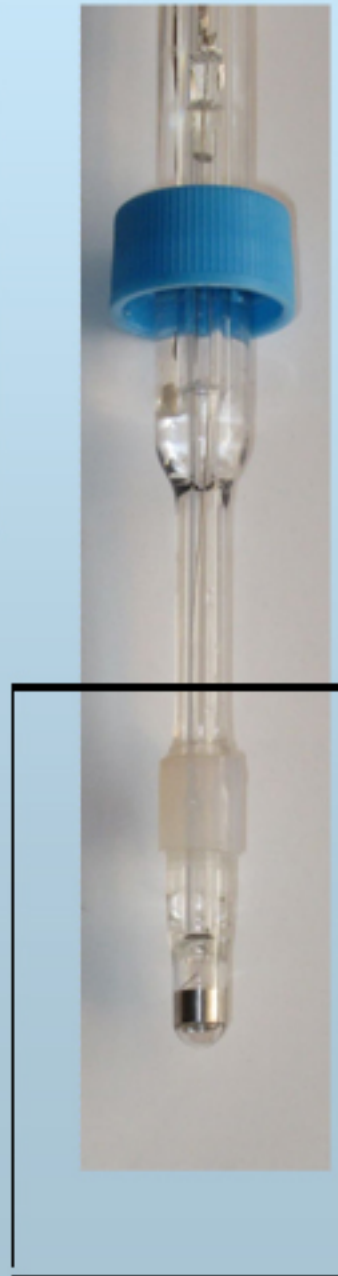
See video 4

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Pump Calibration procedure (6)



Click on the frame above
to activate video



- Place the 100 ml beaker in to the beaker holder
- Place the electrode holder on the top of the beaker and fix by turning clockwise
- Open the refill cap on the ORP electrode and put the electrode in the electrode holder
- immerse the electrode approximately 2 cm (0.8") into the sample to be tested, making sure it does not touch the bottom of the beaker
- Ensure there is the titrant in the dosing tip. If not press the PUMP key for a few seconds until the titrant is in the dosing tip. No air bubble should be in the dosing tip/tube.
- Place the dosing tip, in the electrode holder.

• **See video 5**

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Pump Calibration procedure (7)



- Press the CAL button. The meter enters in pump calibration mode.
- Press the START/STOP button in order to start the system calibration.
- At the end of calibration, DONE appears for one second on the display, and the meter returns to the measurement mode.

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Free SO₂ measurement procedure (1)



- Fill the 100 ml beaker up to 50 ml mark, with the wine sample.

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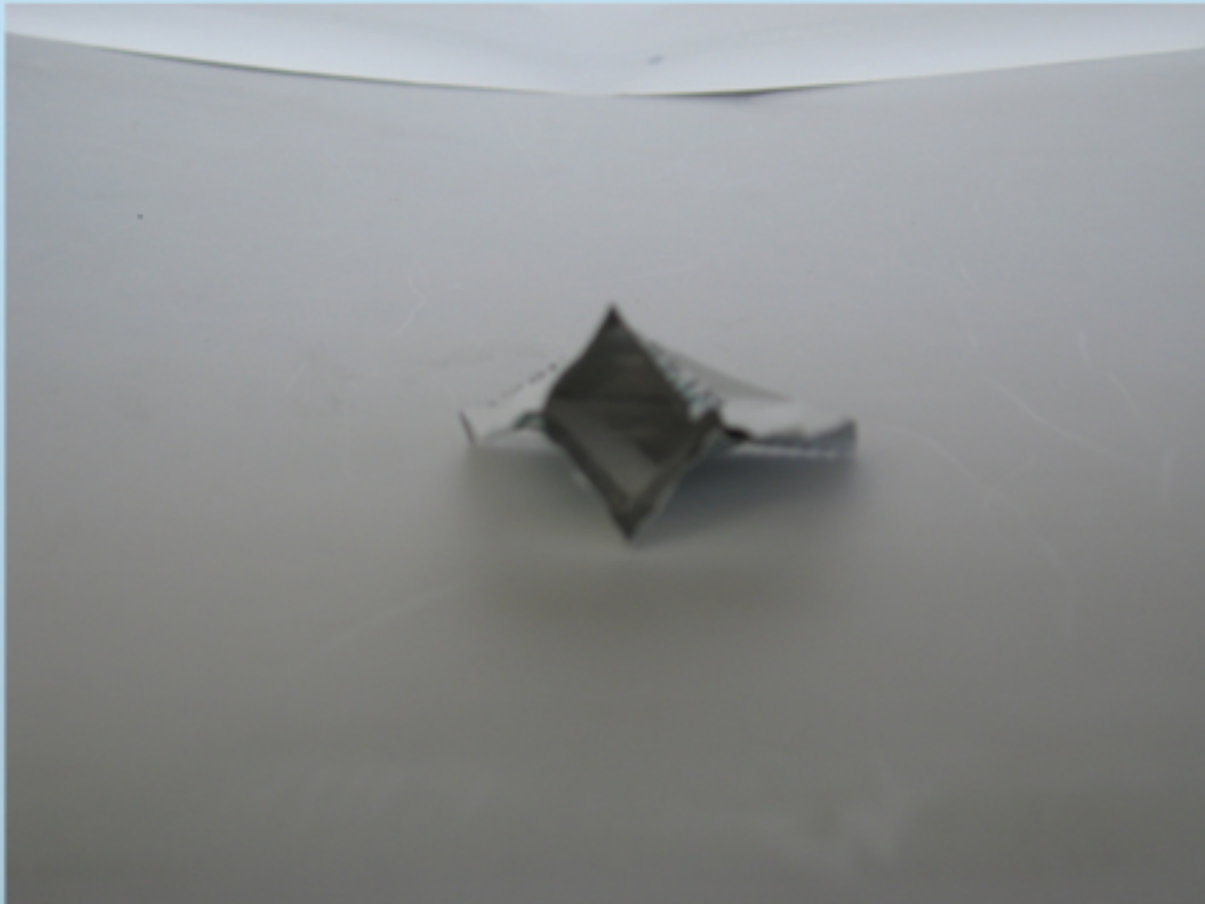
Free SO₂ measurement procedure (2)



- Fill the 25 ml beaker (1) with 5 ml of Mi 555-005 Acid reagent (2)

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Free SO₂ measurement procedure (3)



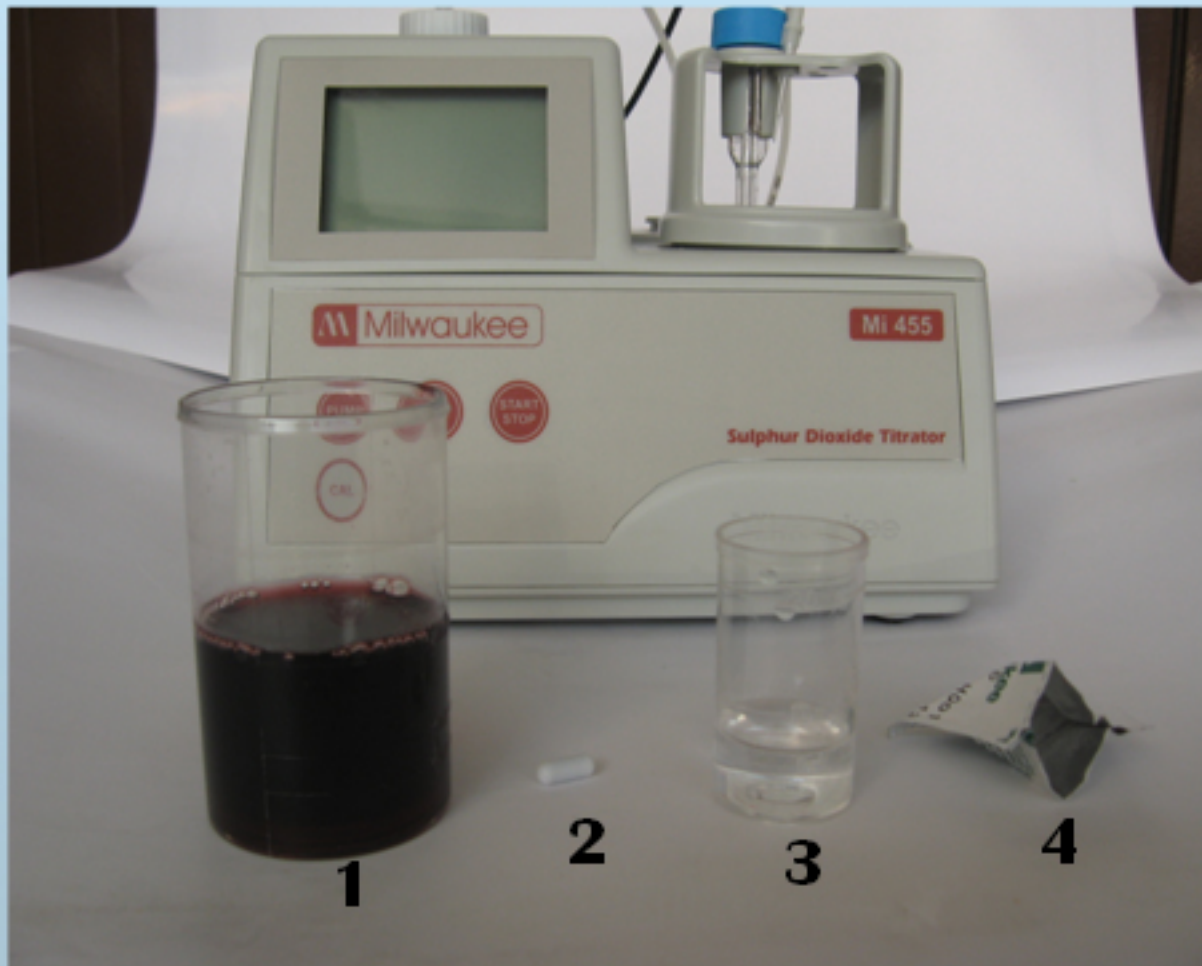
- Open one powder sachet stabilizer (Mi 555-006)

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Free SO₂ measurement procedure (4)

Arrange in sequence:

- 1/ 100 ml beaker with wine sample
- 2/ Stir bar
- 3/ 25 ml beaker with the Mi 555-005 Acid reagent
- 4/ Powder sachet stabilizer Mi 555-006



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Free SO₂ measurement procedure (5)



**Click on the frame above
to activate video**

Place in to 100 ml beaker with
the sample the following
sequence:

- 1/ the 5 ml of Mi 555-005 Acid reagent
- 2/ the powder sachet stabilizer Mi 555-006
- 3/ the stir bar

See video 6

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Free SO₂ measurement procedure (6)



Click on the frame above
to activate video



- Place the 100 ml beaker in to the beaker holder
- Place the electrode holder on the top of the beaker and fix by turning clockwise
- Open the refill cap on the ORP electrode and put the electrode in the electrode holder
- immerse the electrode approximately 2 cm (0.8") into the sample to be tested, making sure it does not touch the bottom of the beaker
- Ensure there is the titrant in the dosing tip. If not press the PUMP key for a few seconds until the titrant is in the dosing tip. No air bubble should be in the dosing tip/tube.
- Place the dosing tip, in the electrode holder.
- **See video 7**

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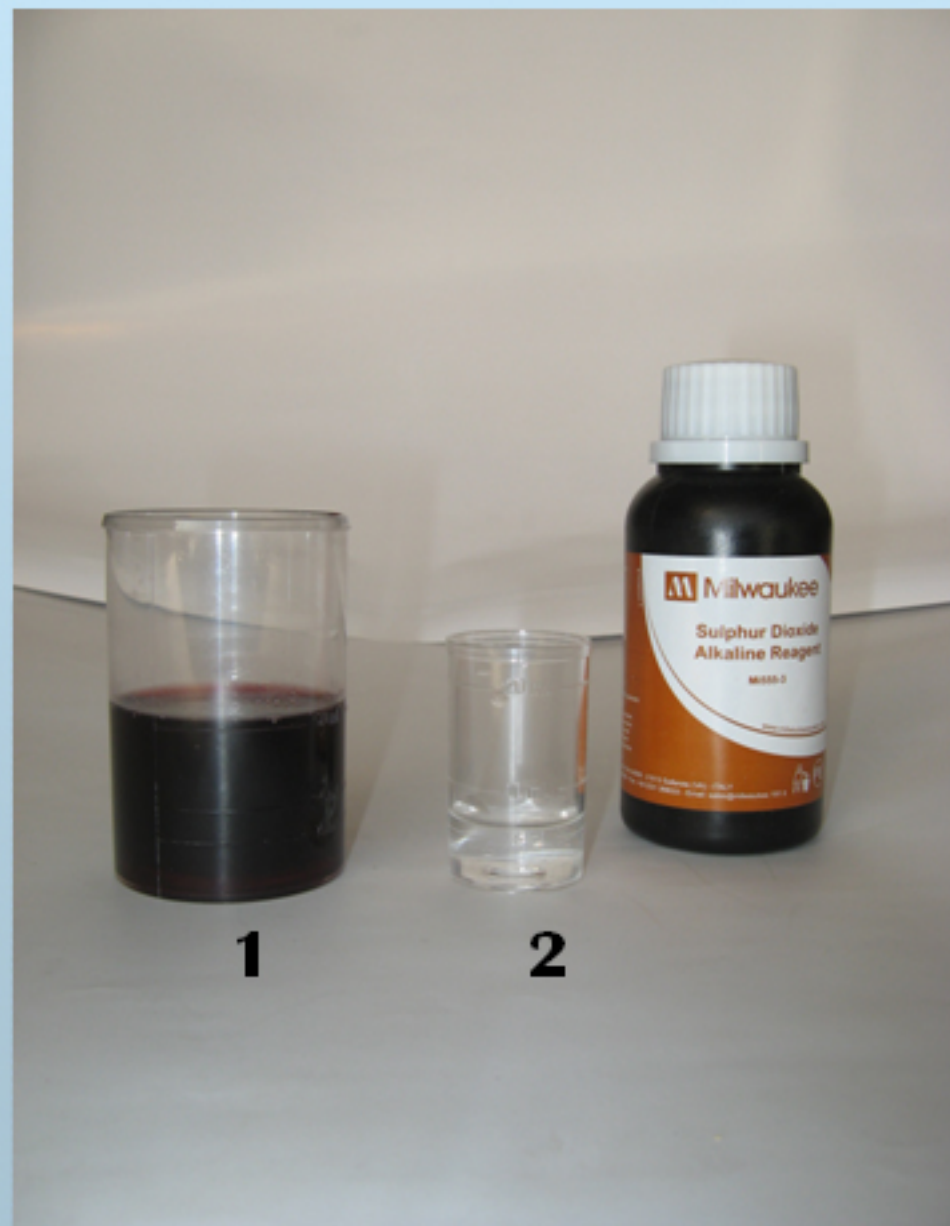
Free SO₂ measurement procedure (7)



- Press the START/STOP button in order to start the titration.
- The display will show “- - -” during the titration, along with the stirrer and pump tags blinking on the display.
- At the end of the titration, the Sulphur Dioxide concentration is displayed in ml/L (ppm) on the display.

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- **Total SO₂ measurement procedure (1)**



1. Fill the 100 ml beaker up to 50 ml mark with the wine sample.
2. Fill the 25 ml beaker up to 5 ml mark with the Mi555-003 Alkaline reagent.
3. Add this Alkaline reagent to the 100 ml beaker containing the wine sample.
4. Stir the sample for 10 seconds and wait for 15 minutes

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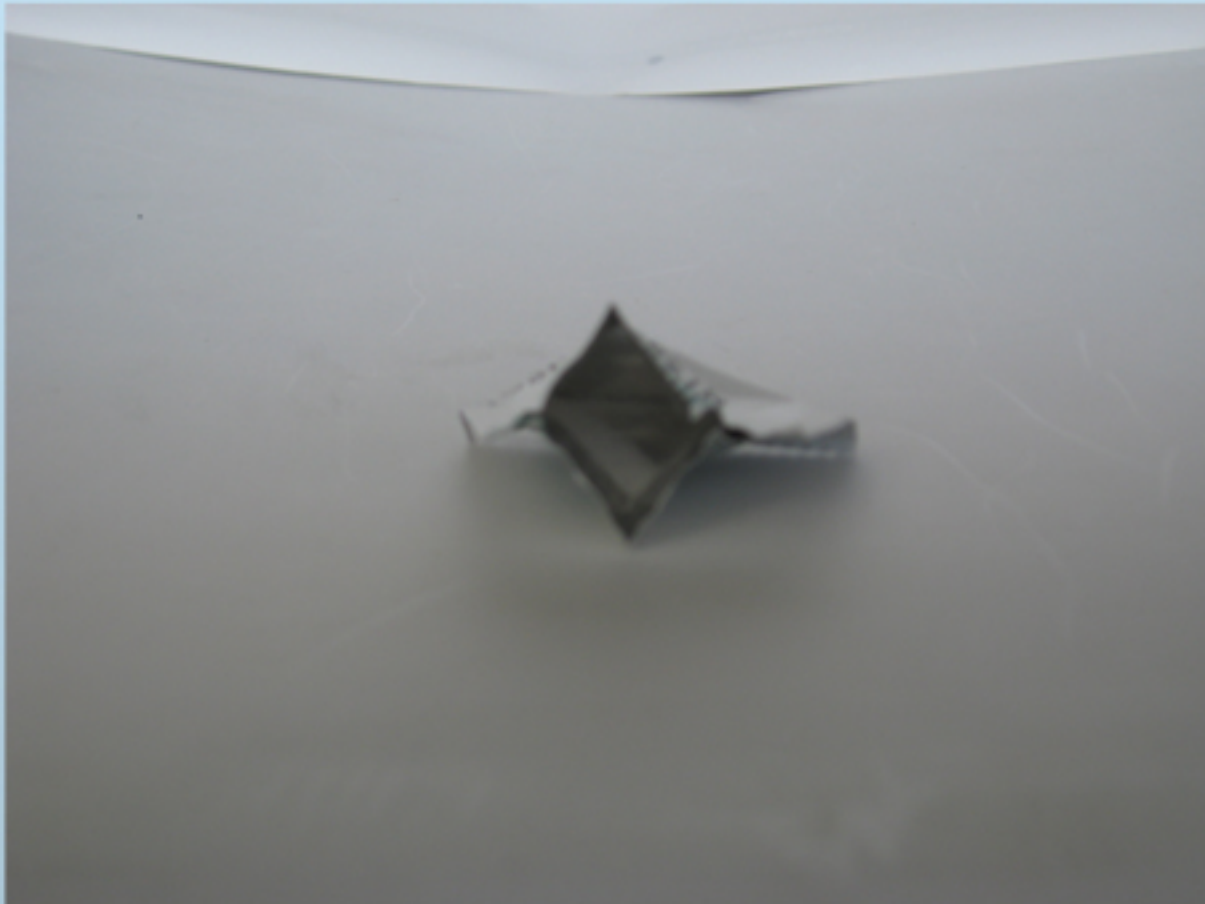
Total SO₂ measurement procedure (2)



1. Fill the 25 ml beaker (1) up to 5 ml mark with the Mi555-004 Acid reagent (2).

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Total SO₂ measurement procedure (3)



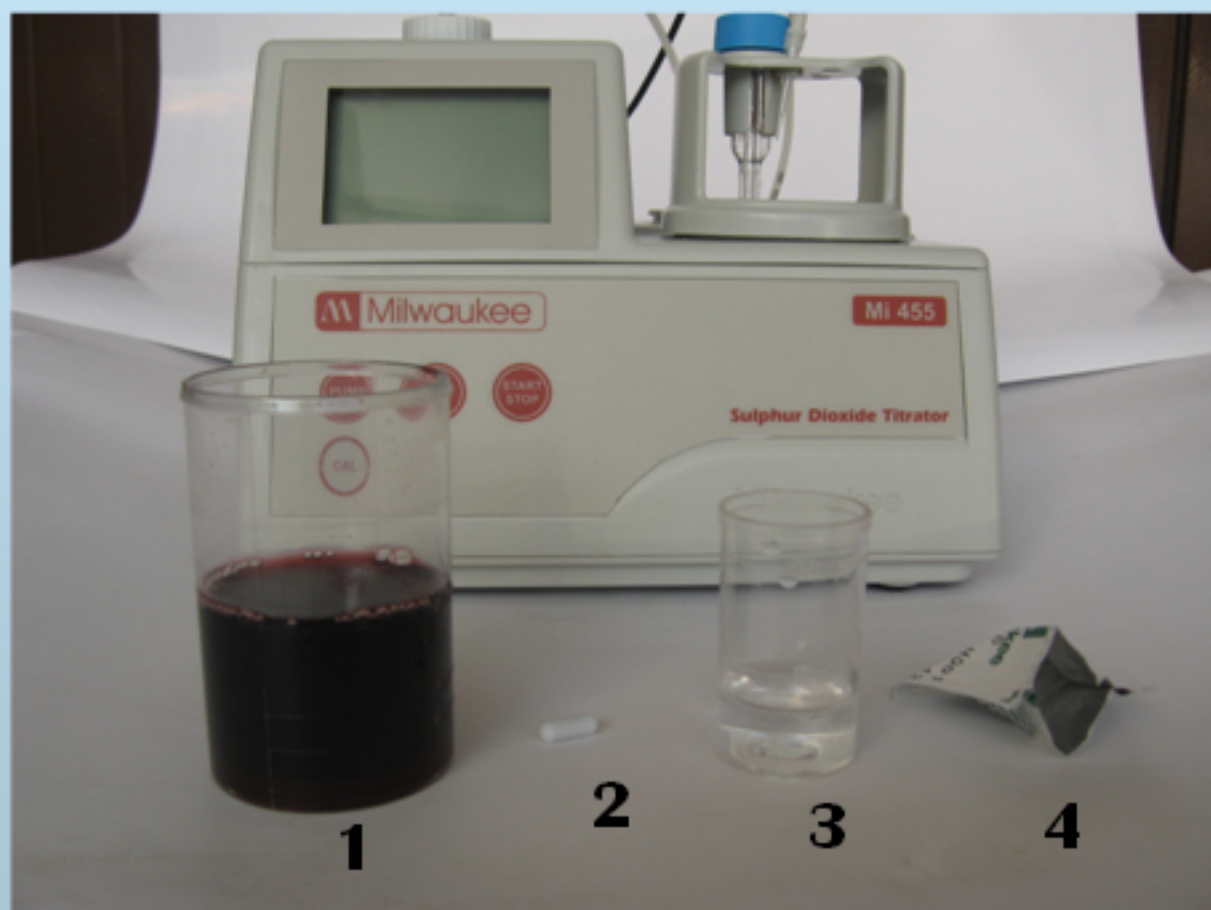
- Open one powder sachet stabilizer (Mi 555-006)

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Total SO₂ measurement procedure (4)

Arrange in sequence:

- 1/ 100 ml beaker with the reacted wine sample
- 2/ Stir bar
- 3/ 25 ml beaker with the Mi 555-005 Acid reagent
- 4/ Powder sachet stabilizer Mi 555-006



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Total SO₂ measurement procedure (5)



**Click on the frame above
to activate video**

Place in to 100 ml beaker with
the reacted wine sample the
following sequence:

- 1/ the 5 ml of Mi 555-005 Acid reagent
- 2/ the powder sachet stabilizer Mi 555-006
- 3/ the stir bar

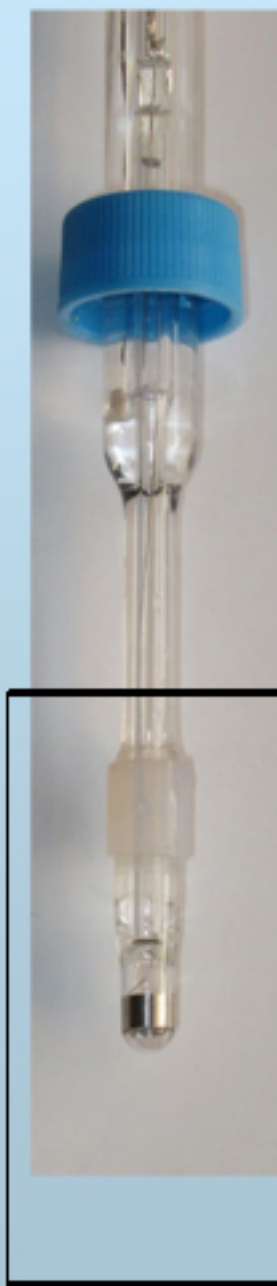
See video 8

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Total SO₂ measurement procedure (6)



Click on the frame above
to activate video



- Place the 100 ml beaker in to the beaker holder
- Place the electrode holder on the top of the beaker and fix by turning clockwise
- Open the refill cap on the ORP electrode and put the electrode in the electrode holder
- Immerse the electrode approximately 2 cm (0.8") into the sample to be tested, making sure it does not touch the bottom of the beaker
- Ensure there is the titrant in the dosing tip. If not press the PUMP key for a few seconds until the titrant is in the dosing tip. No air bubble should be in the dosing tip/tube.
- Place the dosing tip, in the electrode holder.

• **See video 9**

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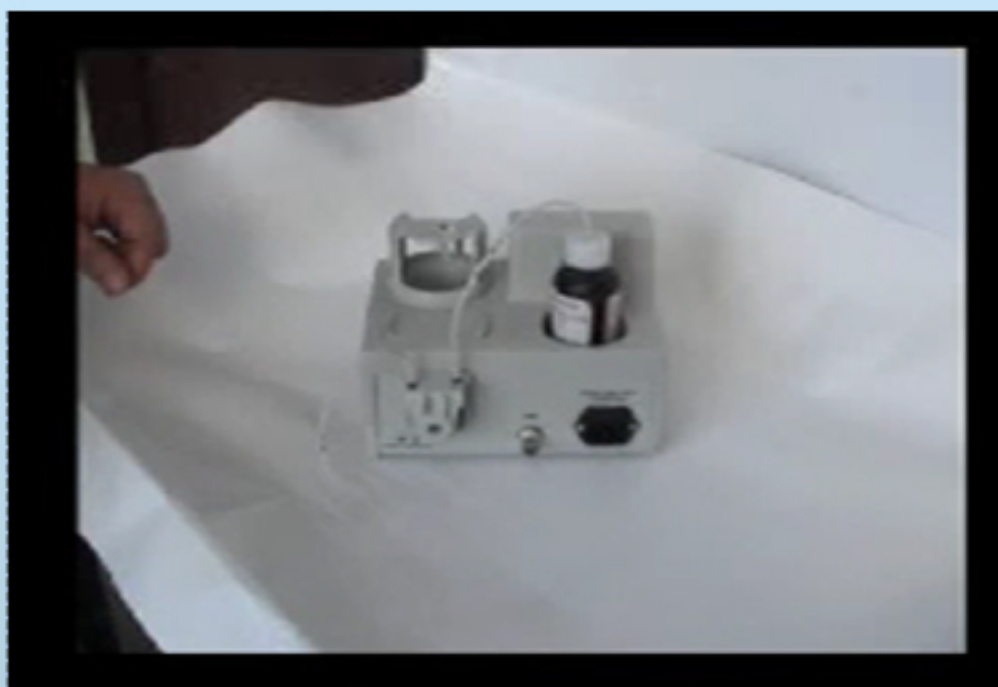
Total SO₂ measurement procedure (7)



- Press the START/STOP button in order to start the titration.
- The display will show “- - -” during the titration, along with the stirrer and pump tags blinking on the display.
- At the end of the titration, the Sulphur Dioxide concentration is displayed in ml/L (ppm) on the display.

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Titrant Tube Replacement



Click on the frame above
to activate video

- To remove the tube of the peristalting pump proceed as follows:
 1. Detach the old tube system (tube, cap and tip), from the titrant bottle.
 2. Lift and take off the fixing ring (black) of the peristaltic pump tube.
 3. Pull the tube until it's taken out from its location.
 4. Remove the other side of the tube.
 5. To mount the new peristaltic pump tube, refer to slide 8 (set up titration tube)

- ***See video 10***

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Fuse Replacement



Click on the frame above
to activate video

- To change the fuse proceed as follow:
 1. Disconnect the power cord from the rear panel of the instrument.
 2. Pull out the fuse holder located near the power cable connector
 3. Replace the fuse with a new one.
 4. Push the fuse holder with the fuse in the appropriate place.
- ***See video 11***

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- **Electrode Refilling procedure**



**Click on the frame above
to activate video**

- If the filling solution (electrolyte) is more than 2.5 cm (1") below the fill hole, add MA9011 3,5 M KCl Electrolyte solution, by using the syringe supplied with the meter
 - For faster response, unscrew the fill hole screw during the measurements.
-
- ***See video 12***

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- **Electrode Cleaning procedure**



- For wine deposits and wine stain use M10016 cleaning solution.
- Put the electrode for 15/20 minutes in the cleaning solution.
- After the cleaning procedure, rinse the electrode (for 20 seconds) thoroughly in distilled water.
- Before the use of electrode, perform the pump calibration procedure (slide 11) .