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Titration

SAMPLE CHANGERS FOR AUTOMATED TITRATION

SI Analytics

a xylem brand

6. Automated titration with flexible sample changers

The number of samples to be processed is growing constantly, while at the same time the demands on reliability are increasing in accordance with GLP and ISO 900X standards. The TW 7200 and the TW 7450 sample changers help you meet these increased requirements and relieve qualified employees from routine work.

Exchangeable sample trays for more flexibility

With sample trays or racks for up to 72 samples (TW 7450) and titration head fittings for a variety of beaker and titrator vessels, you get the flexibility your lab needs.

The sample trays and titrator heads are very quick and simple to change. You can conveniently set the respective tray size in the TitriSoft software's worklist without any need for configuration of the sample changer itself.



Rinsing of electrode and titration tip

To ensure the accuracy of the results, electrodes, and titration tips are rinsed after each titration. This can be done by immersing the electrodes and titration tips in a rinsing solution. How many rinsing positions are to be used and how long rinsing is to be carried out is defined in the worklist. A direct and fast rinsing of the electrodes and titration tips can be carried out by connecting the MP 25 rinsing pump. This involves rinsing directly after the titration either into the titrated sample (TW 7200-16-MP, TW 7450-42-MP) or into a special rinsing vessel at position one (TW 7450-48-MP and TW 7450-72-MP). Finally, a waiting position can be approached to immerse pH electrodes in a KCl solution and prevent them from drying out.

By using an optional second pump, the titrated solution as well as the rinsing solution can be aspirated.

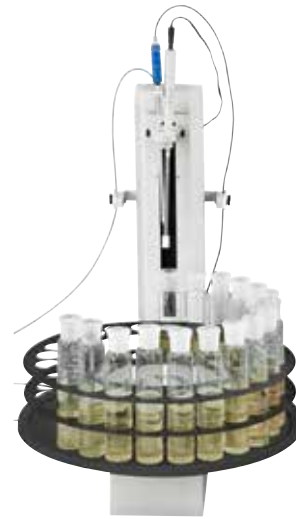
Photo on the left hand side: The connection of a rinsing nozzle in the TZ 3974 titration head now also enables rinsing on the first position into a special rinsing vessel. The rinsing liquid drains from the rinsing vessel into a waste vessel by gravity.



Stirring "from above" or "from below"

Two magnetic stirrers allowing the samples to be stirred "from below" are installed in the TW 7200 as a standard. Alternatively, you can use a rod stirrer which allows stirring "from above".

With the TW 7450 sample changer stirring is generally "from above".



Automatic COD titration

For the direct titration of the chemical oxygen demand (COD) in the digestion vessels, a special sample tray with twenty-four positions and a matching titration head are available for the TW 7200.



The Flexible TW 7200

At first glance, the new TW 7200 sample changer looks quite similar to its predecessor TW alpha plus. But do not be deceived by its appearance: It is a completely newly developed sample changer with higher flexibility due to more sample trays and further new features.



TW 7200 benefits:

- * **Titration heads and sample trays can be changed in one easy step**
- * **Sample trays from 12 to 48 positions for sample vessels from 28 to 82 mm diameter**
- * **Special designs for special vessels with other diameters available on request**
- * **Increased safety due to automatic recognition of the sample tray**
- * **Built-in motor for positioning the head in another sample row**
- * **Two built-in magnetic stirrers**
- * **Connection of two pumps (diaphragm and peristaltic)**
- * **Software controlled setting of the limit switch**

Titration heads and sample trays

Due to the built-in head motor of the TW 7200, double-row sample trays can be used in place of single-row versions simply by switching them over. No need for any special adaptations or modifications.

Examples, from left to right:

TZ4016, single-row, 16 sample positions

TZ4025, double-row, 25 sample positions

TZ4038, double-row, 38 sample positions

TZ4050, double-row, 48 sample positions



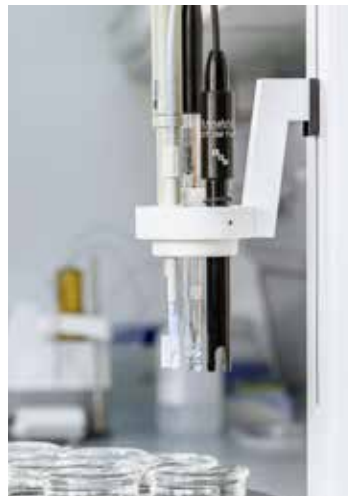
Titration head TZ 1464

Suitable for the TZ4018 and TZ4018 sample trays with 18 and 28 positions for 100 ml beakers. Four openings are available for electrodes, titration tips and the rod stirrer.



Titration head TZ 1467 with splash shield and rinsing nozzle

Suitable for the TZ 4012, TZ 4016 and TZ 4025 sample trays from 12 to 25 positions for 150 ml to 400 ml beakers. Six openings are then still available for electrodes, titration tips and the rod stirrer.



Titration head TZ 1463

Suitable for TZ 4012, TZ 4016, TZ 4025 and TZ 4053 sample trays from 12 to 25 positions for 150 ml to 600 ml beakers.

The titration head is also used for the TZ 4030, TZ 4050 and TZ 4058 sample trays for special dosing tasks such as sample preparation. A total of seven openings are available for electrodes, titration tips and the rod stirrer.



New: Titration head TZ 1469 for 24 and 38 position sample trays

The TZ 1469 micro-titration head now also allows the simultaneous use of a conductivity and a pH electrode (micro version such as SCPpHT-MIC-AMF-3M-DIN-N, 285101335) and rod stirrer.

Without a rod stirrer, a standard pH electrode with 12 mm diameter can also be used. Titration tips can be accommodated in the head too.

Sample preparation with the TITRONIC® 500, TW7200 and TitrISO

A good example of automation is sample preparation for viscometry. For viscometry of polymer solutions, the sample solution must first be prepared with a specified concentration before measurement.

As an alternative to volumetric flasks and very accurate weighing, the TITRONIC® 500 piston burette (with WA 50V exchange unit for highly aggressive and viscous solutions) together with the TW 7200 sample changer can be used for further automation and simplification.



TW7200 with TZ4058 for VZ7081
100 ml laboratory bottles



TZ4050 sample tray for VZ7088 laboratory bottles

Benefits of sample preparation with TITRONIC® 500 over working with volumetric flasks:

- ★ No manual work with aggressive solvents
- ★ When working with TITRONIC® 500, the solvent volume is dosed exactly in accordance with the sample's initial weight. This means that it is no longer necessary to achieve an exact target initial weight
- ★ In addition to the sample's initial weight, the content of impurities such as glass fibers can also be entered in TitrISO. This means that the quantity of solvent to be dosed is calculated only in relation to the pure polymer quantity, in accordance with the viscometry standards such as ISO 1628 or ISO 307
- ★ Different sample trays are available for 16 100 ml laboratory bottles and 40 ml ND 24 (EPA) vials with 30 and 48 positions

Selection table: Sample trays and titration heads for TW 7200

Type	Order No.	Description	Comment	Sample vessels	Titration heads
TZ 4012	285228080	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers, 250 ml, low form	Vessels are included	250 ml tall form TZ 1785, as well as 400 ml tall (not available from Xylem Analytics)	TZ 1463 and TZ 1467
TZ 4016	285228090	Sample tray for TW 7200, for 16 sample vessels without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780.	Vessels are not included	150 ml low form TZ 1784, 150 ml low form "super duty" TZ 1788, 250 ml tall form 1787, 250 ml tall form "super duty" TZ 1780	TZ 1463 and TZ 1467
TZ 4018	285228100	Sample tray for TW 7200, for 18 sample vessels without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)	Vessels are not included	100 ml tall form TZ 1765 as well as 100 ml low form and various plastic vessels (not available from Xylem Analytics)	TZ 1464 and TZ 1469
TZ 4024	285228110	Sample tray for TW 7200, for 24 sample vessels without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786	Vessels are not included	50 ml tall form TZ 1783, 75 ml glass beaker TZ 1786, 50 ml beaker (PP) TZ 3973	TZ 1469
TZ 4025	285228120	Sample tray for TW 7200, double-row for 25 sample vessels, without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780	Vessels are not included	150 ml low form TZ 1784, 150 ml low form "super duty" TZ 1788, 250 ml tall form 1787, 250 ml tall form "super duty" TZ 1780	TZ 1463 and TZ 1467
TZ 4028	285228130	Sample tray for TW 7200, double-row for 28 sample vessels, without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)	Vessels are not included	100 ml tall form TZ 1765 as well as 100 ml low form and various plastic vessels (not available from Xylem Analytics)	TZ 1464 and TZ 1469
TZ 4030	285228140	Sample tray for TW 7200, for 24 sample vessels, without beakers. Suitable for 40 ml sample vials with ND 24 VZ 7088	Vessels are not included	Sample vessels VZ 7088	TZ 1463
TZ 4038	285228150	Sample tray for TW 7200, double-row for 38 sample vessels, without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786	Vessels are not included	50 ml tall form TZ 1783, 75 ml glass beaker TZ 1786, 50 ml beaker (PP) TZ 3973	TZ 1469
TZ 4040	285228160	Sample tray for TW 7200, for 24 COD vessels according to DIN 38 409, without beakers	Vessels are not included	not available from Xylem Analytics	TZ 1461
TZ 4050	285228170	Sample tray for TW 7200, double-row for 48 sample vessels, without beakers. Suitable for 40 ml sample vials with ND 24 VZ 7088	Vessels are not included	Sample vessels VZ 7088	TZ 1463
TZ 4053	285228180	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers 600 ml, tall form	Vessels are included	600 ml tall form TZ 1766	TZ 1463
TZ 4058	285228190	Sample tray for TW 7200, for 16 sample vessels, without beakers. Suitable for 100 ml laboratory bottles VZ 7081	Vessels are not included	100 ml laboratory bottles VZ 7081	TZ 1463

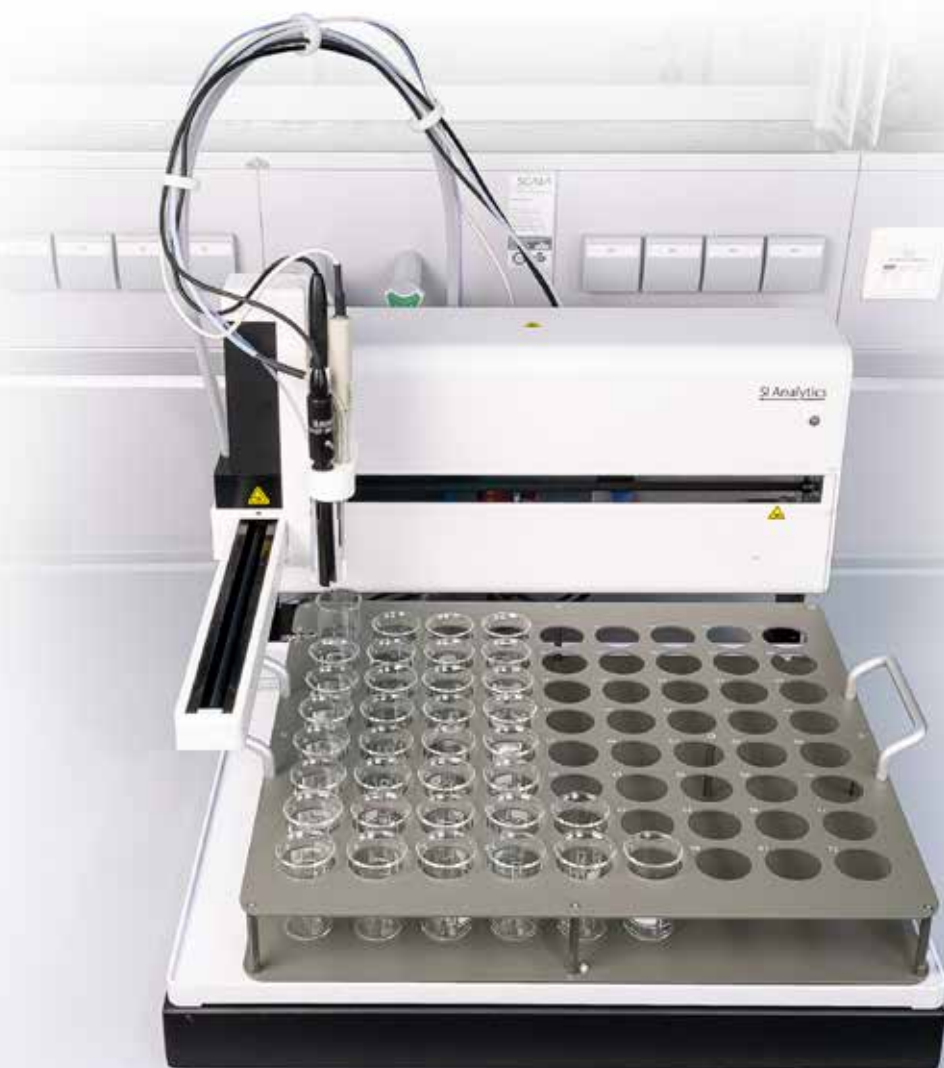
The Powerful TW 7450

The new x/y/z sample changer TW7450 has been developed for high sample throughput. There are three different sample rack sizes of 42, 48 and 72 positions, and three different titration heads available. The sample racks and titration heads can be exchanged in just a few steps.

TW7450-72 and TW7450-72 MP

The sample rack with 72 positions can be used with 50 ml beakers and with special sample vessels for a sample volume of up to approx. 75 ml. Areas of application include wine and beverage analysis, pH measurement in soil samples as well as for the determination of alkalinity in seawater. The new TZ 3974 titration head also facilitates the simultaneous use of conductivity and micro pH electrode such as the ScienceLine PLUS.

The TW 7450-72-MP comes with the MP 25 membrane pump, TZ 3971 rinsing nozzle and TZ 3970 rinsing vessel. Titration head is the TZ 3974.



TW 7450 benefits:

- ★ **Very fast and quiet**
- ★ **Titration heads and sample racks can be changed in just a few practical steps and a software switch in Titrisoft**
- ★ **Single pump (diaphragm or peristaltic) with additional pumps connected via optional I/O interface**
- ★ **Custom design trays for special vessels available on request**

TW7450-48 and TW7450-48 MP

The 48 position sample rack is suitable for 100 ml beakers and is ideal for use in wine, water, beverage, and other applications.



TW7450-42 and TW7450-42 MP

The 42 position sample rack can be operated with either 150 or 250 ml beakers, sizes that are commonly used for water and environmental analysis amongst other applications. The matching titration heads are TZ 3963 and TZ 3967.



Selection table: Trays and titration heads for TW7450

Type.	Order No.	Description	Comment	Sample vessels	Titration heads
TZ 3942	285217790	Sample rack with 42 positions for 150 ml beakers low form or 250 ml beakers tall form	Vessels are included	150 ml low form TZ 1784, 150 ml low form "super duty" TZ 1788, 250 ml tall form 1787, 250 ml tall form "super duty" TZ 1780	TZ 3963 and TZ 3967
TZ 3948	285217800	Sample rack with 48 positions for 100 ml beakers low form	Vessels are included	100 ml tall form TZ 1765 as well as 100 ml low form and various plastic vessels (not available from Xylem Analytics)	TZ 3964 and TZ 3965
TZ 3972	285217810	Sample rack with 72 positions for 50 ml beakers tall form	Vessels are included	50 ml tall form TZ 1783, 75 ml glass beaker TZ 1786, 50 ml beaker (PP) TZ 3973	

Ordering information: TW 7200 and TW 7450 sample changers (basic units)

Type	Order no.	Description
TW 7200	285228000	Basic unit TW 7200 with two integrated magnetic stirrers, connection cable for rod stirrer, USB connection cable TZ 3887, power supply 100-240 V
TW 7200-16	285228010	Basic unit TW 7200 with sample rack TZ 4016 for 16 samples, without beakers, incl. titration head TZ 1463 and power supply 100-240 V
TW 7200-18	285228020	Basic unit TW 7200 with sample rack TZ 4018 for 18 samples, without beakers, incl. titration head TZ 1464 and power supply 100-240 V
TW 7200-24	285228030	Basic unit TW 7200 with sample rack TZ 4024 for 24 samples, without beakers, incl. titration head TZ 1469, power supply 100-240 V
TW 7200-COD	285228040	Basic unit TW 7200 with sample rack TZ 4040 for 24 CSB-samples according to DIN 38 409, without vessels, incl. Titration head TZ 1461, redox electrode Pt 5901, rod stirrer TZ 1846, titration tip TZ 1648, power supply 100-240 V
TW 7200-16-MP	285228050	Basic unit TW 7200 with sample rack TZ 4016 for 16 samples, without beakers, incl. titration head TZ 1467, rinsing pump MP 25, power supply 100-240 V
TW 7200-25	285228200	Basic unit TW 7200 with sample rack TZ 4025 for 25 samples, without beakers, incl. titration head TZ 1463 and power supply 100-240 V
TW 7200-25-MP	285228210	Basic unit TW 7200 with sample rack TZ 4025 for 25 samples, without beakers, incl. titration head TZ 1467, rinsing pump MP 25, power supply 100-240
TW 7450	285221400	Basic TW 7450 unit without titration head and sample rack. With USB connection cable for PC connection, power supply 100-240 V
TW 7450-42	285221440	Basic unit TW 7450 with sample rack TZ 3942 for 42 samples, titration head TZ 3963, rod stirrer TZ 1847 and FEP-hose (5 m), 100-240 V
TW 7450-42-MP	285221450	Basic unit TW 7450 with sample rack TZ 3942 for 42 samples, titration head TZ 3967, rod stirrer TZ 1847, rinsing pump MP 25 and FEP-hose (5 m), 100-240 V
TW 7450-48	285221460	Basic unit TW 7450 with sample rack TZ 3948 for 48 samples, titration head TZ 3964, rod stirrer TZ 1847 and FEP-hose (5 m), 100-240 V
TW 7450-48-MP	285221470	Basic unit TW 7450 with sample rack TZ 3948 for 48 samples, titration head TZ 3964, rod stirrer TZ 1847 and FEP hose (5 m), 100-240 V
TW 7450-72	285221480	Basic unit TW 7450 with sample rack TZ 3972 for 72 samples, titration head TZ 3974, rod stirrer TZ 1847 and FEP hose (5 m), 100-240 V
TW 7450-72-MP	285221490	Basic unit TW 7450 with sample rack TZ 3972 for 72 samples, titration head TZ 3974, rod stirrer TZ 1847, rinsing vessel TZ 3970, rinsing pump MP 25, and FEP hose (5 m), 100-240 V
TL 7000 TW 7200-16 Set	285228060	Complete sample change set consists of TL 7000-M2-20, sampler changer TW 7200-24 and 3 x beaker sets TZ 1783, titration tip TZ 1646 and titration tube TZ 3415; incl. Software TitrSoft
TL 7000 TW 7200-24 Set	285228070	Complete sample change set consists of TL 7000-M2-20, sampler changer TW 7200-24 and 3 x beaker sets TZ 1783, titration tip TZ 1646 and titration tube TZ 3415; incl. software TitrSoft
TL 7000 TW 7450-42 Set	285221410	Complete sample changer set consists of TL 7000-M2-20, sample changer TW 7450, titration head TZ 3963, titration rack TZ 3942, rod stirrer TZ 1847, adapter TZ 1520, titration tube TZ 3425; with software TitrSoft
TL 7000 TW 7450-42-MP Set	285221420	Complete sample changer set consists of TL 7000-M2-20, sample changer TW 7450, titration head TZ 3967, titration rack TZ 3942, pump MP 25, rod stirrer TZ 1847, adapter TZ 1520, titration tube TZ 3425; with software TitrSoft
TL 7000 TW 7450-72 Set	285221430	Complete sample changer set consists of TL 7000-M2-20, sample changer TW 7450, titration head TZ 3974, titration rack TZ 3972, rod stirrer TZ 1847, titration tip TZ 1646 titration tube TZ 3425; with software TitrSoft

Ordering information: TW 7200 and TW 7450 trays/racks and titration heads

Type	Order no.	Description
TZ 4012	285228080	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers, 250 ml, low form
TZ 4016	285228090	Sample tray for TW 7200 for 16 sample vessels without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780
TZ 4018	285228100	Sample tray for TW 7200, for 18 sample vessels without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)
TZ 4024	285228110	Sample tray for TW 7200, for 24 sample vessels without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786

TZ 4025	285228120	Sample tray for TW 7200, double-row for 25 sample vessels, without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780
TZ 4028	285228130	Sample tray for TW 7200, double-row for 28 sample vessels, without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)
TZ 4030	285228140	Sample tray for TW 7200, for 24 sample vessels, without vessel. Suitable for 40 ml sample vials with ND 24 VZ 7088
TZ 4038	285228150	Sample tray for TW 7200, double-row for 38 sample vessels, without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786
TZ 4040	285228160	Sample tray for TW 7200, for 24 COD vessels according to DIN 38 409, without vessels
TZ 4042	285217900	Sample rack for TW 7450, for 42 sample vessels, without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780
TZ 4048	285217910	Sample rack for TW 7450, for 48 sample vessels, without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)
TZ 4050	285228170	Sample tray for TW 7200, double-row for 48 sample vessels, without vessels. Suitable for 40 ml sample vials with ND 24 VZ 7088
TZ 4053	285228180	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers 600 ml, tall form
TZ 4058	285228190	Sample tray for TW 7200, for 16 sample vessels, without bottles. Suitable for 100 ml laboratory bottles VZ 7081
TZ 4072	285217920	Sample rack for TW 7450, for 72 sample vessels, without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786
TZ 1461	285213622	Titration head for COD sample tray for TW 7200
TZ 1462	285213639	Titration head for KF titration for sample tray TZ 4024 or TZ 4038 for TW 7200
TZ 1463	285213647	Titration head for sample tray TZ 4012 and sample tray TZ 4016/TZ 4025, as well as TZ 4030, TZ 4050, TZ 4053 and TZ 4058 with 7 openings NS 14
TZ 1464	285213654	Titration head for sample tray TZ 4018/TZ4028 with four openings with different diameters
TZ 1467	285213671	Titration head for sample tray TZ 4012/TZ 4016/TZ 4025 with 7 openings NS 14 incl. splash shield and rinsing tube
TZ 1469	285213884	Titration head for sample tray TZ 4024 and TZ 4038 with 5 x openings (1 x NS 14, 1 x 15.3 mm and 2 x NS 7 + 1 x 3 mm for FEP-tubes). With adapter TZ 1526 for 12 mm standard electrodes
TZ 3963	285217820	Titration head for sample rack TZ 3942 (42 positions) with 7 openings NS 14,5. For TW 7450
TZ 3967	285217830	Titration head for sample rack TZ 3942 (42 positions) with 7 openings NS 14,5, incl. splash shield. For TW 7450
TZ 3964	285217890	Titration head for sample rack 3948 (48 positions) with 4 openings different sizes. For TW 7450
TZ 3965	285227450	Titration head for sample rack TZ 3948 (48 positions) with 3 openings NS 14 for electrodes and rod stirrer and 2 openings for rinsing nozzle and titration tips, including rinsing nozzle. For TW 7450
TZ 3949	285227440	Rinsing vessel for sample rack TZ 3948, including PVC tube, 3 m
TZ 3970	285227470	Rinsing vessel for sample rack TZ 3972, including PVC-tube, 3 m

Ordering information: Other accessories

Type	Order no.	Description
TZ 1465	285213980	Cap made out of plastic, with opening for titration vessel TZ 1786, 12 pcs.
TZ 1466	285213990	Aluminum foil for titration vessel TZ 1786, 500 pcs.
TZ 1785	1064589	Glass titration beaker, 250 ml low form (10 pcs.) for TZ 1452/TZ 4012
TZ 1783	1064720	Glass titration beaker, 50 ml tall form (10 pcs.) for TZ 1454/TZ 4024/TZ 4038 and TZ 3972
TZ 1787	285201994	Glass titration beaker, 250 ml tall form (10 pcs.) for TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1788	285202008	Glass titration beaker "super duty", 150 ml low form (10 pcs. for TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1765	285202030	Glass titration beaker, 100 ml tall form (10 pcs.) without spout
TZ 1784	285216747	Glass titration beaker, 150 ml low form (10 pcs.) for TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1786	285216756	Beaker made out of glass for max. 75 ml; diameter 40 mm, height 110 mm (10 pcs) for TZ 1454/ TZ 4024/TZ 4038 and TZ 3972
TZ 1780	285226140	Glass titration beaker "super duty", 250 ml tall form (10 pcs. For TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1766	285226160	Glass titration beaker, 600 ml tall form (10 pcs.) without spout
TZ 1844	285213199	Rod stirrer mid size model (120 mm) with NS 14.5
TZ 1846	285215134	Rod stirrer long model (200 mm) with NS 14.5 for COD reaction vessels according to DIN 38 409 section 41 for sample changer TW 7200
TZ 1847	285215175	Rod stirrer short model (103 mm) with NS 14.5
TZ 1863	285216530	Propeller blade three-fold made of PTFE