

Reagents for Analytical Chemistry



- Listed products are intended for laboratory research use only, and not to be used for drug, food or human use.
- This brochure may contain products that cannot be exported to your country due to regulations.
- Bulk quote requests for some products are welcome. Please contact us.

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Reagents for Titration

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Prepared Reagents for Volumetric Analysis (Normal Solution)
 Reference Materials for Volumetric Analysis
 Indicators
 Standard Buffer Solution
 Reagents for Electrode
 Reagents for Colloidal Titration
 Reagents for Non-aqueous Titration
 TraceSure
 JCSS
 Karl Fischer Reagents [Mitsubishi Chemical Corp.]

Prepared Reagents for Volumetric Analysis (Normal Solution)

Reference Materials for Volumetric Analysis

TraceSure Series are certified reference materials that have obtained ASNITE (Accreditation System of National Institute of Technology and Evaluation) (Guide 34) at Wako from International Accreditation Japan (IAJapan) by the Accreditation Program.

Indicators

Highly versatile indicators and indicator solutions are readily available, centering around titration indicators listed in JIS K8001.

Standard Buffer Solutions

Wako has been qualified as an institution for calibration (licensed trader) of standard pH solutions, standard metal solutions and standard ion solutions by the Minister of Economy, Trade and Industry and offers the standard solutions traceable according to the National Metrology Standard. These products are provided with a calibration certificate marked with JCSS to certify that it is traceable according to the National Metrology Standard and, at the same time, attests to the supply of accurate and highly reliable reagent.

Reagents for Electrode

In potentiometric titration, polarographic method, controlled-potential electrolysis, pH measurement (by glass electrode), etc., calomel electrodes, silver-silverchloride electrodes, and other electrodes are used for reference electrodes. As the electrolyte solution of reference electrodes such as calomelectrodes, silver-silver chloride electrodes, etc., a potassium chloride solution of a predetermined concentration is used. In addition, the potassium chloride solution is used for the electrode preservation solution, too.

Reagents for Colloidal Titration

The colloidal titration method is titrimetry for simply determine the polymer electrolyte by titration. In general, colloids having positive or negative electric charges stoichiometrically react with colloids having opposite electric charges and form a sparingly water-soluble precipitation. In the event that the positive colloid is determined by the use of this principle, the solution is titrated with the normal solution of potassium polyvinyl sulfate (PVSK) having a negative electric charge. Toluidine blue of the indicator is a basic dyestuff having -NH₂ and is not absorbed by the positive colloid, showing an original blue color, but when it encounters with a negative colloid, toluidine blue is immediately absorbed and assumes a red-purple color. The equivalent point of the reaction is, therefore, able to be simply and highly accurately detected.

Reagents for Non-aqueous Titration

In the event that an acid and a base are too weak to be titrated in an aqueous solution, they are titrated in an appropriate nonaqueous solvent.

A wide range of solvents, standard solutions, and indicators are lined up for nonaqueous titration.

TraceSure

TraceSure Series product is the certificated reference material which has acquired a certificate of reference material producer by ASNITE certification program of National Institute of Technology and Evaluation, IAJapan. The certificate with the uncertainty of proof of the reliability is attached to each product.

JCSS

Wako has been qualified as an institution for calibration (licensed trader) of standard pH solutions, standard metal solutions and standard ion solutions by the Minister of Economy, Trade and Industry and offers the standard solutions traceable according to the National Metrology Standard. These products are provided with a calibration certificate marked with JCSS to certify that it is traceable according to the National Metrology Standard and, at the same time, attests to the supply of accurate and highly reliable reagent.

Karl Fischer Reagents [Mitsubishi Chemical Corp.]

Karl Fisher method uses Karl Fischer reagent, which reacts quantitatively and selectively with water, to measure moisture content. Karl Fischer reagent consists of iodine, sulfur dioxide, a base and a solvent, such as alcohols. This method can be used in both coulometric and volumetric titration systems.

Reagents for Metal Analysis

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Reagents for Atomic Absorption Spectrochemical Analysis
 Standard Metal Solutions
 Multielement Standard Solutions for ICP Analysis
 Reagents for Analysis of Poisonous Metals

Reagents for Atomic Absorption Spectrochemical Analysis

Atomic absorption spectrochemical analysis is used for determination of trace metals. Because of high sensitivity, high selectivity, and easy operation, atomic absorption spectrochemical analysis is an important analysis method of heavy metals in water, soil, and biological samples.

As reagents used for atomic absorption spectrochemical analysis, high-quality pretreatment reagents of acids, alkalis, etc. and metal standard solutions with extremely little content of heavy metal impurities are readily available.

Standard Metal Solutions

Wako has been qualified as an institution for calibration (licensed trader) of standard pH solutions, standard metal solutions and standard ion solutions by the Minister of Economy, Trade and Industry and offers the standard solutions traceable according to the National Metrology Standard. This product is provided with a calibration certificate marked with JCSS to certify that it is traceable according to the National Metrology Standard and, at the same time, attests to the supply of accurate and highly reliable reagent.

Multielement Standard Solutions for ICP Analysis

These products are mixed reference standards for trace elements analysis by ICP (Inductively Coupled Plasma).

Reagents for Analysis of Poisonous Metals

Hg, Cd, Pb, As and other poisonous metals as environmental pollutants are measured at the ppb level by increased sensitivity of atomic absorption spectrometer, ICP emission spectral analysis/ICP mass spectroscope, etc. Reagents for analysis of poisonous metals are reagent with impurity metal content reduced to the maximum as reagents which are measured against these poisonous metals.

Highly-Pure Solvents / Acids

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Super Special Grade Reagents (S.S.G.)
 Reagents for Ultratrace Analysis
 Highly-Pure Reagents for Electronic Industries
 Infinity Pure Series (∞Pure)

Super Special Grade Reagents (S.S.G.)

Super special grade (S.S.G.) reagents are reagents with the highest quality standard guaranteed for which specification parameters and specification values of JIS special grade or higher are specified.

Reagents for Ultratrace Analysis

■ Each product guarantees the content of various metallic impurities at the ppt level.

■ In order to maintain the ppt-level quality for using fluororesin (PFA) containers (extra-pure water uses high-density polyethylene containers), PFA containers thoroughly cleaned before filling is used.

■ Double plastic bag packing used: Because single plastic bag (inside) packing is performed in the clean room, the reagents are able to be carried into the clean room as it is.

■ Inspection report attached: Impurity metal analysis by ICP-MS and FL-AAS is performed, and the analysis results are attached to the product.

Highly-Pure Reagents for Electronic Industries

High-purity organic solvents and acids for electronic industry.

They are applicable to semiconductor field and have low contents of particles and metal impurities.

Infinity Pure Series (∞Pure)

Infinity Pure is a series of reagents characterized by the highest quality and small packaging unit (100 mL). The reagents, particularly those in the biochemical fields such as gene engineering, immunology and cell biology, are required to be highly purified with little secondary contamination after opening the package. This product is available in the package of 100 mL minimizing unused waste and it is a personal reagent with a space for recording the opening date, user name, etc. in the label.

Reagents for NMR

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Shift Reagents
 Internal Standard Reference Materials
 NMR Test Tubes

Shift Reagents

Shift reagents improve separation of signals making the best of the properties that the NMR peak positions are shifted. Adding these reagents can separate signals and facilitate the analysis.

Internal Standard Reference Materials

This is an internal standard reference material added to the NMR solvent when NMR is measured and is used for determining the shift positions of other peaks.

NMR Test Tubes

NMR test tubes are high-quality reasonable NMR glass tubes. There are S (standard) type used for the routine and HG (high-grade) type with smaller outside diameter and suited for measurement in the high-frequency region. In addition, the total tube length is available in two sizes, 7 inches and 8 inches, so that the tubes can be chosen to fit to measurement instruments used.

Wetting Tension Test Mixtures

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Wetting tension test mixtures are used for plastics -films and sheets- in order to test the wetting tension. It is prescribed in JIS K6768.

CSK Standard Solutions for Analysis for Nutrient Salts in Seawater 26

Each solution is a standard solution prepared in response to the request from the International Cooperative Study of the Kuroshio and Adjacent Regions (CSK). CSK standard solutions were shared marine samples prepared to achieve the integrity of analysis of nutrient salts in seawater. No preservative is contained but the solutions are sterilized.

NMIJ Certified Reference Materials (NMIJ CRM)

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NMIJ CRM is certified reference material supplied by NMIJ (National Metrology Institute of Japan). It is a reference material with the weighing traceability established, and determines the production by the Quality System in accordance with ISO Guide 34 and the certified value based on ISO Guide 35.
 Certified Reference Material (CRM): A certified reference material valued by a metrologically adequate procedure with respect to one or more prescribed properties, and having a certification with the values of prescribed properties and their uncertainties, as well as metrological traceability stipulated.
 Reference Material (RM): Material prepared to be sufficiently homogeneous and stable for one or more prescribed properties and to be suited for the intended use of the measurement process.

Reagents for Titration

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Acephate Reference Material TraceSure	100 mg	010-23681
Acetic Acid for Non-aqueous Titration	500 mL	012-08285
1 mol/L Acetic Acid for Volumetric Analysis	500 mL	013-18845
0.1 mol/L Acetic Acid for Volumetric Analysis	500 mL	016-18835
Aluminium Standard Solution (Al 1,000 mg/L) JCSS	100 mL	016-15471
Aluminium Standard Solution (Al 100 mg/L) JCSS	100 mL	016-18271
Aluminium Standard Stock Solution (Al 1,000 mg/L) for JP General Tests	100 mL	019-23911
Amidosulfuric Acid TraceSure	50 g	015-23371
Ammonium Ion Standard Solution (NH₄⁺ 1,000 mg/L) JCSS	50 mL	019-15461
0.1 mol/L Ammonium Thiocyanate Solution for Volumetric Analysis	500 mL	019-03555
Anilofos Reference Material TraceSure	100 mg	013-23671
Anion Mixture Standard Solution 1 JCSS	50 mL	019-24011
Antimony Standard Solution (Sb 1,000 mg/L) JCSS	100 mL	010-15491
Antimony Standard Solution (Sb 100 mg/L) JCSS	100 mL	013-18281
Aquamicon® AKX Karl Fischer Reagent	AKX 500 mL	Only to Asia 605-07591
Aquamicon® Solvent CM Karl Fischer Reagent	GCM 500 mL	Only to Asia 603-07075
Aquamicon® Solvent CP Karl Fischer Reagent	GCP 500 mL	Only to Asia 604-07245
Aquamicon® Solvent FM Karl Fischer Reagent	GFM 500 mL	Only to Asia 607-07095
Aquamicon® Solvent GEX Karl Fischer Reagent	GEX 500 mL	Only to Asia 608-07525
Aquamicon® Solvent KTX Karl Fischer Reagent	KTX 500 mL	Only to Asia 632-03545
Aquamicon® Solvent ME Karl Fischer Reagent	GME 500 mL	Only to Asia 607-07115
Aquamicon® Solvent ML Karl Fischer Reagent	GML 500 mL	Only to Asia 600-07085
Aquamicon® Solvent MS Karl Fischer Reagent	GMS 500 mL	Only to Asia 604-07125
Aquamicon® Solvent OLII Karl Fischer Reagent	OL2 500 mL	Only to Asia 605-07535
Aquamicon® Solvent OLX Karl Fischer Reagent	OLX 500 mL	Only to Asia 635-03535
Aquamicon® Solvent PE Karl Fischer Reagent	GPE 500 mL	Only to Asia 606-07065
Aquamicon® Solvent PP Karl Fischer Reagent	GPP 500 mL	Only to Asia 600-07105
Aquamicon® Solvent SU Karl Fischer Reagent	SSU 500 mL	Only to Asia 603-07335
Aquamicon® AS Karl Fischer Reagent	SAMA 500 mL	Only to Asia 601-07255
Aquamicon® AX Karl Fischer Reagent	XAMA 500 mL	Only to Asia 604-07485
Aquamicon® AX01 Karl Fischer Reagent	XAMA01 100 mL	Only to Asia 633-07051

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Aquamicon® Check Solution P Karl Fischer Reagent	GCHP 100 mL	Only to Asia 609-07511
Aquamicon® CXU Karl Fischer Reagent	CXU 5mL × 10	Only to Asia 602-07501
Aquamicon® FLS Karl Fischer Reagent	FLS 500 mL	Only to Asia 632-07065
Aquamicon® Solid Water Standard Karl Fischer Reagent	SWS 10 g	Only to Asia 637-07071
Aquamicon® Standard Water Methanol Solution 2mg Karl Fischer Reagent	GMW20 250 mL	Only to Asia 600-07041
Aquamicon® Titrant SS 10 mg (Karl Fischer Reagent SS) Karl Fischer Reagent	GKS100M 500 mL	Only to Asia 603-07215
Aquamicon® Titrant SS 1mg (Karl Fischer Reagent SS) Karl Fischer Reagent	GKS10M 500 mL	Only to Asia 608-07025
Aquamicon® Titrant SS 3mg (Karl Fischer Reagent SS) Karl Fischer Reagent	GKS30M 500 mL	Only to Asia 601-07015
Aquamicon® Titrant SS-Z 1mg (Karl Fischer Reagent SS-Z) Karl Fischer Reagent	SSZ10M 500 mL	Only to Asia 631-03495
Aquamicon® Titrant SS-Z 3mg (Karl Fischer Reagent SS-Z) Karl Fischer Reagent	SSZ30M 500 mL	Only to Asia 634-03505
Aquamicon® Titrant SS-Z 5mg (Karl Fischer Reagent SS-Z) Karl Fischer Reagent	SSZ50L 1 L	Only to Asia 636-03521
Aquamicon® Titrant SS-Z 5mg (Karl Fischer Reagent SS-Z) Karl Fischer Reagent	SSZ50M 500 mL	Only to Asia 631-03515
Aquamicon® Water Standard 0.1mg Karl Fischer Reagent	AWS01 5mL × 10	Only to Asia 639-15101
Aquamicon® Water Standard 0.2mg Karl Fischer Reagent	AWS02 5mL × 10	Only to Asia 604-07561
Aquamicon® Water Standard 10 mg Karl Fischer Reagent	AWS100 8mL × 10	Only to Asia 608-07581
Aquamicon® Water Standard 1mg Karl Fischer Reagent	AWS10 5mL × 10	Only to Asia 601-07571
Arsenic Standard Solution (As 1,000 mg/L) JCSS	100 mL	013-15481
Arsenic Standard Solution (As 100 mg/L) JCSS	100 mL	013-15501
Asulam Reference Material TraceSure	100 mg	016-23661
Atrazine Reference Material TraceSure	100 mg	019-23651
0.2 w/v% Azoviolet Benzene Solution for Non-aqueous Titration	50 mL	015-07371
Barium Standard Solution (Ba 1,000 mg/L) JCSS	100 mL	027-15321
Bensulfuron-methyl Reference Material TraceSure	100 mg	024-17271
Bensulide Reference Material TraceSure	100 mg	021-17301
Bentazone Reference Material TraceSure	100 mg	025-17681
Benthocarb Reference Material TraceSure	100 mg	023-17241
Bethrodine Reference Material TraceSure	100 mg	028-17291
Bifenox Reference Material TraceSure	100 mg	027-17261
Bifenthrin Reference Material TraceSure	100 mg	021-17661
4,4'-Bis(4-amino-1-naphthylazo)-2,2'-stilbenedisulfonic Acid [Indicator] for Indicator	5 g	021-14481
4,4'-Bis(4-amino-1-naphthylazo)-2,2'-stilbenedisulfonic Acid [Indicator] for Indicator	25 g	029-14482

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Bismuth Standard Solution (Bi 1,000 mg/L) JCSS	100 mL	021-12661
Bismuth Standard Solution (Bi 100 mg/L) JCSS	100 mL	023-14201
Boron Standard Solution (B 1,000 mg/L) JCSS	100 mL	025-16581
BPMC Reference Material TraceSure	100 mg	020-17251
Bromide Ion Standard Solution (Br⁻ 1,000 mg/L) JCSS	50 mL	024-15331
0.05 mol/L Bromine Solution for Volumetric Analysis	500 mL	022-14455
0.1 w/v% Bromocresol Green Ethanol (50) Solution [Indicator] for Titration	100 mL	022-14553
Bromocresol Green-Methyl Red Ethanol Solution [Indicator] for Titration	100 mL	026-14573
Bromocresol Green-Methyl Red Ethanol Solution [Indicator] for Titration	500 mL	022-14575
0.1 w/v% Bromophenol Blue Ethanol (50) Solution [Indicator] for Neutralization Titration	100 mL	026-11413
0.1 w/v% Bromophenol Blue Ethanol (50) Solution [Indicator] for Neutralization Titration	500 mL	022-11415
0.1 w/v% Bromothymol Blue Ethanol (50) Solution [Indicator] for Titration	100 mL	023-14603
0.1 w/v% Bromothymol Blue Ethanol (50) Solution [Indicator] for Titration	500 mL	029-14605
1,4-BTMSB-d4 Reference Material TraceSure	50 mg	exc. ASIA ※ 024-17031
1,4-BTMSB-d4 Reference Material TraceSure	50 mg × 4	exc. ASIA ※ 020-17033
Buffer Solution Standard (Phosphate pH Standard Equimolal Solution) pH6.86	500 mL	025-03195
Buffer Solution Standard (Phthalate pH Standard Solution) pH4.01	500 mL	028-03185
Buffer Solution Standard (Tetraborate pH Standard Solution) pH9.18	500 mL	028-03205
Butamifos Reference Material TraceSure	100 mg	028-17671
Cadmium Standard Solution (Cd 1,000 mg/L) JCSS	100 mL	036-16171
Cadmium Standard Solution (Cd 100 mg/L) JCSS	100 mL	030-16211
Caffeine for JP General Tests	100 mg	032-20821
Calcium Chloride (for U-tube) for Water Determination	10 kg	036-00527
Calcium Chloride (for U-tube) for Water Determination	500 g	030-00525
Calcium Standard Solution (Ca 1,000 mg/L) JCSS	100 mL	039-16161
Calcium Standard Solution (Ca 100 mg/L) for JP General Tests	100 mL	033-22291
Calcium Standard Solution (Ca 100 mg/L) JCSS	100 mL	036-17891
Carbofuran Reference Material TraceSure	100 mg	037-22571
Carbonate pH Standard Solution (pH 10.01) JCSS	500 mL	037-16145
Carboxin Reference Material TraceSure	100 mg	031-23331
CAT Reference Material TraceSure	100 mg	030-22561

※exc. = except

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Cesium Standard Solution (Cs 1,000 mg/L) JCSS	100 mL	030-21341
Chlorfenapyr Reference Material TraceSure	100 mg	039-22531
Chlorfluazuron Reference Material TraceSure	100 mg	037-22071
Chloride Ion Standard Solution (Cl⁻ 1,000 mg/L) JCSS	50 mL	032-16151
Chloro IPC Reference Material TraceSure	100 mg	033-22551
Chloroneb Reference Material TraceSure	100 mg	036-22041
Chromium Standard Solution (Cr 1,000 mg/L) JCSS	100 mL	030-16191
Chromium Standard Solution (Cr 100 mg/L) JCSS	100 mL	037-16221
Clothianidin Reference Material TraceSure	100 mg	034-22581
CNP-amino Reference Material TraceSure	100 mg	036-22541
Cobalt Standard Solution (Co 1,000 mg/L) JCSS	100 mL	033-16181
Cobalt Standard Solution (Co 100 mg/L) JCSS	100 mL	039-17901
Copper Standard Solution (Cu 1,000 mg/L) JCSS	100 mL	033-16201
Copper Standard Solution (Cu 100 mg/L) JCSS	100 mL	034-16231
Copper Standard Stock Solution (Cu 1,000 mg/L) for JP General Tests	100 mL	036-22301
Coumaphos Reference Material TraceSure	100 mg	030-22061
1 w/v% Crystal Violet Acetic Acid Solution for Non-aqueous Titration	50 mL	031-07331
Cumyluron Reference Material TraceSure	100 mg	033-22051
Cymoxanil Reference Material TraceSure	100 mg	032-22521
Cyprodinil Reference Material TraceSure	100 mg	034-22081
Daminozide Reference Material TraceSure	100 mg	042-32451
DCMU Reference Material TraceSure	100 mg	049-31861
DEP Reference Material TraceSure	100 mg	041-31681
Diazinon Reference Material TraceSure	100 mg	040-31891
Diiflubenzuron Reference Material TraceSure	100 mg	043-31901
Dimepiperate Reference Material TraceSure	100 mg	043-31881
Dimethyl Sulfone Reference Material TraceSure	100 mg	exc. US ※ 048-33271
1,4-Dioxane for Non-aqueous Titration	500 mL	047-03755
0.025 mol/L Disodium Dihydrogen Ethylenediamine Tetraacetate Solution for Volumetric Analysis	500 mL	058-07005
0.2 mol/L Disodium Dihydrogen Ethylenediamine Tetraacetate Solution for Volumetric Analysis	500 mL	051-06995
Disodium Hydrogenphosphate for pH Standard Solution	500 g	195-05725

※exc. = except

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Dithiopyr Reference Material TraceSure	100 mg	046-31871
DSS-d6 Reference Material TraceSure	50 mg	exc. US ※ 044-31671
DSS-d6 Reference Material TraceSure	50 mg × 4	exc. US ※ 040-31673
Echlomezol Reference Material TraceSure	100 mg	057-08251
EPN Reference Material TraceSure	100 mg	050-08241
Esprocarb Reference Material TraceSure	100 mg	051-08271
Ethylthiometon Reference Material TraceSure	100 mg	053-08731
Etofenprox Reference Material TraceSure	100 mg	053-08231
Famoxadone Reference Material TraceSure	100 mg	066-05841
Flazasulfuron Reference Material TraceSure	100 mg	069-05831
Fludioxonil Reference Material TraceSure	100 mg	064-06001
Flufenoxuron Reference Material TraceSure	100 mg	062-05821
Fluoride Ion Standard Solution (F⁻ 1,000 mg/L) JCSS	50 mL	066-03401
Flusulfamide Reference Material TraceSure	100 mg	067-05991
Flutolanil Reference Material TraceSure	100 mg	065-05811
Fthalide Reference Material TraceSure	100 mg	061-06011
Gallium Standard Solution (Ga 1,000 mg/L) JCSS	100 mL	070-05781
Glycol Chitosan for Colloidal Titration	10 g	072-01581
Glycol Chitosan Titration Solution (N/200) for Colloidal Titration	500 mL	072-05045
Glyphosate Reference Material TraceSure	100 mg	071-05951
Gold Standard Stock Solution (Au 1,000 mg/L) for JP General Tests	100 mL	077-06031
0.02 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	084-02745
0.1 mol/L Hydrochloric Acid for Volumetric Analysis	3 L	087-01113
0.1 mol/L Hydrochloric Acid for Volumetric Analysis	100 mL	081-01111
0.1 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	083-01115
1 mol/L Hydrochloric Acid for Volumetric Analysis	3 L	087-01093
1 mol/L Hydrochloric Acid for Volumetric Analysis	100 mL	081-01091
1 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	083-01095
2 mol/L Hydrochloric Acid for Volumetric Analysis	100 mL	081-02711
2 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	083-02715
5 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	081-05435

※exc. = except

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
6 mol/L Hydrochloric Acid for Volumetric Analysis	100 mL	082-05421
6 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	084-05425
0.01 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	088-02265
0.05 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	087-02735
0.2 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	080-02725
0.5 mol/L Hydrochloric Acid for Volumetric Analysis	100 mL	084-01101
0.5 mol/L Hydrochloric Acid for Volumetric Analysis	500 mL	086-01105
0.05 mol/L Hydrochloric Acid for JP General Tests	500 mL	085-10105
1 mol/L Hydrochloric Acid [CRM] for JP General Tests	500 mL	080-10035
0.1 mol/L Hydrochloric Acid [CRM] for JP General Tests	500 mL	082-10095
2 mol/L Hydrochloric Acid [CRM] for JP General Tests	500 mL	083-10025
0.2 mol/L Hydrochloric Acid [CRM] for JP General Tests	500 mL	084-10055
0.5 mol/L Hydrochloric Acid [CRM] for JP General Tests	500 mL	087-10045
0.5 mol/L Hydrochloric Acid Methanolic Solution for Volumetric Analysis	500 mL	080-07725
Imazosulfuron Reference Material TraceSure	100 mg	092-06321
Indanofan Reference Material TraceSure	100 mg	094-06521
Indium Standard Solution (In 1,000 mg/L) JCSS	100 mL	092-05841
0.01 mol/L Iodine Solution for Volumetric Analysis	500 mL	094-03145
0.05 mol/L Iodine Solution for Volumetric Analysis	100 mL	099-00471
0.05 mol/L Iodine Solution for Volumetric Analysis	500 mL	091-00475
0.5 mol/L Iodine Solution for Volumetric Analysis	500 mL	094-01705
Iprodione Reference Material TraceSure	100 mg	095-06291
Iron Standard Solution (Fe 1,000 mg/L) JCSS	100 mL	094-03841
Iron Standard Solution (Fe 100 mg/L) JCSS	100 mL	091-03851
Isufenphos Reference Material TraceSure	100 mg	098-06541
Isoprothiolane Reference Material TraceSure	100 mg	098-06281
Isoxaben Reference Material TraceSure	100 mg	091-06531
Isoxathion Reference Material TraceSure	100 mg	095-06311
Lead Standard Solution (Pb 1,000 mg/L) JCSS	100 mL	124-04291
Lead Standard Solution (Pb 100 mg/L) JCSS	100 mL	127-04301
Lead Standard Stock Solution (Pb 100 mg/L) for JP General Tests	100 mL	122-06051

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Linuron Reference Material TraceSure	100 mg	124-06131
Lithium Standard Solution (Li 1,000 mg/L) JCSS	100 mL	129-05221
Lithium Tetraborate Anhydrous Wako Special Grade	25 g	129-03602
Lithium Tetraborate Anhydrous Wako Special Grade	500 g	123-03605
0.05 mol/L Magnesium Chloride Solution for Volumetric Analysis	500 mL	135-14215
Magnesium Standard Solution (Mg 1,000 mg/L) JCSS	100 mL	136-12121
Magnesium Standard Solution (Mg 100 mg/L) JCSS	100 mL	136-13601
Magnesium Standard Stock Solution (Mg 1,000 mg/L) for JP General Tests	100 mL	137-17151
Malathion Reference Material TraceSure	100 mg	133-16891
Maleic Acid Reference Material TraceSure	100 mg	exc. US ※ 135-17951
Maltose Hydrate for JP General Tests	100 mg	134-16321
Manganese Standard Solution (Mn 1,000 mg/L) JCSS	100 mL	133-12131
Manganese Standard Solution (Mn 100 mg/L) JCSS	100 mL	139-12111
MCP Reference Material TraceSure	100 mg	135-16971
MCPP Reference Material TraceSure	100 mg	136-16901
Mefenacet Reference Material TraceSure	100 mg	130-16921
MEP Reference Material TraceSure	100 mg	133-16911
Mepronil Reference Material TraceSure	100 mg	134-16941
Metalaxyl Reference Material TraceSure	100 mg	137-16931
Methomyl Reference Material TraceSure	100 mg	132-17461
Methyl Dimethyldithiocarbamate Reference Material TraceSure	100 mg	132-17961
Methyl Glycol Chitosan for Colloidal Titration	10 g	134-04731
Methyl Glycol Chitosan Titration Solution (N/200) for Colloidal Titration	500 mL	137-14655
0.1 w/v% Methyl Orange Solution [Indicator] for Neutralization Titration	100 mL	132-10783
0.1 w/v% Methyl Orange Solution [Indicator] for Neutralization Titration	500 mL	138-10785
0.1 w/v% Methyl Red Ethanol Solution for Titration	100 mL	133-14113
0.1 w/v% Methyl Red Ethanol Solution for Titration	500 mL	139-14115
Methyl Red-Methylene Blue Ethanol Solution for Titration	100 mL	137-14133
Methyl Thioacetohydroxamate Reference Material TraceSure	100 mg	138-17441
MIPC Reference Material TraceSure	100 mg	139-17971
Molinate Reference Material TraceSure	100 mg	131-16951

※exc. = except

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Molybdenum Standard Solution (Mo 1,000 mg/L) JCSS	100 mL	130-14961
MPP Reference Material TraceSure	100 mg	135-17451
Myclobutanil Reference Material TraceSure	100 mg	138-16961
NAC Reference Material TraceSure	100 mg	144-09031
0.2 w/v% p-Naphtholbenzein, Acetic Acid Solution for Non-aqueous Titration	50 mL	147-03661
Napropamide Reference Material TraceSure	100 mg	144-09151
Nickel Standard Solution (Ni 1,000 mg/L) JCSS	100 mL	147-06461
Nickel Standard Solution (Ni 100 mg/L) JCSS	100 mL	144-06471
Nitrate Ion Standard Solution (NO₃⁻ 1,000 mg/L) JCSS	50 mL	143-06441
1 mol/L Nitric Acid for Volumetric Analysis	500 mL	148-03515
0.1 mol/L Nitric Acid for Volumetric Analysis	500 mL	141-01425
Nitrite Ion Standard Solution (NO₂⁻ 1,000 mg/L) JCSS	50 mL	140-06451
0.2 w/v% Nitrophenol Solution for Titration	100 mL	142-07393
Oxalate pH Standard Solution JCSS	500 mL	151-01845
0.0125 mol/L Oxalic Acid Solution for Volumetric Analysis	500 mL	153-02405
0.05 mol/L Oxalic Acid Solution for Volumetric Analysis	500 mL	154-00475
0.5 mol/L Oxalic Acid Solution for Volumetric Analysis	500 mL	157-00465
2,4-PA Reference Material TraceSure	100 mg	163-25101
PAP Reference Material TraceSure	100 mg	164-25491
Pendimethalin Reference Material TraceSure	100 mg	166-25071
0.1 mol/L Perchloric Acid (Acetic Acid Solution) (N/10) for Non-aqueous Titration	500 mL	161-07505
cis-Permethrin Reference Material TraceSure	100 mg	165-25161
trans-Permethrin Reference Material TraceSure	100 mg	162-25171
0.1 w/v% Phenolphthalein Ethanol(90) Solution for Titration	100 mL	166-20593
0.1 w/v% Phenolphthalein Ethanol(90) Solution for Titration	500 mL	162-20595
1.0 w/v% Phenolphthalein Ethanol(90) Solution for Neutralization Titration	100 mL	163-15733
1.0 w/v% Phenolphthalein Ethanol(90) Solution for Neutralization Titration	500 mL	169-15735
Phosalone Reference Material TraceSure	100 mg	160-25471
Phosphate Ion Standard Solution (PO₄³⁻ 1,000 mg/L) JCSS	50 mL	168-17461
Phosphate pH Standard Equimolal Solution JCSS	100 mL	163-12151
Phosphate pH Standard Equimolal Solution JCSS	500 mL	165-12155

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Phosphate pH Standard Solution JCSS	500 mL	166-17445
Phthalate pH Standard Solution JCSS	100 mL	166-12141
Phthalate pH Standard Solution JCSS	500 mL	168-12145
0.0025N Poly(diallyldimethylammonium Chloride) Solution for Colloidal Titration	500 mL	161-14695
1/60 mol/L Potassium Bromate Solution for Volumetric Analysis	500 mL	163-20765
Potassium Chloride Saturated Solution for Electrode	500 mL	166-20375
1 mol/L Potassium Chloride Solution for Electrode	500 mL	163-20405
3 mol/L Potassium Chloride Solution for Electrode	500 mL	160-20395
3.3 mol/L Potassium Chloride Solution for Electrode	500 mL	163-20385
3.3 mol/L Potassium Chloride Solution containing Silver Chloride for Electrode	500 mL	160-20415
Potassium Dichromate TraceSure	50 g	167-25001
1/6 mol/L Potassium Dichromate Solution (1N) for Volumetric Analysis	500 mL	162-07035
1/60 mol/L Potassium Dichromate Solution (N/10) for Volumetric Analysis	500 mL	160-03675
1/24 mol/L Potassium Dichromate Solution (N/4) for Volumetric Analysis	500 mL	169-14015
1/30 mol/L Potassium Dichromate Solution (N/5) for Volumetric Analysis	500 mL	166-14025
Potassium Dihydrogen Phosphate for pH Standard Solution	500 g	163-04265
Potassium Hydrogen Phthalate TraceSure	50 g	161-24661
Potassium Hydrogen Phthalate for pH Standard Solution	25 g	167-03842
Potassium Hydrogen Phthalate for pH Standard Solution	500 g	161-03845
0.1 mol/L Potassium Hydroxide 2-Propanolic Solution for Volumetric Analysis	500 mL	163-03925
0.1 mol/L Potassium Hydroxide Ethanolic Solution for Volumetric Analysis	500 mL	166-03915
0.5 mol/L Potassium Hydroxide Ethanolic Solution for Volumetric Analysis	500 mL	166-07055
0.05 mol/L Potassium Hydroxide Ethanolic Solution for Volumetric Analysis	500 mL	160-07075
1 mol/L Potassium Hydroxide Solution for Volumetric Analysis	500 mL	169-03885
8 mol/L Potassium Hydroxide Solution for Volumetric Analysis	500 mL	169-20365
0.1 mol/L Potassium Hydroxide Solution for Volumetric Analysis	500 mL	169-03905
0.5 mol/L Potassium Hydroxide Solution for Volumetric Analysis	500 mL	166-03895
Potassium Iodate TraceSure	50 g	160-24991
0.05 mol/L Potassium Iodate Solution for Volumetric Analysis	500 mL	161-20825
1/60 mol/L Potassium Iodate Solution for Volumetric Analysis	500 mL	162-20355
1/240 mol/L Potassium Iodate Solution for Volumetric Analysis	500 mL	168-20835

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
0.1 mol/L Potassium Methoxide, Benzene-Methanol Solution for Non-aqueous Titration	500 mL	168-07515
0.02 mol/L Potassium Permanganate Solution for Volumetric Analysis	500 mL	162-21195
0.2 mol/L Potassium Permanganate Solution (1N) for Volumetric Analysis	500 mL	167-07085
0.02 mol/L Potassium Permanganate Solution (N/10) for Volumetric Analysis	500 mL	168-04215
0.002 mol/L Potassium Permanganate Solution (N/100) for Volumetric Analysis	500 mL	164-14185
0.1 mol/L Potassium Permanganate Solution (N/2) for Volumetric Analysis	500 mL	164-07095
0.005 mol/L Potassium Permanganate Solution (N/40) for Volumetric Analysis	3 L	169-08221
0.005 mol/L Potassium Permanganate Solution (N/40) for Volumetric Analysis	500 mL	161-08225
0.04 mol/L Potassium Permanganate Solution (N/5) for Volumetric Analysis	500 mL	167-07105
Potassium Polyvinyl Sulfate for Colloidal Titration	10 g	162-03071
Potassium Polyvinyl Sulfate Titration Solution (N/400) for Colloidal Titration	500 mL	164-21655
Potassium Standard Solution (K 1,000 mg/L) JCSS	100 mL	165-17471
Potassium Standard Solution (K 100 mg/L) JCSS	100 mL	162-19941
Potassium Standard Stock Solution (K 5000 mg/L) for JP General Tests	100 mL	168-25271
0.1 mol/L Potassium Thiocyanate Solution (N/10) for Volumetric Analysis	500 mL	164-07115
Potassium Trihydrogen Dioxalate Dihydrate for pH Standard Solution	25 g	162-04132
Potassium Trihydrogen Dioxalate Dihydrate for pH Standard Solution	500 g	166-04135
Probenazole Reference Material TraceSure	100 mg	163-25081
Prochloraz Reference Material TraceSure	100 mg	164-25131
Procymidone Reference Material TraceSure	100 mg	162-25051
Profenofos Reference Material TraceSure	100 mg	168-26251
Propaphos Reference Material TraceSure	100 mg	167-25481
Propyzamide Reference Material TraceSure	100 mg	169-25061
Pyrazoxyfen Reference Material TraceSure	100 mg	166-25451
Pyributicarb Reference Material TraceSure	100 mg	160-25111
Pyridaphenthion Reference Material TraceSure	100 mg	160-25091
Pyrimethanil Reference Material TraceSure	100 mg	163-25461
Rubidium Standard Solution (Rb 1,000 mg/L) JCSS	100 mL	188-01951
Selenium Standard Solution (Se 1,000 mg/L) JCSS	100 mL	192-13861
Selenium Standard Stock Solution (Se 1,000 mg/L) for JP General Tests	100 mL	199-16431
Silafluofen Reference Material TraceSure	100 mg	198-16261

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Silicon Standard Solution for AAS	100 mL	192-06031
1 mol/L Silver Nitrate Solution (1N) for Volumetric Analysis	500 mL	198-05335
0.1 mol/L Silver Nitrate Solution (N/10) for Volumetric Analysis	100 mL	190-00851
0.1 mol/L Silver Nitrate Solution (N/10) for Volumetric Analysis	500 mL	192-00855
0.01 mol/L Silver Nitrate Solution (N/100) for Volumetric Analysis	500 mL	191-05185
0.02 mol/L Silver Nitrate Solution (N/50) for Volumetric Analysis	500 mL	196-09535
Silver Standard Stock Solution (Ag 1,000 mg/L) for JP General Tests	100 mL	196-16441
Simetryn Reference Material TraceSure	100 mg	191-16251
Sodium Carbonate TraceSure	50 g	190-16221
Sodium Carbonate for pH Standard Solution	500 g	199-01605
0.5 mol/L Sodium Carbonate Solution (1N) for Volumetric Analysis	500 mL	199-05365
0.05 mol/L Sodium Carbonate Solution (N/10) for Volumetric Analysis	500 mL	193-01625
0.25 mol/L Sodium Carbonate Solution (N/2) for Volumetric Analysis	500 mL	194-12525
Sodium Chloride TraceSure	50 g	191-17351
0.01 mol/L Sodium Chloride Solution for Volumetric Analysis	500 mL	198-12545
0.02 mol/L Sodium Chloride Solution for Volumetric Analysis	500 mL	195-12555
1 mol/L Sodium Chloride Solution (1N) for Volumetric Analysis	500 mL	192-05355
0.1 mol/L Sodium Chloride Solution (N/10) for Volumetric Analysis	500 mL	195-01685
0.05 mol/L Sodium Chloride Solution (N/20) for Volumetric Analysis	500 mL	195-05345
Sodium Hydrogen Carbonate for pH Standard Solution	500 g	195-01325
1 mol/L Sodium Hydroxide Solution (1N) for Volumetric Analysis	3 L	196-02173
1 mol/L Sodium Hydroxide Solution (1N) for Volumetric Analysis	100 mL	190-02171
1 mol/L Sodium Hydroxide Solution (1N) for Volumetric Analysis	500 mL	192-02175
1 mol/L Sodium Hydroxide Solution (1N) for Volumetric Analysis	500 mL	190-13085
2 mol/L Sodium Hydroxide Solution (2N) for Volumetric Analysis	100 mL	194-05631
2 mol/L Sodium Hydroxide Solution (2N) for Volumetric Analysis	500 mL	196-05635
4 mol/L Sodium Hydroxide Solution (4N) for Volumetric Analysis	500 mL	193-05385
5 mol/L Sodium Hydroxide Solution (5N) for Volumetric Analysis	100 mL	194-05371
5 mol/L Sodium Hydroxide Solution (5N) for Volumetric Analysis	500 mL	196-05375
8 mol/L Sodium Hydroxide Solution (8N) for Volumetric Analysis	500 mL	194-09575
0.1 mol/L Sodium Hydroxide Solution (N/10) for Volumetric Analysis	3 L	190-02193

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
0.1 mol/L Sodium Hydroxide Solution (N/10) for Volumetric Analysis	100 mL	194-02191
0.1 mol/L Sodium Hydroxide Solution (N/10) for Volumetric Analysis	500 mL	196-02195
0.1 mol/L Sodium Hydroxide Solution (N/10) for Volumetric Analysis	500 mL	197-13095
0.01 mol/L Sodium Hydroxide Solution (N/100) for Volumetric Analysis	500 mL	191-05205
0.5 mol/L Sodium Hydroxide Solution (N/2) for Volumetric Analysis	500 mL	199-02185
0.05 mol/L Sodium Hydroxide Solution (N/20) for Volumetric Analysis	500 mL	191-09585
0.2 mol/L Sodium Hydroxide Solution (N/5) for Volumetric Analysis	500 mL	190-05395
0.02 mol/L Sodium Hydroxide Solution (N/50) for Volumetric Analysis	500 mL	198-05195
0.5 mol/L Sodium Nitrite Solution for Volumetric Analysis	500 mL	192-12565
Sodium Oxalate TraceSure	50 g	192-15941
0.05 mol/L Sodium Oxalate Solution (N/10) for Volumetric Analysis	500 mL	190-05415
0.005 mol/L Sodium Oxalate Solution (N/100) for Volumetric Analysis	500 mL	192-10125
0.25 mol/L Sodium Oxalate Solution (N/2) for Volumetric Analysis	500 mL	199-12575
0.125 mol/L Sodium Oxalate Solution (N/4) for Volumetric Analysis	500 mL	196-12585
0.0125 mol/L Sodium Oxalate Solution (N/40) for Volumetric Analysis	3 L	197-07061
0.0125 mol/L Sodium Oxalate Solution (N/40) for Volumetric Analysis	10 L	195-07067
0.0125 mol/L Sodium Oxalate Solution (N/40) for Volumetric Analysis	500 mL	199-07065
Sodium Standard Solution (Na 1,000 mg/L) JCSS	100 mL	199-10831
Sodium Standard Solution (Na 100 mg/L) JCSS	100 mL	191-12111
Sodium Tetraborate Decahydrate for pH Standard Solution	500 g	198-01435
1 mol/L Sodium Thiosulfate Solution (1N) for Volumetric Analysis	500 mL	197-05425
0.1 mol/L Sodium Thiosulfate Solution (N/10) for Volumetric Analysis	3 L	195-03623
0.1 mol/L Sodium Thiosulfate Solution (N/10) for Volumetric Analysis	100 mL	199-03621
0.1 mol/L Sodium Thiosulfate Solution (N/10) for Volumetric Analysis	500 mL	191-03625
0.01 mol/L Sodium Thiosulfate Solution (N/100) for Volumetric Analysis	100 mL	196-05571
0.01 mol/L Sodium Thiosulfate Solution (N/100) for Volumetric Analysis	500 mL	198-05575
0.5 mol/L Sodium Thiosulfate Solution (N/2) for Volumetric Analysis	500 mL	191-11935
0.05 mol/L Sodium Thiosulfate Solution (N/20) for Volumetric Analysis	500 mL	192-09635
0.005 mol/L Sodium Thiosulfate Solution (N/200) for Volumetric Analysis	500 mL	197-06145
0.025 mol/L Sodium Thiosulfate Solution (N/40) for Volumetric Analysis	100 mL	198-08711
0.025 mol/L Sodium Thiosulfate Solution (N/40) for Volumetric Analysis	500 mL	190-08715

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
0.2 mol/L Sodium Thiosulfate Solution (N/5) for Volumetric Analysis	500 mL	193-12095
0.02 mol/L Sodium Thiosulfate Solution (N/50) for Volumetric Analysis	500 mL	191-05565
Strontium Standard Solution (Sr 1,000 mg/L) JCSS	100 mL	199-13871
Sulfate Ion Standard Solution (SO₄²⁻ 1,000 mg/L) JCSS	50 mL	192-10821
0.25 mol/L Sulfuric Acid [CRM] for JP General Tests	500 mL	190-17625
0.05 mol/L Sulfuric Acid [CRM] for JP General Tests	500 mL	193-17615
0.5 mol/L Sulfuric Acid [CRM] for JP General Tests	500 mL	196-17605
0.5 mol/L Sulfuric Acid (1N) for Volumetric Analysis	100 mL	190-04751
0.5 mol/L Sulfuric Acid (1N) for Volumetric Analysis	500 mL	192-04755
1 mol/L Sulfuric Acid (2N) for Volumetric Analysis	500 mL	198-09595
0.05 mol/L Sulfuric Acid (N/10) for Volumetric Analysis	3 L	190-04773
0.05 mol/L Sulfuric Acid (N/10) for Volumetric Analysis	100 mL	194-04771
0.05 mol/L Sulfuric Acid (N/10) for Volumetric Analysis	500 mL	196-04775
0.005 mol/L Sulfuric Acid (N/100) for Volumetric Analysis	500 mL	199-05245
0.25 mol/L Sulfuric Acid (N/2) for Volumetric Analysis	500 mL	199-04765
0.025 mol/L Sulfuric Acid (N/20) for Volumetric Analysis	500 mL	194-05435
0.1 mol/L Sulfuric Acid (N/5) for Volumetric Analysis	500 mL	191-05445
0.01 mol/L Sulfuric Acid (N/50) for Volumetric Analysis	500 mL	192-05235
Tebufenpyrad Reference Material TraceSure	100 mg	202-19091
Teflubenzuron Reference Material TraceSure	100 mg	202-18751
Tellurium Standard Solution (Te 1,000 mg/L) JCSS	100 mL	209-17921
0.1 mol/L Tetraammonium Cerium(IV) Sulfate Solution for Volumetric Analysis	500 mL	202-15635
Tetraborate pH Standard Solution JCSS	100 mL	203-08771
Tetraborate pH Standard Solution JCSS	500 mL	205-08775
10% Tetrabutylammonium Hydroxide Methanol Solution for Non-aqueous Titration	25 mL	205-14422
Tetraconazole Reference Material TraceSure	100 mg	205-19101
Thallium Standard Solution (Tl 1,000 mg/L) JCSS	100 mL	205-16301
Thiacloprid Reference Material TraceSure	100 mg	205-19081
Thiamethoxam Reference Material TraceSure	100 mg	201-19061
Thiophanate Reference Material TraceSure	100 mg	204-18711
Thiuram Reference Material TraceSure	100 mg	204-18691

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
0.1 w/v% Thymol Blue Ethanol (50) Solution for Neutralization Titration	500 mL	203-11765
0.1 w/v% Thymolphthalein, Ethanol Solution for Neutralization Titration	500 mL	200-11775
Tiadinil Reference Material TraceSure	100 mg	205-18741
Tin Standard Solution (Sn 1,000 mg/L) JCSS	100 mL	202-16311
Tolclofos-methyl Reference Material TraceSure	100 mg	208-19071
Toluidine Blue Indicator Solution for Colloidal Titration	50 mL	205-05811
Triadimefon Reference Material TraceSure	100 mg	201-18721
Tricyclazole Reference Material TraceSure	100 mg	202-19111
Trifloxystrobin Reference Material TraceSure	100 mg	208-18731
0.2 w/v% Uranine Solution for Titration	100 mL	218-01083
0.2 w/v% Uranine Solution for Titration	500 mL	214-01085
Vanadium Standard Solution (V 1,000 mg/L) JCSS	100 mL	221-01851
Vinclozolin Reference Material TraceSure	100 mg	220-01941
Warfarin Reference Material TraceSure	100 mg	236-02441
XMC Reference Material TraceSure	100 mg	249-00911
0.1 w/v% Xylenol Orange Solution for Titration	100 mL	244-00743
0.1 mol/L Zinc Acetate Solution (N/5) for Volumetric Analysis	500 mL	267-01575
0.01 mol/L Zinc Acetate Solution (N/50) for Volumetric Analysis	500 mL	260-01685
Zinc Standard Solution (Zn 1,000 mg/L) JCSS	100 mL	264-01421
Zinc Standard Solution (Zn 100 mg/L) JCSS	100 mL	261-01431
Zinc Standard Stock Solution (Zn 1,000 mg/L) for JP General Tests	100 mL	260-02001
0.1 mol/L Potassium Hydroxide-Ethanol Solution [Aldehyde-free Ethanol] for JP General Tests	500 mL	164-27995
1 mol/L Sodium Hydroxide Solution for JP General Tests	500 mL	191-17915
0.1 mol/L Sodium Hydroxide Solution for JP General Tests	500 mL	194-17905
0.1 mol/L Silver Nitrate Solution for JP General Tests	500 mL	197-18115
0.1 mol/L Sodium Thiosulfate Solution for JP General Tests	500 mL	198-17925
Sodium Fluoride TraceSure	25 g	194-17782
Reagents for Metal Analysis		
Aluminium Standard Solution (Al 1,000 mg/L) JCSS	100 mL	016-15471
Aluminium Standard Solution (Al 100 mg/L) JCSS	100 mL	016-18271
Aluminium Standard Stock Solution (Al 1,000 mg/L) for JP General Tests	100 mL	019-23911

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Ammonium 1-Pyrrolidinecarbodithioate for Atomic Absorption Spectrochemical Analysis	1 g	015-05171
Ammonium 1-Pyrrolidinecarbodithioate for Atomic Absorption Spectrochemical Analysis	1 g × 5	011-05173
Ammonium 1-Pyrrolidinecarbodithioate for Atomic Absorption Spectrochemical Analysis	25 g	013-05172
Ammonium <i>N,N</i>-Diethyldithiocarbamate for Atomic Absorption Spectrochemical Analysis	1 g × 5	013-07713
Ammonium Sulfate for Atomic Absorption Spectrochemical Analysis	500 g	016-08205
Antimony Standard Solution (Sb 1,000 mg/L) JCSS	100 mL	010-15491
Antimony Standard Solution (Sb 100 mg/L) JCSS	100 mL	013-18281
Arsenic Standard Solution (As 1,000 mg/L) JCSS	100 mL	013-15481
Barium Standard Solution (Ba 1,000 mg/L) JCSS	100 mL	027-15321
Bismuth Standard Solution (Bi 1,000 mg/L) JCSS	100 mL	021-12661
Bismuth Standard Solution (Bi 100 mg/L) JCSS	100 mL	023-14201
Boron Standard Solution (B 1,000 mg/L) JCSS	100 mL	025-16581
Butyl Acetate for Atomic Absorption Spectrochemical Analysis	500 mL	021-06115
Cadmium Standard Solution (Cd 1,000 mg/L) JCSS	100 mL	036-16171
Cadmium Standard Solution (Cd 100 mg/L) JCSS	100 mL	030-16211
Calcium Standard Solution (Ca 1,000 mg/L) JCSS	100 mL	039-16161
Calcium Standard Solution (Ca 100 mg/L) for JP General Tests	100 mL	033-22291
Calcium Standard Solution (Ca 100 mg/L) JCSS	100 mL	Only to Asia 036-17891
Cerium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	039-11661
Cesium Standard Solution (Cs 1,000 mg/L) JCSS	100 mL	030-21341
Chromium Standard Solution (Cr 1,000 mg/L) JCSS	100 mL	030-16191
Chromium Standard Solution (Cr 100 mg/L) JCSS	100 mL	037-16221
<i>N</i>-Cinnamoyl-<i>N</i>-2,3-xylylhydroxylamine for Vanadium Determination	1 g	036-09601
Cobalt Standard Solution (Co 1,000 mg/L) JCSS	100 mL	033-16181
Cobalt Standard Solution (Co 100 mg/L) JCSS	100 mL	039-17901
Copper Standard Solution (Cu 1,000 mg/L) JCSS	100 mL	033-16201
Copper Standard Solution (Cu 100 mg/L) JCSS	100 mL	034-16231
Copper Standard Stock Solution (Cu 1,000 mg/L) for JP General Tests	100 mL	036-22301
Diammonium Hydrogencitrate for Atomic Absorption Spectrochemical Analysis	500 g	015-07935
2,6-Dimethyl-4-heptanone for Atomic Absorption Spectrochemical Analysis	500 mL	046-18855
Diphenylarsinic Acid Standard for Arsenic Analysis	200 mg	040-29181

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Dithizone JIS Special Grade	5 g	048-04101
Dithizone JIS Special Grade	25 g	046-04102
Dysprosium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	045-20111
Erbium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	054-04361
Europium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	051-04251
Gadolinium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	070-02481
Gallium Standard Solution (Ga 1,000 mg/L) JCSS	100 mL	070-05781
Germanium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	077-02131
Gold Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	077-01771
Gold Standard Stock Solution (Au 1,000 mg/L) for JP General Tests	100 mL	077-06031
Holmium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	081-04651
Hydrochloric Acid for Analysis of Poisonous Metal	500 mL	081-03475
Hydrochloric Acid for Arsenic Analysis	500 mL	084-01086
Hydrogen Peroxide for Atomic Absorption Spectrochemical Analysis	500 mL	085-04056
Hydroxylammonium Chloride for Atomic Absorption Spectrochemical Analysis	100 g	087-03391
Hydroxylammonium Chloride for Atomic Absorption Spectrochemical Analysis	500 g	089-03395
Hydroxylammonium Chloride for Analysis of Poisonous Metal	25 g	083-03452
Hydroxylammonium Chloride for Analysis of Poisonous Metal	100 g	085-03451
Hydroxylammonium Chloride JIS Special Grade	25 g	089-01472
Indium Standard Solution (In 1,000 mg/L) JCSS	100 mL	092-05841
Iron Standard Solution (Fe 1,000 mg/L) JCSS	100 mL	094-03841
Iron Standard Solution (Fe 100 mg/L) JCSS	100 mL	091-03851
Lanthanum Chloride Solution for Atomic Absorption Spectrochemical Analysis	100 mL	124-02351
Lanthanum Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	127-02841
Lead Standard Solution (Pb 1,000 mg/L) JCSS	100 mL	124-04291
Lead Standard Solution (Pb 100 mg/L) JCSS	100 mL	127-04301
Lead Standard Stock Solution (Pb 100 mg/L) for JP General Tests	100 mL	122-06051
Lithium Standard Solution (Li 1,000 mg/L) JCSS	100 mL	129-05221
Lutetium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	122-02911
Magnesium Nitrate Solution [10 mg/mL Mg in 15% Nitric Acid] for Atomic Absorption Spectrochemical Analysis	100 mL	132-13321
Magnesium Standard Solution (Mg 1,000 mg/L) JCSS	100 mL	136-12121

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Magnesium Standard Solution (Mg 100 mg/L) JCSS	100 mL	136-13601
Magnesium Standard Stock Solution (Mg 1,000 mg/L) for JP General Tests	100 mL	137-17151
Manganese Standard Solution (Mn 1,000 mg/L) JCSS	100 mL	133-12131
Manganese Standard Solution (Mn 100 mg/L) JCSS	100 mL	139-12111
4-Methyl-2-pentanone for Atomic Absorption Spectrochemical Analysis	3 L	139-05641
4-Methyl-2-pentanone for Atomic Absorption Spectrochemical Analysis	500 mL	131-05645
Methyldiphenylarsine Oxide Standard for Arsenic Analysis	20 mg	135-16351
Methylphenylarsinic Acid Standard for Arsenic Analysis	20 mg	138-16341
Molybdenum Standard Solution (Mo 1,000 mg/L) JCSS	100 mL	130-14961
Multielement Standard Solution BM for ICP Analysis (Al, Cu, Fe, Mn, Pb, Zn)	50 mL	132-11481
Multielement Standard Solution L-I for ICP Analysis (Al, Ba, Ca, Cr, Fe, Mg, Pb, Sr)	50 mL	138-11461
Multielement Standard Solution L-II for ICP Analysis (Cu, Mn, Ni, V, Zn)	50 mL	135-11471
Multielement Standard Solution R-I for ICP Analysis (Ce, La, Pr, Sc, Y)	50 mL	137-11431
Multielement Standard Solution R-II for ICP Analysis (Eu, Gd, Nd, Sm, Tb)	50 mL	134-11441
Multielement Standard Solution R-III for ICP Analysis (Dy, Er, Ho, Lu, Tm, Yb)	50 mL	131-11451
Multielement Standard Solution W-I for ICP Analysis (K, Na, P)	50 mL	139-11491
Multielement Standard Solution W-II for ICP Analysis (Ca, Co, Fe, Mg, Mn, Ni)	50 mL	132-11501
Multielement Standard Solution W-III for ICP Analysis (Cd, Cr, Cu, Pb, Zn)	50 mL	139-11511
Multielement Standard Solution W-IV for ICP Analysis (Cd, Cr, Cu, Fe, Mn, Na, Pb, Zn)	50 mL	139-11871
Multielement Standard Solution W-V for ICP Analysis (Al, B, Cd, Cr, Cu, Fe, Mn, Mo, Na, Ni, Pb, Zn)	50 mL	138-13781
Multielement Standard Solution W-VI for ICP Analysis (Al, B, Ca, Cd, Cr, Cu, Fe, Mg, Mn, Na, Pb, Zn)	50 mL	139-14551
Multielement Standard Solution W-X for ICP-MS Analysis (Al, As, Cd, Cr, Cu, Mn, Pb, Se, Zn)	50 mL	134-16201
Neodymium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	149-04841
Nickel Standard Solution (Ni 1,000 mg/L) JCSS	100 mL	147-06461
Nickel Standard Solution (Ni 100 mg/L) JCSS	100 mL	144-06471
Nickel (II) Nitrate Solution (10 mg Ni/ml 15% Nitric Acid Solution) for Atomic Absorption Spectrochemical Analysis	100 mL	141-06981
Niobium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	Only to Asia 146-04971
Nitric Acid (1.38) for Analysis of Poisonous Metal	500 mL	140-04016
Palladium (II) Nitrate Solution for Atomic Absorption Spectrochemical Analysis	100 mL	163-17531
Palladium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	166-08111
Platinum Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	163-08121

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
5 w/v% Potassium Permanganate Solution for Waste Water Test	500 mL	163-21005
Potassium Peroxodisulfate for Analysis of Poisonous Metal	500 g	164-09175
Potassium Standard Solution (K 1,000 mg/L) JCSS	100 mL	165-17471
Potassium Standard Solution (K 100 mg/L) JCSS	100 mL	162-19941
Potassium Standard Stock Solution (K 5000 mg/L) for JP General Tests	100 mL	168-25271
Praseodymium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	161-12831
Rhodium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	183-00661
Rubidium Standard Solution (Rb 1,000 mg/L) JCSS	100 mL	Only to Asia 188-01951
Samarium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	195-08721
Scandium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	196-08751
Selenium Standard Solution (Se 1,000 mg/L) JCSS	100 mL	192-13861
Selenium Standard Stock Solution (Se 1,000 mg/L) for JP General Tests	100 mL	199-16431
Silicon Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	192-06031
Silver Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	199-06041
Silver Standard Stock Solution (Ag 1,000 mg/L) for JP General Tests	100 mL	196-16441
Sodium <i>N,N</i>-Diethyldithiocarbamate Trihydrate for Atomic Absorption Spectrochemical Analysis	10 g	190-07051
Sodium <i>N,N</i>-Diethyldithiocarbamate Trihydrate for Atomic Absorption Spectrochemical Analysis	100 g	196-07053
Sodium Standard Solution (Na 1,000 mg/L) JCSS	100 mL	199-10831
Sodium Standard Solution (Na 100 mg/L) JCSS	100 mL	191-12111
Sodium Tetrahydroborate for Atomic Absorption Spectrochemical Analysis	25 g	196-10542
Sodium Tetrahydroborate for Atomic Absorption Spectrochemical Analysis	100 g	198-10541
Strontium Chloride Hexahydrate for Atomic Absorption Spectrochemical Analysis	100 g	195-07361
Strontium Standard Solution (Sr 1,000 mg/L) JCSS	100 mL	199-13871
Sulfuric Acid for Analysis of Poisonous Metal	500 g	199-07325
Tantalum Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	206-08141
Tellurium Standard Solution (Te 1,000 mg/L) JCSS	100 mL	209-17921
Terbium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	209-08871
Thallium Standard Solution (Tl 1,000 mg/L) JCSS	100 mL	205-16301
Thulium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	207-09151
Tin Standard Solution (Sn 1,000 mg/L) JCSS	100 mL	202-16311
Tin (II) Chloride Dihydrate for Analysis of Poisonous Metal	25 g	204-06682

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Tin (II) Chloride Dihydrate for Analysis of Poisonous Metal	100 g	206-06681
Titanium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	209-06171
Tungsten Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	203-08151
Vanadium Standard Solution (V 1,000 mg/L) JCSS	100 mL	221-01851
Ytterbium Standard Solution (1,000 ppm) for Atomic Absorption Spectrochemical Analysis	100 mL	257-00131
Yttrium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	250-00121
Zinc Standard Solution (Zn 1,000 mg/L) JCSS	100 mL	264-01421
Zinc Standard Solution (Zn 100 mg/L) JCSS	100 mL	261-01431
Zinc Standard Stock Solution (Zn 1,000 mg/L) for JP General Tests	100 mL	260-02001
Zinc Powder for Arsenic Analysis	100 g	266-00901
Zinc Powder for Arsenic Analysis	500 g	268-00905
Zinc for Arsenic Analysis	500 g	267-00095
Zirconium Standard Solution for Atomic Absorption Spectrochemical Analysis	100 mL	263-00891

Highly-Pure Solvents / Acids

■ Specification comparison chart towards metals for solvents and acids

Specification Requirement	2-Propanol		
	169-28121 for Electronics Industry	164-08335 Super Special Grade	162-17001 ∞ Pure
Ag	1 ppb	-	-
Al	3 ppb	-	-
As	2 ppb	-	-
Ba	1 ppb	-	-
Ca	1 ppb	-	-
Cd	1 ppb	-	-
Co	1 ppb	-	-
Cr	1 ppb	-	-
Cu	1 ppb	5 ppb	5 ppb
Fe	1 ppb	10 ppb	10 ppb
K	1 ppb	-	-
Li	1 ppb	-	-
Mg	1 ppb	-	-
Mn	1 ppb	-	-
Na	10 ppb	-	-
Ni	1 ppb	-	-
Pb	1 ppb	5 ppb	5 ppb
Sr	1 ppb	-	-
Zn	1 ppb	-	-

Specification Requirement	Nitric Acid (1.42)		Nitric Acid (1.38)	
	143-09741 for Electronics Industry	148-06935 for Ultratrace Analysis	149-02886 Super Special Grade	140-04016 for Analysis of Poisonous Metal
Ag	0.001 ppm	50 ppt	-	-
Al	0.1 ppm	100 ppt	-	-
As	0.002 ppm	50 ppt	0.001 ppt	1 ppb
Ba	0.1 ppm	50 ppt	-	-
Be	-	50 ppt	-	-
Bi	-	50 ppt	-	-
Ca	0.05 ppm	100 ppt	0.01 ppt	-
Cd	0.001 ppm	50 ppt	0.1 ppt	0.1 ppb
Co	0.001 ppm	-	0.003 ppt	-
Cr	0.002 ppm	100 ppt	0.001 ppt	1 ppb
Cu	0.005 ppm	50 ppt	0.003 ppt	-
Fe	0.05 ppm	-	0.01 ppt	-
Hg	-	-	0.05 ppt	0.05 ppb
K	0.05 ppm	50 ppt	0.1 ppt	-
Li	0.005 ppm	50 ppt	-	-
Mg	0.05 ppm	50 ppt	-	-
Mn	0.005 ppm	-	0.001 ppt	1 ppb
Mo	-	50 ppt	-	-
Na	0.2 ppm	100 ppt	0.1 ppt	-
Ni	0.005 ppm	-	0.001 ppt	-
Pb	0.01 ppm	50 ppt	0.5 ppt	0.5 ppb
Rb	-	50 ppt	-	-
Sb	-	-	-	10 ppb
Se	-	-	-	10 ppb
Sn	-	50 ppt	-	10 ppb
Sr	0.005 ppm	50 ppt	-	-
Th	-	50 ppt	-	-
U	-	50 ppt	-	-
V	-	-	-	10 ppb
W	-	50 ppt	-	-
Zn	0.02	100 ppt	0.005 ppt	5 ppb

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
1-Methyl-2-pyrrolidone for Electronics Industry	1 L	139-18691
2-Propanol for Electronics Industry	1 L	169-28121
Acetic Acid Super Special Grade	3 L	010-00241
Acetic Acid Super Special Grade	500 mL	012-00245
Acetone for Electronics Industry	1 L	012-26821
Acetone ∞ Pure	100 mL	014-14811
Acetonitrile ∞ Pure	100 mL	011-14821
Benzene Super Special Grade	500 mL	021-06615
Benzene ∞ Pure	100 mL	021-12301
Benzyl Alcohol Super Special Grade	1 kg	028-06201
Chloroform ∞ Pure	100 mL	033-15721
Cyclohexane Super Special Grade	500 mL	031-06895
Dichloromethane ∞ Pure	100 mL	042-24521
Diethyl Ether ∞ Pure	100 mL	049-24531
Dimethyl Sulfoxide ∞ Pure	100 mL	045-24511
N,N-Dimethylformamide ∞ Pure	100 mL	048-24501
1,4-Dioxane ∞ Pure	100 mL	045-24491
Ethanol for Electronics Industry	1 L	056-09201
Ethanol (99.5) Super Special Grade	500 mL	050-00446
Ethanol (99.5) ∞ Pure	100 mL	053-06531
Ethyl Acetate ∞ Pure	100 mL	055-05991
Heptane ∞ Pure	100 mL	089-06891
Hexaammonium Heptamolybdate Tetrahydrate, Crystals Super Special Grade	100 g	018-08961
Hexaammonium Heptamolybdate Tetrahydrate, Powder Super Special Grade	100 g	017-10761
Hexane ∞ Pure	100 mL	082-06901
Hydrochloric Acid Super Special Grade	500 mL	083-03435
20% Hydrochloric Acid Super Special Grade	500 mL	088-01805
Hydrochloric Acid for Ultratrace Analysis	500 mL	089-07555
Hydrochloric Acid Super Special Grade	1 kg	087-10361
Hydrogen Peroxide Super Special Grade	100 mL	084-07441

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
Hydrogen Peroxide Super Special Grade	500 mL	086-07445
Methanol Super Special Grade	500 mL	136-09475
Methanol Super Special Grade	1 L	133-18731
Methanol ∞ Pure	100 mL	134-11821
Nitric Acid (1.38) Super Special Grade	500 mL	Only to Asia 149-02886
Nitric Acid for Electronics Industry	1 kg	143-09741
Nitric Acid (1.42) for Ultratrace Analysis	500 mL	Only to Asia 148-06935
50% Potassium Hydroxide Solution Super Special Grade	500 mL	168-20455
2-Propanol Super Special Grade	500 mL	164-08335
2-Propanol ∞ Pure	100 mL	162-17001
1-Propanol ∞ Pure	100 mL	165-16991
Pyridine ∞ Pure	100 mL	169-17011
50% Sodium Hydroxide Solution Super Special Grade	100 mL	195-12371
50% Sodium Hydroxide Solution Super Special Grade	500 mL	197-12375
Sulfuric Acid Super Special Grade	500 g	190-04675
Sulfuric Acid for Electronics Industry	1 kg	194-18321
Tetrahydrofuran, Stabilizer Free ∞ Pure	100 mL	205-12881
25% Tetramethylammonium Hydroxide Solution Super Special Grade	500 mL	206-15035
Tin (II) Chloride Dihydrate Super Special Grade	500 g	201-06675
Toluene ∞ Pure	100 mL	208-12871
Ultrapure Water for Ultratrace Analysis	1 L	217-01031

Reagents for NMR

Chlorotris(triphenylphosphine)rhodium (I) Wako 1st Grade	1 g	034-14271
Chlorotris(triphenylphosphine)rhodium (I) Wako 1st Grade	5 g	030-14273
(R)-(+)-2-Methoxy-2-(trifluoromethyl)phenylacetic Acid for NMR	1 g	138-09131
(S)-(-)-2-Methoxy-2-(trifluoromethyl)phenylacetic Acid for NMR	1 g	131-09121
NMR Test Tube HG-Type (φ4.951 ~ 4.965 mm × 7 in.) for NMR	10 tubes	297-47951
NMR Test Tube HG-Type (φ4.951 ~ 4.965 mm × 7 in.) for NMR	100 tubes	293-47953
NMR Test Tube HG-Type (φ4.951 ~ 4.965 mm × 8 in.) for NMR	10 tubes	295-48351
NMR Test Tube HG-Type (φ4.951 ~ 4.965 mm × 8 in.) for NMR	100 tubes	291-48353
NMR Test Tube S-Type (φ4.932 ~ 4.970 mm × 7 in.) for NMR	10 tubes	291-47851

Product Name Grade	Manufacture's Code Package Size	Note for Shipment Wako Cat. No.
NMR Test Tube S-Type (φ4.932 ~ 4.970 mm × 7in.) for NMR	100 tubes	297-47853
NMR Test Tube S-Type (φ4.932 ~ 4.970 mm × 8in.) for NMR	10 tubes	293-48151
NMR Test Tube S-Type (φ4.932 ~ 4.970 mm × 8in.) for NMR	100 tubes	299-48153
Polyethylene Cap (Blue) For NMR Test Tube for NMR	100 each	290-49401
Polyethylene Cap (Green) For NMR Test Tube for NMR	100 each	293-49251
Polyethylene Cap (Red) For NMR Test Tube for NMR	100 each	297-49151
Polyethylene Cap (White) For NMR Test Tube for NMR	100 each	299-49351
Polyethylene Cap (Yellow) For NMR Test Tube for NMR	100 each	291-49551
Tetramethylsilane for NMR	10 mL	201-08451
Tetramethylsilane for NMR	25 mL	209-08452

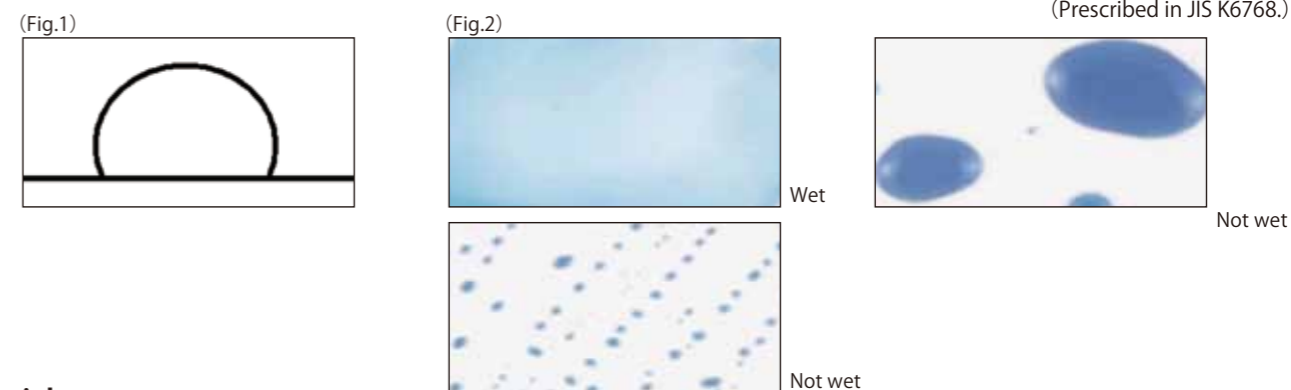
Wetting Tension Test Mixtures

Wetting Tension is ...

The ability of plastic films to retain inks, coating, adhesives, etc., is primarily dependent on the character of their surfaces, and can be improved by one of several surface-treating techniques. These techniques have been found to increase the wetting tension of a plastic film surface in contact with mixtures of solvents. It is therefore possible to relate the wetting tension of a plastic film surface relates to its ability to accept and retain inks, coatings, adhesives, etc.

The condition with water drops placed on the surface is not defined to be wet (Fig. 1). To let the surface get wet with a liquid with strong surface tension as in the case of water, the film surface must have the property to blend into water (high polarity). Conversely, with the solvent with weak surface tension as in the case of organic solvent, the film surface gets wet even if the film surface has a property to repel water. Consequently, when plastic film is coated with paint, provided with coating, or bonded, it is important to know the wetting tension of plastic film.

(Prescribed in JIS K6768.)



Principle

A series of mixtures of solvents of gradually increasing surface tension are applied to the surface of the plastic film until a mixture is obtained that just wets the film surface. The wetting tension of the surface under test is approximately by the surface tension of this particular mixture.

Wetting Tension Test Mixture

36 kinds of test mixtures of graduated wetting tension are available for wetting tension test.

Procedure

A cotton-tipped stick is used for spreading the test mixtures and the liquid shall be spread rapidly over an area of at least 20 cm². The quantity of liquid shall be such that it forms a thin film without pools. Impregnate the mixture and apply only one coat to the film in the lateral direction. The amount of the liquid applied exerts great effect on the accuracy of the test, to which care must be taken.

○ In the case of excess application

The liquid film does not break from the film inside but shrinks from the surrounding, and forms a large liquid drop (large measurement value results)

○ In the case of application of an appropriate amount

Breakage of coated liquid film simultaneously occurs not only from the surrounding but also the center part of the film

○ In the case of application of excessively small amount

In the case of application, breakage of liquid film occurs in the direction where the cotton-tipped stick is moved and application irregularity is formed (small measurement value results).

How to determine

Observe the liquid film of the test mixture under glancing illumination and note the time taken for the continuous liquid film to break up into droplets. If the liquid film holds together for more than 2 seconds, repeat the test on a new specimen with a mixture of the next higher surface tension, until the liquid film breaks up in less than 2 seconds. If the liquid film holds for less than 2 seconds, proceed to lower surface tensions until the film persists for 2 seconds. (Fig. 2)

Product Name	Package Size	Wako Cat. Code
Wetting Tension Test Mixture No.25.4	50 mL	238-01801
Wetting Tension Test Mixture No.27.3	50 mL	235-01811
Wetting Tension Test Mixture No.30.0	50 mL	232-01821
Wetting Tension Test Mixture No.32.0	50 mL	236-01841
Wetting Tension Test Mixture No.33.0	50 mL	233-01851
Wetting Tension Test Mixture No.34.0	50 mL	230-01861
Wetting Tension Test Mixture No.35.0	50 mL	237-01871
Wetting Tension Test Mixture No.36.0	50 mL	234-01881
Wetting Tension Test Mixture No.37.0	50 mL	231-01891
Wetting Tension Test Mixture No.38.0	50 mL	234-01901
Wetting Tension Test Mixture No.39.0	50 mL	231-01911
Wetting Tension Test Mixture No.40.0	50 mL	238-01921
Wetting Tension Test Mixture No.41.0	50 mL	235-01931
Wetting Tension Test Mixture No.42.0	50 mL	232-01941
Wetting Tension Test Mixture No.43.0	50 mL	239-01951
Wetting Tension Test Mixture No.44.0	50 mL	236-01961
Wetting Tension Test Mixture No.45.0	50 mL	233-01971
Wetting Tension Test Mixture No.46.0	50 mL	230-01981
Wetting Tension Test Mixture No.48.0	50 mL	237-01991
Wetting Tension Test Mixture No.50.0	50 mL	234-02001
Wetting Tension Test Mixture No.52.0	50 mL	231-02011
Wetting Tension Test Mixture No.59.0	50 mL	239-02051
Wetting Tension Test Mixture No.60.0	50 mL	236-02061
Wetting Tension Test Mixture No.61.0	50 mL	233-02071
Wetting Tension Test Mixture No.62.0	50 mL	230-02081
Wetting Tension Test Mixture No.63.0	50 mL	237-02091
Wetting Tension Test Mixture No.64.0	50 mL	230-02101
Wetting Tension Test Mixture No.65.0	50 mL	237-02111
Wetting Tension Test Mixture No.67.0	50 mL	234-02121
Wetting Tension Test Mixture No.70.0	50 mL	231-02131
Wetting Tension Test Mixture No.31.0	50 mL	239-01831
Wetting Tension Test Mixture No.54.0	50 mL	238-02021
Wetting Tension Test Mixture No.56.0	50 mL	235-02031
Wetting Tension Test Mixture No.58.0	50 mL	232-02041
Wetting Tension Test Mixture No.22.6	50 mL	235-01791
Wetting Tension Test Mixture No.73.0	50 mL	238-02141

CSK Standard Solutions for Analysis for Nutrient Salts in Seawater

CSK Standard Solution Nitrate (contains 3.05% NaCl) N:0.00 µg atom/L	50 mL	039-10181
CSK Standard Solution Nitrate (contains 3.05% NaCl) N:10.0 µg atom/L	50 mL	039-10201
CSK Standard Solution Nitrate (contains 3.05% NaCl) N:20.0 µg atom/L	50 mL	033-10221
CSK Standard Solution Nitrate (contains 3.05% NaCl) N:40.0 µg atom/L	50 mL	037-10241
CSK Standard Solution Nitrate (contains 3.05% NaCl) N:5.00 µg atom/L	50 mL	036-10191
CSK Standard Solution Nitrite N:0.00 µg atom/L	50 mL	034-10131
CSK Standard Solution Nitrite N:0.50 µg atom/L	50 mL	038-10151
CSK Standard Solution Nitrite N:1.00 µg atom/L	50 mL	035-10161
CSK Standard Solution Nitrite N:2.00 µg atom/L	50 mL	032-10171
CSK Standard Solution Phosphate (contains 3.05% NaCl) P:0.00 µg atom/L	50 mL	037-10001
CSK Standard Solution Phosphate (contains 3.05% NaCl) P:0.50 µg atom/L	50 mL	034-10011
CSK Standard Solution Phosphate (contains 3.05% NaCl) P:1.00 µg atom/L	50 mL	031-10021
CSK Standard Solution Phosphate (contains 3.05% NaCl) P:2.00 µg atom/L	50 mL	038-10031
CSK Standard Solution Phosphate (contains 3.05% NaCl) P:3.00 µg atom/L	50 mL	035-10041
CSK Standard Solution Potassium Iodate (0.0100N)	300 mL	034-10251
CSK Standard Solution Silicate (contains 3.05% NaCl) Si:0.0 µg atom/L	50 mL	032-10051

Product Name	Manufacture's Code	Package Size	Wako Cat. Code
CSK Standard Solution Silicate (contains 3.05% NaCl) Si:10.0 µg atom/L		50 mL	036-10071
CSK Standard Solution Silicate (contains 3.05% NaCl) Si:100 µg atom/L		50 mL	033-10101
CSK Standard Solution Silicate (contains 3.05% NaCl) Si:200 µg atom/L		50 mL	037-10121
CSK Standard Solution Silicate (contains 3.05% NaCl) Si:5.0 µg atom/L		50 mL	039-10061
CSK Standard Solution Silicate (contains 3.05% NaCl) Si:50.0 µg atom/L		50 mL	030-10091

NMIJ Certified Reference Materials (NMIJ CRM)

Acetaldehyde	NMIJ CRM 4054-a	10 mL	630-20401
L-Alanine	NMIJ CRM 6011-a	0.5 g	634-22121
L-Arginine	NMIJ CRM 6017-b	0.5 g	634-22143
Benzo[a]pyrene in 2,2,4-Trimethylpentane	NMIJ CRM 4213-a	1 g	639-11701
Bromodichloromethane	NMIJ CRM 4020-a	5 mL	639-11681
Bromoform (Tribromomethane)	NMIJ CRM 4019-a	5 mL	632-11671
Cholesterol	NMIJCRM6001-A	1 g	636-10111
C-peptide	NMIJ CRM 6901-b	1 vial	638-25681
Creatinine	NMIJ CRM 6005-a	2 g	631-11761
Dibromochloromethane	NMIJ CRM 4036-a	5 mL	636-11691
Dibutyl Sulfide	NMIJ CRM 4221-a	2 mL	639-25611
1,4-dichlorobenzene	NMIJ CRM 4039-a	5 g	639-14481
Ethylene Dichloride	NMIJCRM4004-A	15 mL	634-10031
1,1-Dichloroethylene	NMIJ CRM 4014-a	15 mL	637-23071
Dichloromethane	NMIJ CRM 4005-a	15 mL	630-22101
1,2-Dichloropropane	NMIJ CRM 4038-a	15 mL	635-21051
Diethyl Phthalate	NMIJCRM4022-B	1.5 mL	639-10081
17 β-Estradiol	NMIJ CRM 6004-a	300 mg	630-21121
Phenylethane	NMIJCRM4021-A	15 mL	632-10071
γ-HCH in 2,2,4-Trimethylpentane	NMIJCRM4203-A	1 g	635-05811
L-Histidine	NMIJ CRM 6024-a	0.5 g	631-25671
Hydrocortisone	NMIJ CRM 6007-a	200 mg	638-16031
L-Isoleucine	NMIJ CRM 6013-a	0.5 g	637-20411
Bisphenol A	NMIJCRM4030-A	1.5 g	636-10091
L-Leucine	NMIJ CRM 6012-a	0.5 g	631-22131
L-Lysine Monohydrochloride	NMIJ CRM 6018-a	0.5 g	635-22151
Perfluorooctanoic acid	NMIJ CRM 4056-a	50 mg	634-23081
L-Phenylalanine	NMIJ CRM 6014-a	0.5 g	634-20421
Potassium Perfluorooctanesulfonate in Methanol	NMIJ CRM 4220-a	1 g	633-21091
Progesterone	NMIJ CRM 6003-a	300 mg	632-23141
L-Proline	NMIJ CRM 6016-a	0.5 g	634-20661
L-Serine	NMIJ CRM 6021-a	0.5 g	634-25661
Sulfur in Toluene	NMIJ CRM 4217-a	10 mL	637-22111
Sulfur in Toluene	NMIJ CRM 4215-a	5 mL	636-11711
Sulfur in Toluene (blank)	NMIJ RM 4216-a	30 mL	631-20671
L-Threonine	NMIJ CRM 6020-a	0.5 g	637-25651
L-Tyrosine	NMIJ CRM 6019-a	0.5 g	630-25641
Urea	NMIJ CRM 6006-a	10g	636-14491
Uric Acid	NMIJ CRM 6008-a	2 g	637-21131
L-Valine	NMIJ CRM 6015-a	0.5 g	631-20431
m-Xylene	NMIJCRM4012-A	15 mL	638-10051
o-Xylene	NMIJCRM4011-A	15 mL	631-10041
p-Xylene	NMIJCRM4013-A	15 mL	635-10061

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