Analytical Volumetric Solutions

The Principle of Titrimetry

Titrimetry or measurement by titration includes a set of widely used analytical techniques, some of which have been in widespread use for almost 200 years. Volumetric titration dates back at least to the work of French chemist Gay- Lussac, who devised a method in 1835 to determine the purity of Silver, using standardised Sodium Chloride as the titrant.

The principle of all titrimetry involves the determination of the quantity of the reagent of known concentration (titrant), that is required to react completely with an unknown analyte. Volumetric titrimetry involves measuring the volume of the solution of known concentration (titrant) consumed, gravimetric titrimetry measures the mass of the reagent consumed and coulometric titration measures a direct electrical current of known magnitude that consumes the analyte. In coulometry, the time it takes to complete the electrochemical reaction, is the measurand.

An analytical volumetric solution (also called titrant, standard titrant or standard solution) is a reagent of known concentration that is added from a burette or other dispensing apparatus to a sample (analyte) until a reaction between the two liquids is judged to be complete. This completeness (end point) is usually observed in a manual titration by the production of a physical change read visually as the titrant is added to the analyte. Such a change may include an appearance, disappearance or change of colour or appearance/disappearance of turbidity (cloudiness). Nowadays, instruments are widely used to detect the end points by detection of any of several properties or characteristics of the analyte solution including colour, turbidity, temperature, refractive index, potential difference, current or conductivity. In simple terms titrimetry is broadly divided into two main classifications - manual and instrumental - irrespective of how the end point is detected. In the case of manual titrations, indicator, titrant or analyte change of colour is by far the most important method of end point detection. Therefore, the availability of a wide selection of indicators is an integral part of any offering of Analytical Volumetric Solutions. This catalogue carries by far the most extensive offering of both indicators and titrants available in the market place. The end point in automatic titration is indicated most commonly by a change in potential of an electrode that responds to the concentration of the reagent or the analyte.

Analysis by titration brings a large number of benefits to the analyst including the following:

- It is an absolute method
- Relatively easy to perform (although high accuracy manual titration requires practice, dexterity, experience and sound judgement)
- Rapid, cheap and versatile
- Accurate, reproducible, traceable and comparable

Furthermore, titration reactions should exhibit defined stoichiometry, be quantitative, establish equilibrium that is definite and fast, and provide unambiguous results.

Types of Titration Reactions

Acid/Base reactions (also called neutralisation titrations)

These are used to determine either the amount of acid/base in an analyte or substances that can be converted to an acid/base. They may also sometimes be used to track the progress of chemical reactions that produce or consume hydrogen ions. The titrants are always strong acids or bases and include hydrochloric acid, perchloric acid, sulphuric acid, sodium hydroxide, potassium hydroxide and sometimes barium hydroxide. Weak acids or bases are not used because they react incompletely with the analyte. The colour indicator used in an acid base titration is a weak acid/base itself which in its undissociated form differs in colour from its conjugate acid or base form. Typical elements suitable to this type of titration method include carbon, nitrogen, chlorine, bromine and fluorine. Pretreatment of these elements converts the element to an inorganic acid or base that is then titrated. An example is nitrogen which occurs in a wide range of forms both organic, inorganic or as a constituent of biological materials. Therefore, a methodology for nitrogen measurement in amine groups such as the Kjeldahl method is extremely important in determining the protein content in grains, meats, and other human or animal foodstuffs. In addition to amines, others like esters and hydroxyl functional groups can also be determined. In addition, inorganic compounds such as carbonates, ammonium salts and several other NOx species can be determined.

Fields of Application

- Acid content in wine, milk, ketchup, fruit juice (etc)
- Content of HCl, HNO_3, H_2SO_4, NaOH, KOH
- Alkalinity determination in water
- TAN and TBN in petroleum products, edible or inedible oils and fats
- Determination of boric acid in cooling fluids of nuclear power stations
- Determination of free or total acidity in plating baths
- Determination of active ingredients in drugs or raw materials for the pharmaceutical industry
- Total nitrogen determination by Kjeldahl
- Wide range of inorganic, organic or biological species that possess inherent acidic or basic properties
- Use of chemical treatment that converts an analyte to an acid or base followed by titration with standardised strong acid or base

Oxidation/Reduction Titrations

These titrations may be performed manually or potentiometrically. In manual titrations, if indicators are used, they change colour upon being oxidized or reduced, independently of the chemical nature of the titrant or analyte. Instead, they depend on changes in the electropotential of the oxidation reduction system. Examples of such indicators include:

- Iron (III) complexes of orthophenothrolines
- Starch solutions
- Potassium thiocyanate

The principle of this type of titration involves a reaction between an oxidising and reducing pair, e.g. titration of iron (II) with cerium (IV) sulphate

- Oxidising agents (examples)
  - Iodine (Iodometry), potassium dichromate, potassium permanganate, potassium bromate, cerium (IV) ammonium nitrate, cerium (IV) ammonium sulphate, cerium (IV) hydrogen sulphate, cerium hydroxide, chlorine
- Reducing agents (examples)
  - Sodium thiosulphate, oxalic acid, iron ammonium (II) sulphate (Mohr's salt), hydrogen peroxide, phenylarsine oxide (PAO), iron (II) ethylene diamine sulphate

Fields of Application

- *Environment*
  - COD of water
  - Oxidation capacity of water by permanganate.
- *Food and beverage*
  - Determination of free and total SO_2 in water, wine, alcohol, dried fruit etc.

- *Pharmaceuticals*
  - Vitamin C determination.
  - Surface treatment
  - Titration of copper or tin using iodine.
  - Titration of chromium (VI)
- *Petrochemicals*
  - Determination of water in hydrocarbons

Complexometric Titrations

Complexometric reactions have many applications in chemical analysis and in science in general. Their use in titrometry is a very important one of these applications. The reaction end point is detected either potentiometrically or manually using an indicator, whereby, a metal ion reacts appropriately with a ligand to form a complex. EDTA is the most widely used titrant in complexometric reactions although the use of other chemicals similar to EDTA are described in the literature; e.g. nitrilotriacetic acid. Generally, organic dyes that form complexes with metal ions to form chelates are used as indicators, a commonly used one being Eriochrome Black T. Methods have been developed, validated and published for detection or quantification of almost every metal in the periodic table with the exception of the Alkalii metals using EDTA complexation. This includes methods for at least 40 metals developed in our metals laboratory in Reagecon, with more at development or validation stage.

This methodology is regularly used to determine the concentration of divalent cations such as calcium, magnesium, copper, lead, zinc, cadmium, aluminium

Fields of application

- *Environment*
  - Total hardness of water (Ca^{2+} and Mg^{2+}).
- *Surface treatment*
  - Determination of Cu^{2+}, Ni^{2+}, Pb^{2+}, Zn^{2+} in plating baths

Precipitation Titrations

This analytical methodology is based on reactions that yield compounds of limited solubility. There is not a very wide range of precipitating agents that can be used gainfully in titrometry and silver nitrate is by far the most important. These titrations, (also called argentometric titration) is where silver nitrate is used as the titrant. Silver nitrate can be used for determination of halides (Cl-, I-, Br-) and anions that behave like halides (SCN-, CN-, CNO-). It can also be used for determination of Mercaptans and organic materials that include Fatty Acids. Indicators typically used for precipitation titrations include sodium chromate, fluorescein and iron (III). A wide range of standardised silver nitrate titrants are available, some of which are standardised to specifically give a one to one equivalence with sodium chloride in various food stuffs.

Fields of Application

- *Environment*
  - Determination of chloride in water
- *Food and beverage*
  - Determination of chloride in many finished products (cooked meats, dairy products, etc.)
- *Precious metals*
  - Determination of silver
- *Pharmaceuticals*
  - Titration of halides

Analytical Volumetric Solutions

Description	Product No. 1L	Product No. 5L
Acetic acid 0.1M	CH20101	CH20105
Acetic acid 0.5M	CH20051	CH20055
Acetic acid 1.0M	CH21001	CH21005
Acetic acid 2.0M	CH22001	CH22005
Ammonia 0.1M	NH20101	NH20105
Ammonium Chloride 0.1M	NHCl011	
Ammonium Hydroxide 0.5M	NH2051	
Ammonium Hydroxide 6M	NH32601	
Ammonium Iron (II)Sulphate 0.1M	NHS2011	
Ammonium sulphate 0.5M	AS2051	AS2055
Ammonium Thiocyanate 1.0M	AT21F	
Barium chloride 0.05M	BACL20051	BACL20055
Barium chloride 0.5M	BACL2051	BACL2055
Barium chloride 1.0M	BACL2101	BACL2105
Barium Perchlorate 0.005M Alcoholic Solution	BACLO200051	
Bromine (Bromate/bromide) 0.05M	BR20101	BR20105
Calcium acetate 1.0M	CAAC2101	CAAC2105
Calcium chloride 0.005M	CACL20051	CACL20055
Calcium chloride 0.01M	CACL20011	CACL20015
Calcium chloride 0.0125M	CACL2001251	CACL2001255
Calcium chloride 0.02M	CACL20021	CACL20025
Calcium chloride 0.5M	CACL2051	CACL2055
Calcium Chloride 1.0M	CACL101	
Cerium IV sulphate 0.05M	CS20051	CS20055
Cerium IV sulphate 0.1M	CS2011	CS2015
Cerium IV sulphate 0.2M	CS20251	CS20255
Cerium IV sulphate 1.0M	CS2101	CS2105
Citric Acid 1.0M	CH2101	
Copper II Chloride 0.5M	CUCL2051	CUCL2055
Copper II sulphate 0.1M	CUS02011	CUS02015
Copper II sulphate 0.5M	CUS02051	CUS02055
Cupric solution 0.168M	CU201681	CU201685
Di-Potassium Oxalate 0.05M	KO20051	KO20055
EDTA (DiSodium salt) 0.01M	ED20011	ED20015
EDTA (DiSodium salt) 0.02M	ED20021	
EDTA (DiSodium Salt) 0.027M	EDB200271	
EDTA (DiSodium salt) 0.05M	ED20051	
EDTA (DiSodium salt) 0.1M	ED2011	ED2015
Hyamine 1622 -Benzethonium chloride 0.004M	HY0041	HY0045
Hyamine 1622 -Benzethonium chloride 0.04M	HY041	HY045
Hydrochoric Acid 0.01M	H20011	H20015
Hydrochoric Acid 0.02M	H20021	H20025
Hydrochloric Acid 0.027M	H200271	
Hydrochoric Acid 0.0357M	H2003571	H2003575
Hydrochoric Acid 0.05M	H20051	H20055
Hydrochoric Acid 0.1M	H20101	H20105
Hydrochoric Acid 0.2M	H20201	H20205
Hydrochloric Acid 0.233M		H202335
Hydrochoric Acid 0.25M	H20251	H20255
Hydrochoric Acid 0.357M	H203571	H203575
Hydrochloric Acid 0.5M	H20501	H20505
Hydrochloric Acid 1.0M	H21001	H21005
Hydrochloric Acid 1.8M		H21805
Hydrochloric Acid 2.0M	H22001	H22005
Hydrochloric Acid 3.57M	H23571	H23575
Hydrochloric Acid 3M	H23001	H23005
Hydrochloric Acid 4M		H24005
Hydrochloric Acid 5.0M	H25001	H25005
Hydrochloric Acid 6.0M	H26001	H26005

Analytical Volumetric Solutions

Description	Product No. 1L	Product No. 2.5L	Product No. 5L
Hydrofluoric Acid 0.05M	HF20051		HF20055
Iodine 0.005M	I20005F		
Iodine 0.02365M	I20023F		
Iodine 0.05M	I2005F	I2005W	
Iodine 0.5M	I2050F	I2050W	
Iron (II) Sulphate 0.1M	FES2011		
Iron (II) Sulphate 0.2M	FES2021		FES2025
Iron (III) Chloride 1.0M	FECL211		FECL215
Lactic Acid 0.1M	CH6011		
Lead (II) Acetate 0.05M	PBA20051		PBA20055
Lead (II) Acetate 0.5M	PBA2051		PBA2055
Lead (II) Nitrate 0.5M	PBN02051		PBNO2055
Lead Nitrate 0.01M	PB20011		
Lead Nitrate 0.1M	PB2011		
Lithium Methoxide 0.1M in Toluene/Methanol			
Magnesium Chloride 0.01M	MG20011		MG20015
Magnesium Chloride 0.1M	MG2011		MG2015
Magnesium Sulphate 0.09M	MS0091		
Magnesium Sulphate 0.1M	MGS02011		MGSO2015
Manganese (II) Chloride 0.05M	MNCL20051		MNCL20055
Manganese (II) Chloride 0.5M	MNCL2051		MNCL2055
Mercuric (II) Nitrate 0.05M	HGN20051		
Mercury (I) Nitrate 0.1M	HGN2011		HGN2015
Mercury (II) Nitrate 0.01M	HGN20011		HGN20015
Mercury (II) Nitrate 0.005M	HGN200051		HGN200055
Methanolic HCl 0.5M		MH2050	
Morpholine 0.5M in Methanol		MD2050	
Nickle (II) Chloride 0.05M	NICL20051		NICL20055
Nickle (II) Chloride 0.5M	NICL2051		NICL2055
Nitric Acid 0.01M	NO20011		
Nitric Acid 0.02M	NO20021		NO20025
Nitric Acid 0.1M	NO20101		NO20105
Nitric Acid 1.0M	NO21001		NO21005
Nitric Acid 2.0M	NO22001		NO22005
Nitric Acid 4.0M	NO24001		NO24005
Nitric Acid 6.0M	NO26001		
Nitric Acid 8.0N 8.0M	NO28001		NO28005
Oxalic Acid 0.025M	OA200251		OA200255
Oxalic Acid 0.05M	OA20051		OA20055
Oxalic Acid 0.1M	OA2011		
Oxalic Acid 0.5M	OA2051		OA2055
Perchloric Acid in 1.4 Dioxan	PD201F	PD201W	
Perchloric Acid in Acetic Acid 0.1M	P2010F	P2010W	
Perchloric Acid in Acetic Acid 0.5M	P2050F		
Phenylarsine Oxide 0.00564M	CH500561		
Phosphorous Tribromide 1M in Dichloromethane		PBR3DCM	
Potassium Biiodate 0.025N	HK2O0025F		
Potassium Biiodate 0.1N	HK2O01F		
Potassium Bromate/Bromide 0.0167M	KB20016F	KB20016W	
Potassium Bromide 0.5M	KBR205F		
Potassium Bromide 1M	KBR21F		
Potassium Chloride 0.01M	KCL20011		
Potassium Chloride 0.2M	KCL2021		KCL2025
Potassium Chloride 0.5M	KCL2051		
Potassium Chloride 1.0M	KCL2101		KCL2105
Potassium Dichromate 0.0167M	KC20016F	KC20016W	
Potassium Dichromate 0.02M	KC20021		
Potassium Dichromate 0.041M	KC20041F	KC20041W	
Potassium Dichromate 0.167M	KC2016F	KC2016W	
Potassium Dichromate 0.25M	KC20251		

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Description	Product No. 1L	Product No. 2.5L	Product No. 5L
Potassium Ferricyanide 0.1M	KFE2011		KFE2015
Potassium Hydrogen Phythalate 0.1M	PHP2011		PHP2015
Potassium Hydroxide 0.05M	KOH20051		KOH20055
Potassium Hydroxide 0.1M	KOH20101		KOH20105
Potassium Hydroxide 0.1M in Ethanol	ETKOH01F	ETKOH01W	
Potassium Hydroxide 0.1M in Methanol	MKOH01F	MKOH01W	
Potassium Hydroxide 0.223M			KOH202235
Potassium Hydroxide 0.23M			KOH20235
Potassium Hydroxide 0.5M	KOH20501		KOH20505
Potassium Hydroxide 0.5M in Ethanol	ETKOH05F	ETKOHO5W	
Potassium Hydroxide 0.5M in Methanol	MKOH205F	MKOH205W	
Potassium Hydroxide 1.0M	KOH21001		KOH21005
Potassium Hydroxide 1.0M in Ethanol	ETKOH1F	ETKOH1W	
Potassium Hydroxide 1.0M in Methanol	MKOH1F	MKOH1W	
Potassium Iodate 0.0147M		PI2008W	
Potassium Iodate 0.01667M		PI20016W	
Potassium Iodate 0.025M		PI20025W	
Potassium Iodate 0.05M		PI2005W	
Potassium Iodate/Iodide 0.00333M		PII2002W	
Potassium Iodide 0.1M	KI2011		KI2015
Potassium Iodide 1.0M	KI2101		KI2105
Potassium Iodide 3.0M	K12301		K12305
Potassium Methoxide 0.1M			
Potassium Permanganate 0.01M	PP2001F	PP2001W	
Potassium Permanganate 0.02M	PP2002F	PP2002W	
Potassium Permanganate 0.2M	PP2020F	PP2020W	
Potassium Thiocyanate 0.02M	KT2002F	KT2002W	
Potassium Thiocyanate 0.05M	KT2005F	KT2005W	
Potassium Thiocyanate 0.1M	KT201F	KT201W	
Potassium Thiocyanate 1.0M	KT210F	KT210W	
Silver Nitrate 0.0141M		N20014W	
Silver Nitrate 0.0192N	N20019F		
Silver Nitrate 0.025M	N20025F		
Silver Nitrate 0.0282M		N20028W	
Silver Nitrate 0.02M	N20020F	N20020W	
Silver Nitrate 0.05M	N20050F	N20050W	
Silver Nitrate 0.085M		N20085W	
Silver Nitrate 0.1709M	N201709F	N201709W	
Silver Nitrate 0.1M	N20100F	N20100W	N201005
Silver Nitrate 0.1M in Methanol	MN2010F		
Silver Nitrate 0.5M	N2050F		
Silver Nitrate 1.0M	N21000F	N21000W	
Silver Nitrate in Methanol 0.01M	MN20010F		
Sodium Acetate 0.2M	SA02F		
Sodium Acetate 2.0M L	SA2F		
Sodium acetate solution 0.3M	SA03MOLF1		
Sodium Arsenite 0.005M	SA200005F		
Sodium Arsenite 0.05M	SA2005F		
Sodium Arsenite 0.15M	SA2015F		
Sodium Arsenite 0.5M		SA2005W	
Sodium Carbonate 0.05M	SC20051		SC20055
Sodium Carbonate 0.5M	SC20501		SC20505
Sodium Chloride 0.05M	NACL20051		NACL20055
Sodium Chloride 0.1M	NACL2011		NACL2015
Sodium Chloride 1M	NACL2011		
Sodium Hydroxide (Low in carbonate) 0.1M	S20101LC		S20105LC
Sodium Hydroxide (Low in carbonate) 0.5M	S20501LC		S20505LC
Sodium Hydroxide (Low in carbonate) 1.0M	S21001LC		S21005LC

Analytical Volumetric Solutions

Description	Product No. 1L	Product No. 2.5L	Product No. 5L
Sodium Hydroxide 0.01M	S20011	S20015	
Sodium Hydroxide 0.02M	S20021	S20025	
Sodium Hydroxide 0.05M	S20051	S20055	SB200510
Sodium Hydroxide 0.111M	S20111	S20115	
Sodium Hydroxide 0.156M	S20011		
Sodium Hydroxide 0.1M	S20101	S20105	SB20110
Sodium Hydroxide 0.25M	S20251	S20255	
Sodium Hydroxide 0.2M	S20201	S20205	SB202010
Sodium Hydroxide 0.313M	S203131	S203135	
Sodium Hydroxide 0.35465M	S2035461	S2035465	
Sodium Hydroxide 0.5M	S20501	S20505	SB205010
Sodium Hydroxide 0.6M		S2065	
Sodium Hydroxide 1.0M	S21001	S21005	SB210010
Sodium Hydroxide 1.2M		SB21205	SB212010
Sodium Hydroxide 10M	S10001		
Sodium Hydroxide 2.0M	S22001	S22005	SB220010
Sodium Hydroxide 3.57M	S23571	S23575	SB235710
Sodium Hydroxide 4M	S24001		
Sodium Hydroxide 5.0M	S25001	S25005	SB250010
Sodium Hydroxide 6M	S26001		
Sodium Lauryl (Dodecyl) Sulphate 0.1M	SLS011		
Sodium Methoxide Titrant 0.5M in Methanol			
Sodium Nitrite 0.1M	NANO011		
Sodium Nitrite 0.2M	NANO021		
Sodium Nitrite 0.5M	NANO051	NANO055	
Sodium Nitrite 1M	NANO11		
Sodium Nitrite 4M	NANO41		
Sodium Oxalate 0.025M	NAC00251		
Sodium Oxalate 0.05M	NAX0051		
Sodium Thiocyanate 0.1M	NAT20101	NAT20105	
Sodium Thiocyanate 1.0M	NAT21001	NAT21005	
Sodium Thiosulphate 0.001M	T200011		
Sodium Thiosulphate 0.0125M	T2001251		
Sodium Thiosulphate 0.01M	T20011	T20015	TB200110
Sodium Thiosulphate 0.02M	T20021		
Sodium Thiosulphate 0.0551M	T2005511	T2005515	
Sodium Thiosulphate 0.05M	T20051	T20055	
Sodium Thiosulphate 0.1M	T20101	T20105	TB201010
Sodium Thiosulphate 1.0M	T21001	T21005	TB210010
Sodium Thiosuphate 2.0M	T22001		
Sulphuric Acid 0.005M	SU200051		
Sulphuric Acid 0.01M	SU20011	SU20015	
Sulphuric Acid 0.025M	SU200251		
Sulphuric Acid 0.0416M	SU2004161	SU2004165	
Sulphuric Acid 0.05M	SU20051	SU20055	
Sulphuric Acid 0.1275M	SU2012751	SU2012755	
Sulphuric Acid 0.128M		SU201285	
Sulphuric Acid 0.13M	SU20131	SU20135	
Sulphuric Acid 0.1M	SU20101	SU20105	
Sulphuric Acid 0.25M	SU20251	SU20255	SUB202510
Sulphuric Acid 0.319M	SU203191	SU203195	
Sulphuric Acid 0.5M	SU20501	SU20505	SUB205010
Sulphuric Acid 0.9M		SU2095	
Sulphuric Acid 1.0M	SU21001	SU21005	SUB210010
Sulphuric Acid 2.5M	SU22501	SU22505	SUB225010
Sulphuric Acid 5.0M	SU25001	SU25005	SUB250010

Analytical Volumetric Solutions

Description	Product No. 2.5L	Product No. 500ML
Tetra Butylammonium Fluoride 1M in THF CA 5% water soln-2.5L	TBAF125	
Tetra N Butyl Ammonium Hydroxide 0.02M in 50/50 Methanol/Propan-2-ol		TB002H
Tetra n Butyl Ammonium Hydroxide 0.1M in 50/50 Methanol/Propan-2-ol		TB010H
Tetra n Butyl Ammonium Hydroxide 0.5M in 50/50 methanol / Propan-2-ol		TB050H

Description	Product No. 1L	Product No. 5L
Zinc Chloride 0.01M	ZNCL20101	ZNCL20105
Zinc Chloride 0.5M	ZNCL20501	ZNCL20505
Zinc Sulphate 0.02M	ZS021	
Zinc Sulphate 0.05M	ZNS000501	ZNSO00505
Zinc Sulphate 0.1M	ZS011	ZNSO0105

Concentrated Volumetric Solutions

Each Ampoule is supplied in its own box, full instructions are printed on the box.

Description	Ampoule to make 1L
Acetic acid 1.0M	CHC101L
EDTA (DiSodium salt) 0.01M	EDC0011L
EDTA (DiSodium salt) 0.1M	EDC0101L
EDTA 0.05M	ETC0051L
Hydrochoric Acid 0.1M	HC0101L
Hydrochoric Acid 0.2M	HC0201L
Hydrochloric Acid 0.5N 0.5M	HC0501L
Hydrochloric Acid 1.0M	HC1001L
Iodine 0.005M	IC00051L
Iodine 0.05M	IC0051GL
Iodine 0.025M	IC025G1L
Potassium Chloride 0.01M	KCL0101L
Silver Nitrate 0.0282M	NC00281L
Silver Nitrate 0.1M	NC0101L
Ammonia 0.1M	NH4C011L
Ammonia 1.0M	NH4C101L
Ammonium Thiocyanate 0.1M	NHTC011L
Nitric Acid 1.0M	NOC101L
Oxalic Acid 0.05M	OA20051L
Potassium Permanganate 0.02M	PCO021GL
Sodium Hydroxide 0.1M	SC0101L
Sodium Hydroxide 0.5M	SC0501L
Sodium Hydroxide 1.0M	SC1001L
Sulphuric Acid 0.01M	SUC0011L
Sulphuric Acid 0.05M	SUC0051L
Sulphuric Acid 0.5M	SUC051L
Sodium Thiosulphate 0.0125M	TC00121L
Sodium Thiosulphate 0.1M	TC0101L

Indicator Solutions

Product No.	Description	Pack Size
ALRED01	Alizarine Red solution 125mls	125ml
ALREDH	Alizarine Red solution 500mls	500ml
AZVIO01	Azo Violet Indicator, 0.1% (w/v) Alcoholic Solution	125ml
1012602	Bromocresol Green - Methyl Red Mixed Indicator	100ml
BRCGM05	Bromocresol Green Indicator, 0.04% (w/v) in Methanol	500ml
BRCG0105	Bromocresol Green Indicator, 0.1% (w/v) Aqueous Solution	500ml
BRCGIPA0105	Bromocresol Green Indicator, 0.1% (w/v) in IPA	500ml
BRCG105	Bromocresol Green Indicator, 1% (w/v) Aqueous Solution	500ml
BRCG05	Bromocresol Green, 0.04%	500ml
BRPBB02M05	Bromocresol Purple - Bromothymol Blue Mixed Indicator 0.2% (w/v) in Methanol	500ml
BRP01M05	Bromocresol Purple Indicator, 0.1 % (w/w) in Methanol	500ml
BRP0105	Bromocresol Purple Indicator, 0.1% (w/v) Aqueous	500ml
BRP0405	Bromocresol Purple Indicator, 0.4% (w/v) Aqueous	500ml
BRP1M05	Bromocresol Purple Indicator, 1 % (w/w) in Methanol	500ml
BRP105	Bromocresol Purple Indicator, 1% (w/v) Aqueous	500ml
1012701	Bromocresol Purple, 0.04%	100ml
BRBPIPA05	Bromophenol Blue Indicator, 0.04% (w/v) in Isopropyl Alcohol	500ml
BRBP00505	Bromophenol Blue Indicator, 0.05% Aqueous	500ml
BRBP0105	Bromophenol Blue Indicator, 0.1% (w/v) Aqueous Solution	500ml
BRBPIPA0105	Bromophenol Blue Indicator, 0.1% (w/v) in Isopropyl Alcohol	500ml
BRBP0405	Bromophenol Blue Indicator, 0.4% Aqueous	500ml
BRBP0125	Bromophenol Blue, 0.04%	125ml
BRBP05	Bromophenol Blue, 0.04%	500ml
BRTH00205	Bromothymol Blue Indicator, 0.02% (w/v) Aqueous Solution	500ml
BRTHIPA00205	Bromothymol Blue Indicator, 0.02% (w/v) in Isopropyl Alcohol	500ml
BRTHIPA00405	Bromothymol Blue Indicator, 0.04% (w/v) in Isopropyl Alcohol	500ml
BRTH05	Bromothymol Blue, 0.04%	500ml
CALM00505	Calmagite Indicator, 0.05% (w/v) Aqueous Solution	500ml
CALM0105	Calmagite Indicator, 0.1% (w/v) Aqueous Solution	500ml
CALM0605	Calmagite Indicator, 0.6% (w/v) Aqueous Solution	500ml
CALM105	Calmagite Indicator, 1%	500ml
CAUB0105	Caustic Blue Indicator, 0.1% (w/v) Aqueous Solution	500ml
CPR05	Chlorophenol Red, 0.04%	500ml
COR105	Congo Red 0.1%	500ml
COR1005	Congo Red Indicator, 1% (w/v) Aqueous Solution	500ml
CRER0405	Cresol Red Indicator, 0.04% (w/v) Aqueous	500ml
CRER205	Cresol Red Indicator, 0.2% (w/v) Aqueous	500ml
CVSOLN011	Crystal Violet Indicator, 0.1% (w/v) in Glacial Acetic Acid, for Nonaqueous Titrations	100ml
CVSOLN021	Crystal Violet Indicator, 0.2% (w/v) in Glacial Acetic Acid, for Nonaqueous Titrations	100ml
CVSOLN1	Crystal Violet solution 1% in Glacial Acetic Acid	100ml
1022901	Crystal Violet, 0.1% (Non-aqueous indicator)	100ml
DPC05	Diphenylcarbazone 0.1%	500ml
DPCBRBP05	Diphenylcarbazone-Bromophenol Blue Mixed Indicator	500ml
EOW00051	Eosin Y TS, 0.5% (w/v) Aqueous Solution, Adsorption Indicator for Argentometric Titrations	1L
EOW0011	Eosin Y 1% (w/v) Aqueous Solution, Adsorption Indicator	1L
EBB05	Erichrome Blue Black R	500ml
EBTT05	Eriochrome Black T Indicator in Triethanolamine, Water Hardness Indicator	500ml
EBTNACL105	Eriochrome Black T Indicator, 1% (w/w) in Sodium Chloride	500ml
EBTNACL0205	Eriochrome Blue Black R Indicator, 0.2% (w/w) in Sodium Chloride	500ml
ETVI01M05	Ethyl Violet Indicator, 0.1% w/v in 50% Methanol	500ml

Product No.	Description	Pack Size
FS0101	Fehlings solution No. 1	1L
FS0102	Fehlings solution No. 2	1L
FEALI1	Ferric Alum Indicator Solution	1
1037702	Ferric Ammonium Sulfate	1L
PFS1	Ferroin Indicator	100ml
FEI0011	Ferroin Indicator, 0.01 Molar	1L
FEI00251	Ferroin Indicator, 0.025 Molar	1L
TB04F	Indicator Thymol Blue Alcoholic Sol. 0.04%	500ml
INDCA05	Indigo Carmine Indicator	500ml
FEA25	Iron Alum (Volhard)	250ml
MGI00505	Malachite Green Indicator, 0.05% (w/v) Aqueous Solution	500ml
MBTHI00505	MBTH Indicator, 0.05%	500ml
MBTHI0505	MBTH Indicator, 0.5% (w/v) Aqueous Solution	500ml
MCP00405	m-Cresol Purple Indicator, 0.04% (w/v) Aqueous	500ml
MCP0105	m-Cresol Purple Indicator, 0.1% (w/v) Aqueous	500ml
MCP05	m-Cresol Purple, 0.4%	500ml
MTPSI01	Metalphthalein-Screened Indicator RS	100ml
MOXCI05	Methyl Orange - Xylene Cyanol Indicator Solution	500ml
MTR05025	Methyl Orange Indicator Alcoholic solution 0.1%	250ml
M004F	Methyl Orange Indicator, 0.04% Aqueous Solution	500ml
MPRIPA1505	Methyl Purple Indicator, in dilute IPA (15% v/v)	500ml
MTR06025	Methyl Red Alcoholic solution 0.1%	250ml
1055102	Methyl Red Alcoholic solution 0.02%	100ml
TASHI025	Methyl Red- Methylene Blue Indicator	250ml
1055102	Methyl Red, 0.02%	100ml
MTBLU0050250	Methylene Blue, 0.05%	250ml
MTBLU010250	Methylene Blue, 0.1%	250ml
MTBLU10250	Methylene Blue, 1%	250ml
PR045	Phenol Red Indicator, 0.04% (w/v) Aqueous Solution	500ml
PR105	Phenol Red Indicator, 0.1% (w/v) Aqueous	500ml
PR505	Phenol Red Indicator, 0.5% (w/v) Aqueous Solution	500ml
PR1005	Phenol Red Indicator, 1% (w/v) Aqueous Solution	500ml
1063601	Phenol Red, 0.02%	100ml
IPT01H	Phenolphthalein indicator, 0.1%	500ml
IPT05H	Phenolphthalein Indicator, 0.5%	500ml
IPT1025	Phenolphthalein indicator, 1%	250ml
IPT10H	Phenolphthalein indicator, 1%	500ml
IPT16W	Phenolphthalein indicator, 1.6%	2.5L
PCS5	Potassium chromate, 5%	500ml
MOS05	Screened Methyl Orange Alcoholic solution 0.1%	500ml
ST105	Starch Indicator 1%	500ml
ST205	Starch Indicator 2%	500ml
ST0055	Starch Indicator, 0.05% (w/v)	500ml
ST0205	Starch Indicator, 0.2% (w/v) Aqueous Solution	500ml
ST0255	Starch Indicator, 0.25% (w/v) Aqueous Solution	500ml
ST0305	Starch Indicator, 0.3% (w/v)	500ml
ST0505	Starch Indicator, 0.5% (w/v)	500ml
ST0505P	Starch Indicator, with 0.5% Potassium Iodide	500ml
ST505P	Starch Indicator, with 5% Potassium Iodide	500ml
SO0405	Sulfo Orange, 0.04%	500ml
SO405	Sulfo Orange, 0.4%	500ml
SO0105	Sulfo Orange, 0.1% (w/v) (Tropaeolin O) Aqueous Solution	500ml
1090701	Thymolphthalein Indicator, 0.05% (w/v) in 90% (v/v) Alcohol	100ml
1090701	Thymolphthalein, 0.05%	100ml
UN1005	Universal Indicator solution	50ml
VANG5H	Van Gieson Stain 500ml	500ml
WHI05	Water Hardness Indicator	500ml