

Navigator 550

Hydrazine wet-section



Measurement made easy

—
Navigator 550
hydrazine wet-section

Introduction

This publication provides commissioning instructions for the Navigator 550 hydrazine wet-section. The wet-section is used in conjunction with the Navigator 540 transmitter.

Note.

Purchase or prepare the correct solutions prior to commissioning:

- to purchase solutions, contact your local ABB representative
- to prepare solutions, refer to Solution preparation (overleaf)

For more information

Further publications are available for free download from:

abb.com/measurement

or by scanning this code:



Search for or click on

Data Sheet
Navigator 500
Hydrazine analyzer DS/AHM550-EN

Operating Instruction
Navigator 500
Hydrazine analyzer OI/AHM550-EN

Commissioning Instruction
Navigator 540 transmitter CI/AWT540-EN

Health & Safety

Safety precautions

Be sure to read, understand and follow the instructions contained within this manual before and during use of the equipment. Failure to do so could result in bodily harm or damage to the equipment.

Warning. Installation, operation, maintenance and servicing must be performed:

- by suitably trained personnel only
- in accordance with the information provided in this manual
- in accordance with relevant local regulations

Potential safety hazards

Electrical

The Navigator 550 hydrazine wet-section operates from 24 V DC supplied from the Navigator 540 transmitter.

There are no hazardous voltages present.

Chemical reagents

Warning. To ensure safe use when handling chemicals, the following points must be observed:

- Review the Material Safety Data Sheets prior to handling containers, reservoirs, and delivery systems that contain chemical reagents and standards.
- Protective eye wear and hand wear must always be used when contact with chemicals is possible.
- Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and / or temperature.
- Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry.
- When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant Material Safety Data Sheets (where applicable) can be obtained from the Company, together with servicing and spares information.

Safety standards

This product has been designed to satisfy the requirements of IEC61010-1:2010 3rd edition 'Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use' and complies with US NEC 500, NIST and OSHA.

Safety conventions

Warning. In this manual, a warning is used to indicate a condition which, if not met, could cause serious personal injury and / or death. Do not proceed beyond a warning until all conditions have been met.

Caution. A caution is used to indicate a condition which, if not met, could cause minor or moderate personal injury and / or damage to the equipment. Do not proceed beyond a caution until all conditions have been met.

Note. A note is used to indicate important information or instructions that should be considered before operating the equipment.

Symbols

Symbols that appear on this product are shown below:

	Direct current supply only.
	This symbol, when noted on a product, indicates a potential hazard which could cause serious personal injury and / or death. The user should reference this instruction manual for operation and / or safety information.
	This symbol identifies a risk of chemical harm and indicates that only individuals qualified and trained to work with chemicals should handle chemicals or perform maintenance on chemical delivery systems associated with the equipment.
	This symbol indicates the need for protective eye wear.
	This symbol indicates the need for protective hand wear.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems. In conformity with European local and national regulations, European electrical equipment users must now return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

Product recycling and disposal (Europe only)

	<p>Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August 2005. To conform to European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.</p> <p>ABB is committed to ensuring that the risk of any environmental damage or pollution caused by any of its products is minimized as far as possible.</p>
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Note. For return for recycling, please contact the equipment manufacturer or supplier for instructions on how to return end-of-life equipment for proper disposal.

Restriction of Hazardous Substances (RoHS)

	The European Union RoHS Directive and subsequent regulations introduced in member states and other countries limits the use of six hazardous substances used in the manufacturing of electrical and electronic equipment. Currently, monitoring and control instruments do not fall within the scope of the RoHS Directive, however ABB has taken the decision to adopt the recommendations in the Directive as the target for all future product design and component purchasing.
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Specification

Mechanical data

Protection

IP54

Dimensions

Height – 480 mm (18.90 in.)

Width – 290 mm (11.41 in.) – door shut

Depth – 185 mm (7.28 in.) door closed – minimum (excluding fixing brackets)

Weight – 4.5 kg (10 lb)

Electrical

Power supply (supplied by transmitter)

24 V DC max.

Power consumption

8 W max.

1 Sample requirements

The sampling point should be as near as possible to the wet-section and must provide a thoroughly mixed representative sample.

The sample must conform to the following conditions:

- Sample must contain less than 10 ppm suspended solids with a particle size no greater than 60 µm. (If particle sizes exceed 60 µm, use a 60 µm filter.)
- Sample temperature must be within the range 5 to 55 °C (41 to 131 °F).
- Sample flow rates must be within the range 100 to 400 ml/min (6.10 to 24.4 to cu in./min.).
- Sample must be at atmospheric pressure.

2 Locating the wet-section

Caution. This equipment will be damaged if subjected to freezing conditions.

Referring to Fig. 1:

1. Locate the wet-section / transmitter indoors in a clean, dry, well-ventilated, easily-accessible area.
2. Do not locate in rooms containing corrosive gases or vapors – for example, with chlorination equipment or chlorine gas cylinders.
3. Select a location not subject to strong electrical and magnetic fields. If this is not possible (for example, where mobile communications equipment is present), use screened cables within flexible, earthed, metal conduit.

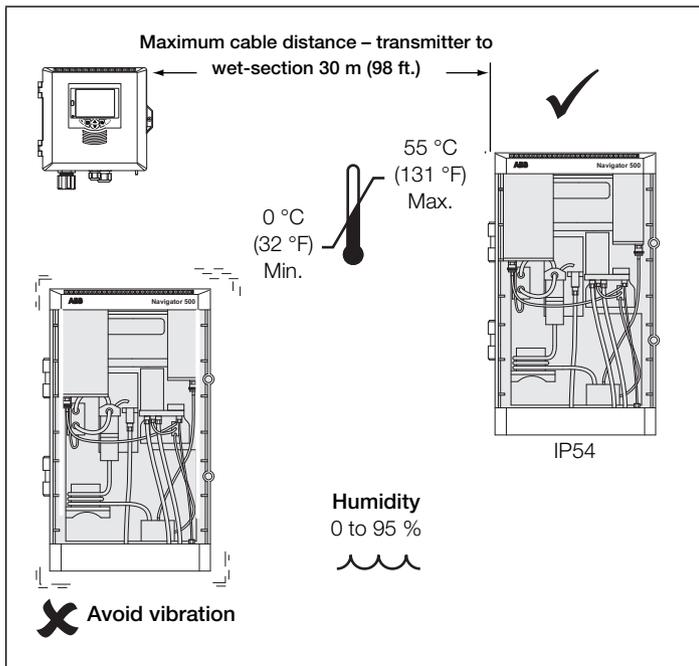


Fig. 1 Locating the wet-section

3 Mounting the wet-section

Refer to Fig. 2 for wet-section dimensions. The wet-section weighs 4.5 kg (10 lb), excluding solutions.

Note. Clearance – the enclosure doors can open 180°. If mounting in a confined area, allow sufficient clearance for door opening.

Referring to Fig. 2:

1. Mark the wall using the dimensions shown.
2. Drill and plug 3 holes (A) and (B) in the wall suitable for M6 or 1/4 in. fixings.
3. Screw in top fixing (A), leaving a gap of 20 mm (0.78 in.) between the fixing head and the wall.

Note. Fixing (A) cannot be adjusted once the wet-section is placed over it.

4. Hang the wet-section onto fixing (A), ensuring the wet-section is retained firmly against the wall.
5. Secure the wet-section to the wall using 2 fixings (B).

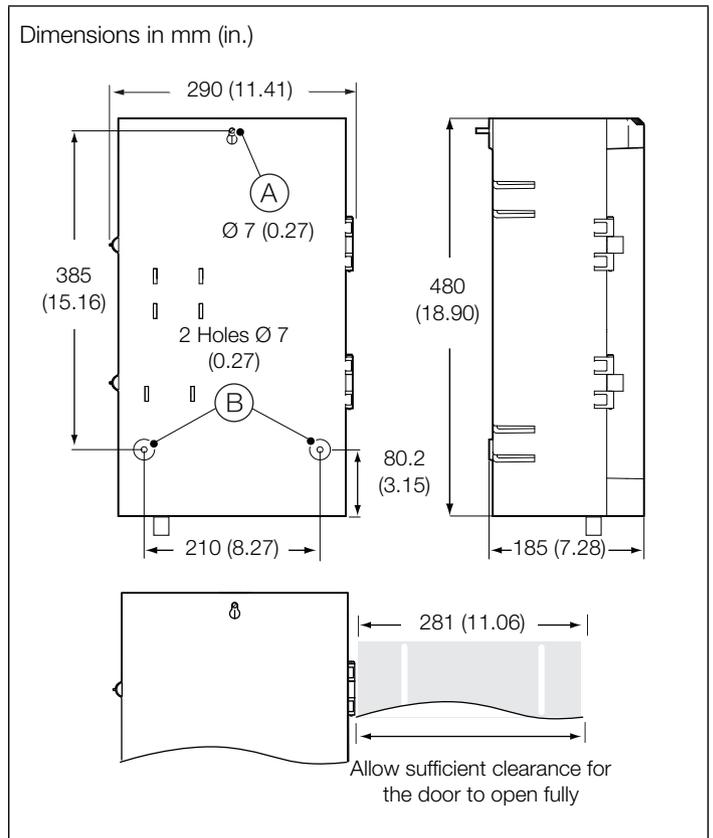


Fig. 2 Mounting the wet-section

4 Connecting the sample lines

Note.

- Sample inlet tubing is customer-supplied.
- Keep sample drains as short as possible and vertical to enable the sample to drain freely.
- Where particulate matter is present (for example, magnetite in boiler samples) it is recommended that a 60 micron sample filter is fitted to the sample inlet line.

To make external sample inlet connections:

1. Fit a shut-off valve (not supplied) at each sample inlet.

Referring to Fig. 3:

2. Connect the sample inlet tubing (A) using flexible PVC tubing ($\frac{1}{4}$ in. ID non-flowmeter or $\frac{3}{8}$ in. ID with flowmeter) to barbed connector (B) at the base of:
sample inlet (C) (wet-section without flowmeter)
or
sample inlet (D) (wet-section with flowmeter)
3. Ensure the drain tubing (E) is kept as straight as possible and is routed to a suitable drain.
4. Ensure the 2 drain tubes (F) from the constant-head unit (G) are kept as straight as possible and routed through the funnel (H) at the base of the wet-section. Drain tubes are factory-fitted but may have moved in transit.

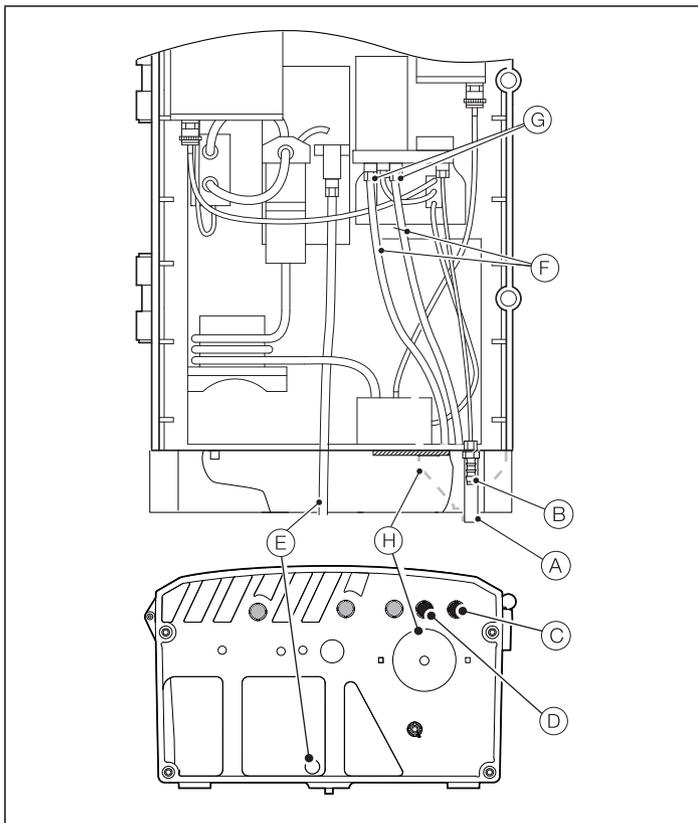


Fig. 3 Connecting the sample lines

5 Connecting the standard solution 2 (high) and reagent tubing

Connections to the standard solution 2 (high) and reagent containers (at the QD couplings) must be made on site. All other internal wet-section tubing connections are factory-made.

Note. If reagent and standard solutions have not already been prepared, proceed to *Solution preparation* (overleaf).

Referring to Fig. 44:

1. Fill the standard solution 2 (high) and reagent containers with the correct solutions – refer to *Solution preparation*.
2. Connect the standard solution 2 (high) tubing QD coupling plug (A) to the mating connector (B) at the base of the standard solution 2 (high) container.
3. Connect the reagent solution tubing QD coupling plug (C) to the mating connector (D) at the base of the reagent solution container.

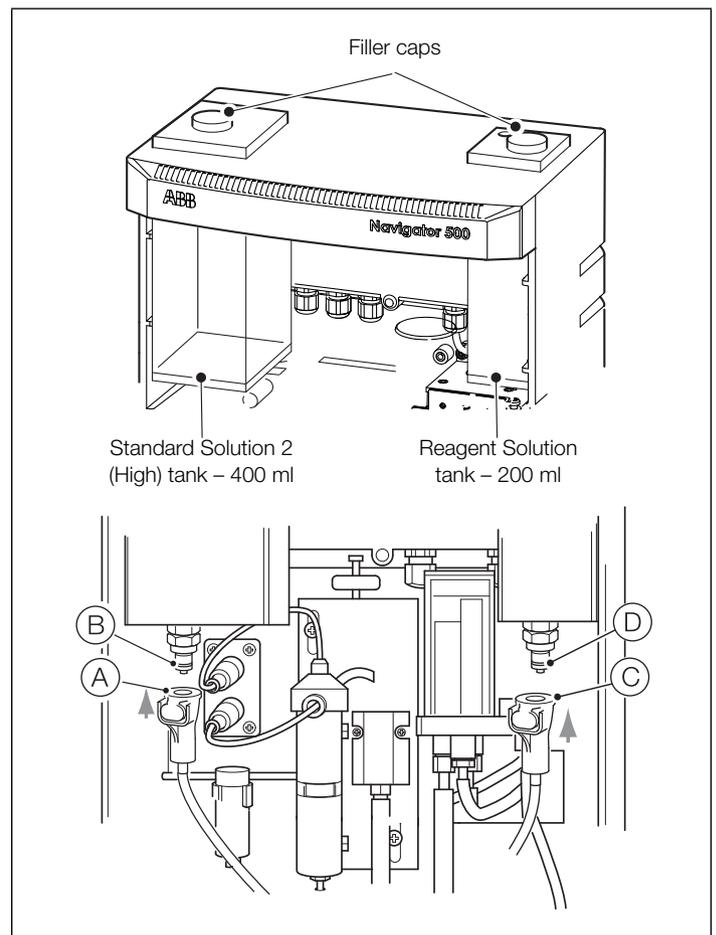


Fig. 4 Connecting the standard solution 2 (high) and reagent tubing QD couplings

6 Setup

This section describes how to set up the analyzer up for first-time use.

Caution. Do not attempt to set up the analyzer unless the wet-section and transmitter are fully installed and ready for operation.

If multiple wet-sections are being connected to 1 transmitter, an additional setup procedure is required – refer to Operating Instructions (OI/AHM550-EN).

Transmitter start-up

Ensure all electrical connections have been made and switch the power on to the transmitter. If the wet-section is being commissioned for the first time, calibration and programming of parameters is required – complete steps 1 to 13, then follow the instructions from step 14 onwards to complete setup at the transmitter.

Setting up the wet-section

Warning. The wet-section uses chemical solutions in its operation. Suitable precautions must be taken to ensure safe handling.

Referring to Fig. 5:

1. Fill the hydrazine sensor assembly with fresh gel as follows:
 - a. Holding the black closure cap tightly in place on the filling syringe, snap the syringe plunger into position and remove the black closure cap.
 - b. Slowly inject the filling gel through the lower hole in the outer jacket until it reaches the top hole.
 - c. Remove the syringe and replace its closure cap.
 - d. Fit lower 10-32 UNF blanking plug (A).
 - e. Fit upper 10-32 UNF blanking plug (B).
2. Push the hydrazine sensor assembly (C) into clip (D) on the sub-panel, ensuring sensor outlet tube (E) is positioned directly above drain tundish (F).
3. Connect the tube (G) from the mixing / delay coil to inlet nipple (H).

Note. Hold the sensor firmly at the top so that the centre portion is not pushed out when the tube is connected.

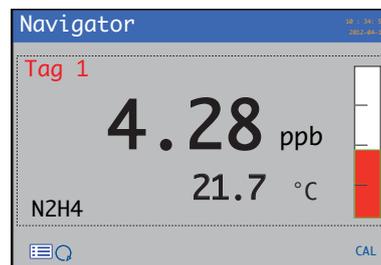
4. Connect the hydrazine sensor (I) (red) and temperature sensor (J) (blue) electrical connectors to the appropriate color-coded sockets on the hydrazine sensor connector block.

5. Set up an appropriate sample flow into the wet-section – check that the solution weirs over the adjustable overflow pipe in the constant-head unit and flows through the sensor.
6. Remove reagent tube (K) from membrane clamp (L), situated on the top of the reagent dosing chamber (M).
7. Place a small beaker into the main case and hold the end of reagent tube (K) over it to enable the reagent to flow through the tube to displace any air bubbles.
8. Reconnect reagent tube (K) to membrane clamp (L).
9. Remove mixing / delay coil tubing (G) from reagent dosing chamber outlet (N).
10. Establish flow through the new disc by clamping the sample inlet tube (O) and applying suction from a plastic syringe to the reagent dosing chamber outlet (N).
11. Refit the mixing / delay coil tubing (G) to the reagent dosing chamber outlet (N).
12. Remove the clamp from sample inlet tube (O).
13. Allow approximately one hour for caustic dosing to be established (the pH of the effluent at the sensor outlet must be at least 10.5).

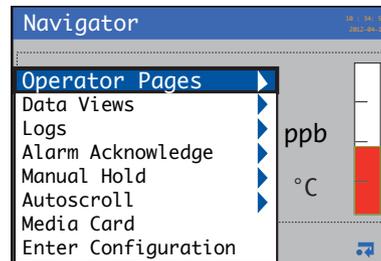
Analyzer accuracy is dependent on the flow rates of the standard and sample through the sensor. The flow rates have been pre-set at the factory but, to ensure accuracy, it is advisable to check the flow rates and adjust if necessary – refer to the Operating Instructions (OI/AHM550-EN) for flow rate values.

At the transmitter:

14. Calibrate the transmitter as described in the Commissioning instructions (CI/AWT540-EN).
15. Access the Configuration level menus as follows:
 - a. Press the  key (below the  icon).



The Operator menus are displayed:



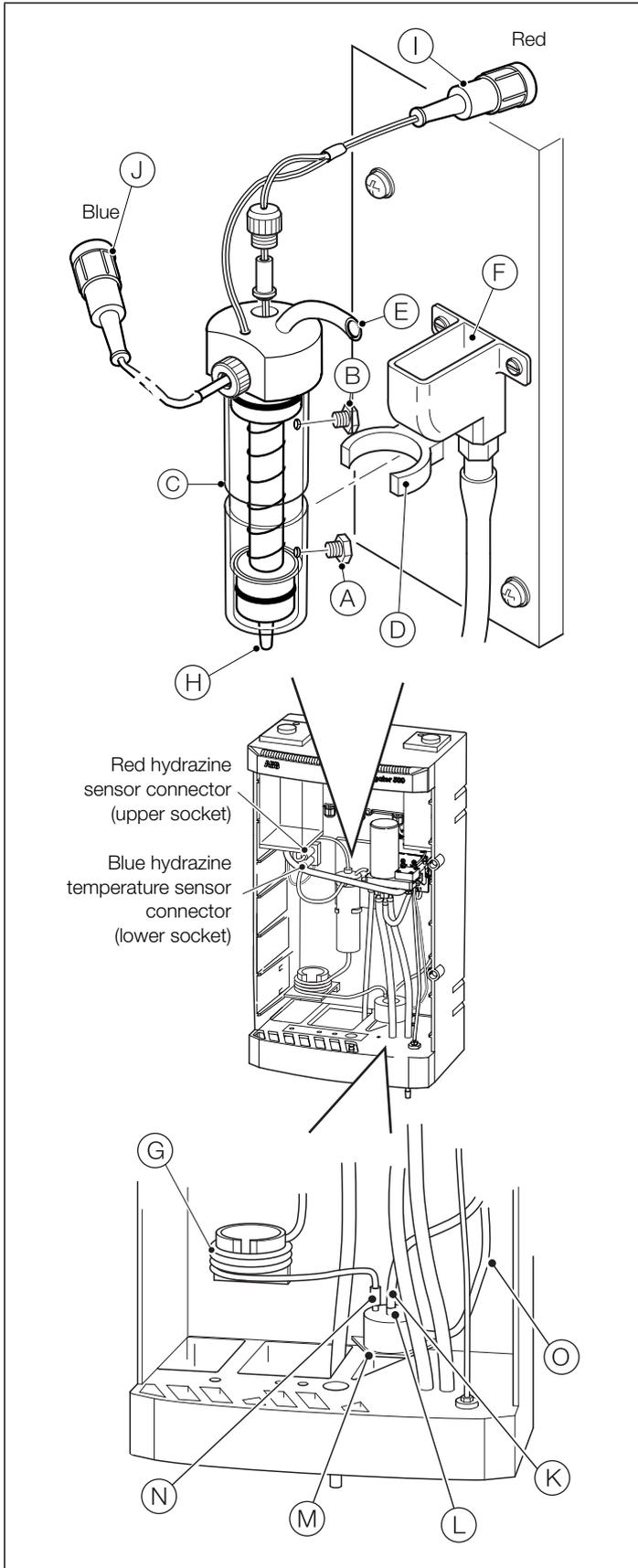
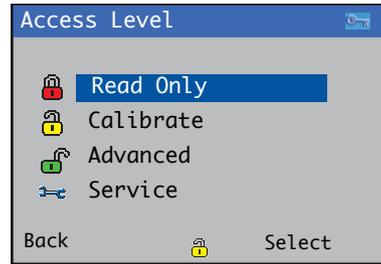


Fig. 5 Setting up the sample flow

- b. Press the ∇ key to select the *Enter Configuration* menu and press the ∇ key (below the \rightarrow icon).

The *Access Level* page is displayed:



- c. Use the ∇ key to scroll to the *Advanced* access level and press the ∇ key (below the *Select* prompt) to enter the top level *Configuration* menus.
 - d. Use the Δ / ∇ keys to scroll to the *Calibrate* page and press the ∇ key (below the *Select* prompt) to enter the *Calibrate* menus.
16. Use the ∇ key to scroll to the *Calibration Setup* menu, press the ∇ key (below the *Select* prompt) to access the *Standard Solution* menu.
 17. Press the ∇ key (below the *Select* prompt on the *Standard Solution* page).
 18. Enter the required concentration of the standard solution using the Δ / ∇ keys to scroll to the required numbers.
Press the ∇ key (below the *Next* prompt) to save each selected number. When the last number is highlighted, press the ∇ key (below the *OK* prompt) to set the value and exit the page.

Note. If, during normal operation, the transmitter does not display the expected hydrazine level, refer to the *Operating Instructions (OI/AHM550-EN)* for troubleshooting procedures.

Solution preparation

Reagent Solution – 5M (20% W/V) Sodium Hydroxide

Warning. Sodium Hydroxide is extremely caustic and must be handled with great care. Wear gloves and eye protection.

The solution used to fill the reagent container is made up as shown below – consumption is approximately 250 ml in 2 to 4 weeks.

1. Weigh out 2.5 (± 0.1) g EDTA and transfer to a 500 ml (16.9 fl oz) measuring flask (a little high purity water can be used to help this transfer).
2. In a separate vessel, weigh out 100 (± 1) g sodium hydroxide, NaOH, pellets (analytical reagent grade) and dissolve in approximately 300 ml (10.0 fl oz) high purity water in a plastic container. Allow this solution to cool.
3. Transfer this solution to the measuring flask, shake well to dissolve the EDTA and top up to the mark with more high purity water.

Standard solution

Warning. Hydrazine sulphate is an irritant to skin and eyes. Avoid breathing the dust. Wear gloves, eye protection and a dust mask when handling this substance.

Choose a convenient value for the hydrazine concentration of the standard solution – typically 50 or 80 $\mu\text{g kg}^{-1}$. Other concentrations can be used if required.

Note. Hydrazine solutions deteriorate with time: replace the stock solution at monthly intervals. Dilute standard solutions must be freshly prepared.

Prepare a stock solution of 1000 mg l^{-1} hydrazine as follows:

1. Weigh out 4.058 (± 0.001) g analytical reagent grade hydrazine sulphate ($\text{N}_2\text{H}_4 \cdot \text{H}_2\text{SO}_4$) and dissolve in approximately 800 ml (27.0 fl oz) high purity water.
2. Transfer to a 1 l (33.81 fl oz) volumetric flask and top up to the mark with more high purity water.
3. Dilute the stock solution to provide the required standard solution for the particular measuring range (usually 30 or 80 $\mu\text{g kg}^{-1}$).

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