

# The solution for all turbidimetric and color-indicated titrations

## DP5 Phototrode™



DP5 Phototrode™

The DP5 Phototrode™ is the latest advancement of the well established Phototrodes from METTLER TOLEDO. For the first time, the unique features of the DP5 allow the switching between 5 different wavelengths for the indication of various titrations.

For many titration tasks, such as the automated determination of metal ions with EDTA, photometric indication using a color indicator is the best solution. In addition, the detection of turbidity changes is frequently used for titrations, e.g. for the automated determination of surfactant content. METTLER TOLEDO offers a multitude of methods for various applications using the DP5 Phototrode™.

### Innovative development on a well proven basis

An optimized outer casing guarantees better use of the DP5, independent of the selected titration stand or sample changer. The main innovation, however, is hidden inside and allows the use of one DP5 for all turbidimetric and color-indicated titrations.

### A small rainbow

Dark green, green, orange, light red, red – in addition to the wavelengths 555nm and 660nm, the DP5 Phototrode™ covers the wavelengths 520nm, 590nm and 620nm. Now when selecting a suitable color indicator for your sample, a multitude of new possibilities arises, all using a single sensor.

### In agreement with existing standards

According to EN 196-2 (1994), some cement components such as Fe(III), Al(III) or Ca(II) must be analyzed by titration with EDTA or EGTA. The wavelengths specified by the standard are 520nm and 620nm, respectively. The DP5 Phototrode™ together with METTLER TOLEDO titrators now easily fulfils all requirements.

### Your investment is protected

The classical two-phase titration is sometimes the only possible solution for the analysis of various surfactants. Existing accessories like the two-phase titration beaker, as well as methods developed by METTLER TOLEDO for this purpose, can continue to be used with the DP5 Phototrode™.

### Ordering Information

Phototrode™..... DP5

The standard delivery includes the Y cable and an appropriate power supply unit.

#### Replacement parts:

Mirror assembly.....22684

2 Mirrors, sealings.....999192

Removable cones.....22986

Y Cable (connection of the DP5 to the power supply and the titrator).....51109905

Power Supply Europe 100-250 Volt / 9 Volt.....51191597

Power Supply USA 100-250 Volt / 9 Volt.....51191598

Power Supply UK 100-250 Volt / 9 Volt.....51191599

#### Optional accessories:

Two-phase titration beaker.....51107655

Steel probe (for use in aggressive solutions).....999186

**METTLER TOLEDO**

## Selection of typical applications

| Wavelength | Compound to be determined                               | Titrant                      | Indicator   | Conditions  | Remarks   |
|------------|---|------------------------------|---|---|---|
| 520 nm     | Fe(III) als $\text{Fe}_2\text{O}_3$                     | EDTA                         | Sulfosalicylic acid                                   | 47.5 °C<br>pH 1.5                                     | Analysis of cement components according to EN 196-2 (1994)      |
|            | Al(III) als $\text{Al}_2\text{O}_3$                     | EDTA                         | o-PAN   | slightly boiling<br>pH 3.0                            | Analysis of cement components according to EN 196-2 (1994)      |
|            | Ca(II) als CaO  | EGTA or EDTA (alternatively) | Calcein   | pH 12.5   | Analysis of cement components according to EN 196-2 (1994)      |
| 555 nm     | Sodium dodecyl sulfate (SDS)                            | CPC or Hyamine 1622          | Turbidimetric indication                              | pH 3.0  | Method M603*  |
|            | Calcium and Magnesium content in water (total hardness) | EDTA                         | Eriochrome black T (at pH 10) and Murexide (at pH 12) | pH 10 (for Calcium and Magnesium) and pH 12 (Calcium) | Method M069*  |
|            | Chondroitin sulfate (dietary supplement)                | CPC                          | Turbidimetric indication                              | Phosphate buffer pH 7.2                               | Analysis of chondroitin sulfate according to USP26 (NF21, 2003) |
|            | Free complexing agents in electroless copper bath       | $\text{CuSO}_4$              | Murexide  | Alkaline environment                                  | Method M063*  |
|            | Nickel in electroless nickel bath                       | EDTA                         | Murexide  | pH 10   | Method M066*  |
| 590 nm     | Strong acid content in aqueous solution                 | NaOH                         | Phenolphthalein                                       |   |   |
|            | Cadmium (II) in aqueous solution                        | EDTA                         | Xylenol orange  | Hexamethylentetraamine buffer                         |   |
|            | Carboxyl groups in PET                                  | KOH (in benzyl alcohol)      | Bromophenol blue                                      | Solvent: Chloroform: phenol 3:2                       | Method M206*  |
|            | Lead nitrate in aqueous solution                        | EDTA                         | Xylenol orange  | 20% Urotropine buffer                                 |   |
|            | Vitamin C (ascorbic acid) in aqueous solution           | DPI                          | Self-indicating titration                             | 2% Oxalic acid solution                               |   |
| 620 nm     | Ca(II) as CaO   | EGTA or EDTA (alternatively) | Murexide  | pH 12.5   | Analysis of cement components according to EN 196-2 (1994)      |
|            | Mg(II) as MgO   | DCTA or EDTA (alternatively) | Methylthymol blue                                     | pH 10.5   | Analysis of cement components according to EN 196-2 (1994)      |
| 660 nm     | Chondroitin sulfate (dietary supplement)                | CPC                          | Turbidimetric indication                              | Phosphate buffer pH 7.2                               | Analysis of chondroitin sulfate according to USP26 (NF21, 2003) |
|            | Zinc in aqueous solutions                               | EDTA                         | Eriochrome black T                                    | Buffer pH 10  | Borate or ammonia buffer  |
|            | Calcium and Magnesium content in water (total hardness) | EDTA                         | Eriochrome black T (at pH 10) and Calcon (at pH 12)   | pH 10 (for Calcium and Magnesium) and pH 12 (Calcium) | Method M069*  |
|            | Sulphate in aqueous solutions                           | Barium perchlorate           | Dimethylsulfon-azo III                                | pH 3.0  | Precipitation titration with solvent water: acetone = 1:1       |

\* Electronic copies of the methods can be found in LabX titration or on the internet (<http://www.mt.com>)



DP5  
Phototrode™



Two-phase  
titration beaker



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Environmental management system ISO 14001  
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Worldwide service

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