pH electrodes with screw cap S7. Special application electrodes.

Suitable to cover special applications.

**52 07**

For surfaces.
Its main characteristic is that its diaphragm and the membrane are on the same plane. Place it directly onto the surface to be measured.
If the surface is dry you must place one drop of distilled water between to assist the contact.

Applications
Paper, fabric, leather, agar, leaves, etc.

Limitations
Temperatures exceeding 80 °C.

**52 08 and 52 09**

Electrodes for microsamples.

- **Common features**
  - Micro, semi-spheric membrane.
  - The internal electrolyte inside the membrane is gel.
  - Reference system: reference element, electrolyte and diaphragm.
  - Applications: in biology and clinical areas.
  - Limitations: Solutions with colloids or solids in suspension.
  - Differences: The diameter and the length of the electrodes.

**52 08**

Diameter 3 mm.
The electrode 52 08, Ø3, is very fragile.
It can take measurements in volumes under 100 µl.

**52 09**

Diameter 6 mm.
It is more rugged than the electrode 52 08.

**52 21, 52 23 and 52 24.**
The difference between these electrodes and the 52 21 are the pH measuring range of the membrane -pH 12 or 14 - and the reference electrolyte.

**Specifications**

<table>
<thead>
<tr>
<th>Electrode code</th>
<th>52 07</th>
<th>52 08</th>
<th>52 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>Operating temperature (ºC)</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>Reference element</td>
<td>Ag wire coated with AgCl</td>
<td>Encapsulated Ag/AgCl crystals</td>
<td>Encapsulated Ag/AgCl crystals</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>Ring of porous PTFE</td>
<td>Ceramic</td>
<td>Ceramic</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>CRISOLYT A</td>
<td>CRISOLYT</td>
<td>CRISOLYT</td>
</tr>
<tr>
<td>Body material</td>
<td>Glass</td>
<td>Glass</td>
<td>Glass</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Connector</td>
<td>S7</td>
<td>S7</td>
<td>S7</td>
</tr>
</tbody>
</table>
52 21 • 52 22 • 52 23 • 52 24
Electrodes for difficult samples.

These electrodes can solve the most common or unexpected problems when measuring pH.

Common features

• Large cylindrical membrane made of the highest quality glass with very fast response times.
• Excellent reference element, with encapsulated Ag/AgCl crystals, providing high stability and long life span.
• Sleeve diaphragm ensuring good contact between electrolyte and sample. This diaphragm provides a constant electrolyte flow and it never gets blocked.
• Limitation: temperatures exceeding 60 °C.

Differences

• The pH measuring range and the reference electrolyte.

52 21
...up to pH 12.
It is the best-selling electrode of this range and thus the most economical.

Applications
Appropriate for samples as diverse as distilled water, wine, paint, emulsions, creams, etc.

52 22
...up to pH 14.

Applications
Adequate where values exceeding pH 12 will be measured frequently.

52 23
For food industry.

Applications
Viscous samples with a high protein content.
CRISOLYT G, a glycerine-based electrolyte is used.

52 24
For non-aqueous media.

Applications
This electrode is basically used to perform titrations in non-aqueous media.
LiCl 1 M in ethanol is used as electrolyte.

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52 21
0.12

52 22
0.14

52 23
0.14

52 24
0.14

0.60

encapsulated Ag/AgCl crystals
sleeve
CRISOLYT
CRISOLYT
CRISOLYT G
LiCl Ethanol

glass
—
S7
pH electrodes with screw cap S7. Puncture electrodes.

These electrodes are appropriate for taking measurements in cheeses, meats, fish, fruits, bread doughs, etc. They can also be used for taking measurements in aqueous samples.

**52 30, 52 31 and 52 32**

**Puncture electrodes.**

**Common features**
- Pointed shape membrane.
- Polymer reference electrolyte.
- Limitation: samples with pH < 2.

**Differences**
- The puncture diameter, the shape and the body material.
- The internal electrolyte inside the membrane.
- The pH measuring range and temperature.
- The number of diaphragms.

> See specifications for each model.

**52 30**

**Glass body.**
Specially to take measurements inside large cheeses. It requires extremely careful handling.

**52 31**

**Stainless steel body.**
The most rugged puncture electrode on the market. These unique electrodes can be used in any position as air bubble formation never occurs in the membrane.

**52 32**

**POM body.**
The POM is a plastic approved by the FDA for use in the food industry. This is a high quality electrode backed up by thousand of sales.

**Specifications**

<table>
<thead>
<tr>
<th>Electrode code</th>
<th>52 30</th>
<th>52 31</th>
<th>52 32</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2.14</td>
<td>2.14</td>
<td>2.11</td>
</tr>
<tr>
<td>Operating temperature (ºC)</td>
<td>0.60</td>
<td>0.60</td>
<td>0.80</td>
</tr>
<tr>
<td>Reference element</td>
<td>encapsulated Ag/AgCl crystals</td>
<td>encapsulated Ag/AgCl crystals</td>
<td>Ag wire coated with AgCl</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>1 ceramic + 1 open</td>
<td>1 ceramic + 1 open</td>
<td>1 open</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>solid</td>
<td>solid</td>
<td>solid</td>
</tr>
<tr>
<td>Body material</td>
<td>glass</td>
<td>glass / stainless steel 316</td>
<td>glass / POM</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Connector</td>
<td>S7</td>
<td>S7</td>
<td>S7</td>
</tr>
</tbody>
</table>
**pH electrodes with screw cap S7. Low-maintenance electrodes.**

These are electrodes with gelled electrolytes, non-refillable. They are called low-maintenance electrodes because they do not require monitoring of the electrolyte levels. We offer two versions, which differ in the body material, the reference element and the type of diaphragm.

**52 00 Low cost.**

One of our best-selling electrodes, with excellent price-quality ratio. **Applications**

For clean aqueous media. Frequently used with the old CRISON 507 portable pH-meter. **Limitations**

Low-conductivity, dirty or viscous solutions. Products with colloids or solids in suspension. Samples containing sulphides, reducing sugars or other substances which react with the silver ion.

**52 12 With a large porous PTFE diaphragm ring.**

The most important feature of this electrode is the reference element, which is highly resistant to contamination by external ions. The large-surface diaphragm is made of porous, non-stick Teflon, facilitating perfect contact between the electrolyte and the sample, without contaminating the sample. **Applications**

Particularly recommended for measuring distilled water, creams, dirty or viscous and difficult samples. This is the electrode recommended when the life-span of other electrodes is lower than expected.

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**Specifications**

<table>
<thead>
<tr>
<th>Electrode code</th>
<th>52 00</th>
<th>52 12</th>
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</thead>
<tbody>
<tr>
<td>Measuring range</td>
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<td>0.14</td>
</tr>
<tr>
<td>Operating temperature (ºC)</td>
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<td>0.100</td>
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<tr>
<td>Reference element</td>
<td>Ag wire coated with AgCl</td>
<td>Sleeved Ag wire coated with AgCl</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>ceramic</td>
<td>annular porous PTFE</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>gel</td>
<td>gel</td>
</tr>
<tr>
<td>Body material</td>
<td>interior glass / exterior polycarbonate</td>
<td>glass</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Connector</td>
<td>S7</td>
<td>S7</td>
</tr>
</tbody>
</table>
The pH measurement of a solution is based on transforming the electrical signal obtained by a glass electrode (indicator) and a reference electrode. According to Nernst’s law, this signal is proportional to H+ ion activity. The potential of the glass electrode is directly dependent on the pH of the sample, whereas the reference electrode has a constant potential which is compared to that of the indicator electrode.

In 1948, Dr. Ingold made the first combined electrode. He merged the two electrodes, indicator and reference, into one. Ever since they were invented, pH electrodes have evolved to adapt to the most diverse measuring conditions. Nevertheless applications still exist that require the use of two separate electrodes.

**Specifications**

<table>
<thead>
<tr>
<th>Electrode code</th>
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<tbody>
<tr>
<td>Measuring range</td>
<td>0.14</td>
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<tr>
<td>Operating temperature (ºC)</td>
<td>0.80</td>
</tr>
<tr>
<td>Reference element</td>
<td>—</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>—</td>
</tr>
<tr>
<td>Body material</td>
<td>glass</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>—</td>
</tr>
<tr>
<td>Connector</td>
<td>S7</td>
</tr>
</tbody>
</table>

**52 50**

Glass, for measuring pH.

Mainly used in practical labs, together with various reference electrodes. For measuring pH or very special titrations. Cable: connected with the same cable as combined electrodes.
Reference electrodes generate a constant potential, against which the potential of the indicator electrode is compared. The reference electrolyte should not change the concentration of ions being analysed. It should not react with any of the components of the sample, to prevent clogging the diaphragm. Always used together with an indicator electrode (pH, metallic or ion selective). Cable: connected to a specific cable, code 94 38 or 94 39.

### Specifications

<table>
<thead>
<tr>
<th>Electrode code</th>
<th>52 40</th>
<th>52 41</th>
<th>52 42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Operating temperature (°C)</td>
<td>0…100</td>
<td>0…60</td>
<td>0…80</td>
</tr>
<tr>
<td>Reference element</td>
<td>encapsulated Ag/AgCl crystals</td>
<td>encapsulated Ag/AgCl + saline bridge</td>
<td>encapsulated Ag/AgCl + saline bridge</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>ceramic</td>
<td>sleeved</td>
<td>large-sized ceramic</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>CRISOLYT to select</td>
<td>to select</td>
<td>to select</td>
</tr>
<tr>
<td>Body material</td>
<td>glass</td>
<td>glass</td>
<td>glass</td>
</tr>
<tr>
<td>Temperature sensor</td>
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<td>—</td>
</tr>
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<td>S7</td>
<td>S7</td>
<td>S7</td>
</tr>
</tbody>
</table>

### 52 40

**The basic.**

**Applications**

For general use, for measuring pH, redox and working with F- and Ca²⁺ ion-selective electrodes.

**Limitations**

The reference electrolyte must always be KCl 3M.

### 52 41

**For ISE.**

Its main characteristic is the saline bridge, where it is easy to replace one electrolyte with another.

**The diaphragm in contact with the sample is a sleeve diaphragm.**

**Applications**

Used with ion selective electrodes

**Limitations**

Temperatures exceeding 60 °C.

### 52 42

**For ISE. Economical.**

Saline bridge. The diaphragm that is in contact with the sample is a large ceramic diaphragm which is easy to replace.

**Well priced.**

**Applications**

Very useful when the same electrolyte is used.

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**Common features**

- The reference element, encapsulated Ag/AgCl crystals.

**Differences**

- The type of diaphragm.
- The electrolyte.
- The operating temperature range.
- The models 52 41 and 52 42 have saline bridge.

⚠️ See specifications for each model.