

Parameter, Ranges and Reagents for Spectrophotometer SP600

**Spectrophotometer
for water and
waste water testing
330 - 900 nm**

Parameter, Ranges and Reagents for

Test	$\lambda^a)$ / nm	Method	Cuvette	Range	Display
Alkalinity-m	615	Acid/Indicator ^{1,2}	24 mm \emptyset	5 - 200 mg/l	CaCO ₃
Alkalinity-p	551	Acid/Indicator ^{1,2}	24 mm \emptyset	5 - 300 mg/l	CaCO ₃
Aluminium	530	Eriochrome cyanine R ²	24 mm \emptyset	0.01 - 0.25 mg/l	Al
Ammonia	676	Salicylate ^{1,2}	24 mm \emptyset	0.02 - 1 mg/l	N
Ammonia vario	655	Salicylate ²	24 mm \emptyset	0 - 0.5 mg/l	N
Ammonia vario LR	655	Salicylate ²	16 mm \emptyset	0 - 2.5 mg/l	N
Ammonia vario HR	655	Salicylate ²	16 mm \emptyset	0 - 50 mg/l	N
Arsenic (III, IV)	507	Silberdiethyldithiocarbamate ¹	20 mm \square	0.02 - 0.6 mg/l	As
Bromine	510	DPD ⁵	50 mm \square 10 mm \square 24 mm \emptyset	0.05 - 1 mg/l 0.1 - 3 mg/l 0.1 - 6.5 mg/l	Br
Bromine	510	DPD ⁵	24 mm \emptyset	0.1 - 4.5 mg/l	Br
Cadmium (Cd²⁺)	525	Cadion	16 mm \emptyset	0.025 - 0.75 mg/l	Cd
Chlorine ^{b)}	510	DPD ^{1,2}	50 mm \square 10 mm \square 24 mm \emptyset	0.02 - 0.5 mg/l 0.05 - 1.5 mg/l 0.05 - 3 mg/l	Cl ₂
Chlorine ^{b)}	510	DPD ^{1,2}	24 mm \emptyset	0.05 - 2 mg/l	Cl ₂

MSDS (Material Safety Data Sheets): www.tintometer.com

Legend

¹ Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

² Standard Methods for the Examination of Water and Wastewater, 18th Edition; 1992

³ Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

⁴ Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

⁵ Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond,

\square Rectangular cell

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the SP600

Reagent	Form of reagent/Quantity	Order-No.
ALKA-M-PHOTOMETER	Tablet / 100	51 32 10
ALKA-P-PHOTOMETER	Tablet / 100	51 32 30
VARIO Aluminum ECR/F20 VARIO Aluminum Hexamine/F20 VARIO Aluminum Masking Reagt.	Powder Pack / 100 Powder Pack / 100 Liquid reagent / 25 ml Set	53 50 00
AMMONIA No. 1	Tablet / 100	51 25 80
AMMONIA No. 2	Tablet / 100	51 25 90
VARIO Ammonia Salicylate F10	Powder Pack / 100	53 13 80
VARIO Ammonia Cyanurate F10	Powder Pack / 100	53 13 70
VARIO Ammonia Salicylate F5 VARIO Ammonia Cyanurate F5 VARIO Am Diluent Reagent Low Range	Powder Pack / 100 Powder Pack / 100 Tube test / 50 Set	53 56 00
VARIO Ammonia Salicylate F5 VARIO Ammonia Cyanurate F5 VARIO Am Diluent Reagent High Range	Powder Pack / 100 Powder Pack / 100 Tube test / 50 Set	53 56 50
Details on request	----	
DPD No. 1	Tablet / 100	51 10 60
DPD No. 1 HIGH CALCIUM ^{†)}	Tablet / 100	51 57 40
DPD 1 Buffer-Solution	Liquid reagent / 15 ml	47 10 10
DPD 1 Reagent-Solution	Liquid reagent / 15 ml	47 10 20
Spectroquant® 1.14834.0001	Tube test / 25	42 07 50
DPD No. 1	Tablet / 100	51 10 60
DPD No. 1 HIGH CALCIUM ^{†)}	Tablet / 100	51 57 40
DPD No. 3	Tablet / 100	51 10 80
DPD 1 Buffer-Solution	Liquid reagent / 15 ml	47 10 10
DPD 1 Reagent-Solution	Liquid reagent / 15 ml	47 10 20
DPD 3 Solution	Liquid reagent / 15 ml	47 10 30

Legend

- a) Wavelength
- b) Determination of free, combined and total is possible.
- c) User must re-calibrate the photometer with each new batch of SPADNS-reagent. Therefore the Fluoride-standard is needed
- d) Determination of total chromium, Cr(VI) and Cr(III) is possible
- e) Please order from your Merck local dealer. Spectroquant® is a Merck KGaA Trademark.
- †) alternative reagent, used instead of DPD No.1 where turbidity in the water sample caused by high concentration of calcium and/or high conductivity
- * Reactor necessary for COD (150°C), TOC (120°C), total -chromium, -nitrogen, -phosphate (100°C)
- RT Reagent test: Includes complete set of chemicals necessary for this method.
- TT Tube test: Includes vials and reagents.

Parameter, Ranges and Reagents for

Test	$\lambda^a)$ / nm	Method	Cuvette	Range	Display
Chlorine vario^{b)}	510	DPD ^{1,2}	24 mm \emptyset	0.01 - 2 mg/l	Cl ₂
Chlorine HR	470	Potassium iodide ⁵	16 mm \emptyset	5 - 200 mg/l	Cl ₂
Chlorine Dioxide	510	DPD ^{1,2}	50 mm \square 24 mm \emptyset	0.04 - 1 mg/l 0.5 - 2.5 mg/l	ClO ₂
Chlorine Dioxide	510	DPD ^{1,2}	24 mm \emptyset	0.5 - 2.5 mg/l	ClO ₂
Chloride	455	Iron (III)-thiocyanate ⁴	24 mm \emptyset	5 - 60 mg/l	Cl
Chromium^{d)*}	542	1,5-Diphenylcarbohydrazide ^{1,2}	50 mm \square 16 mm \emptyset	0.005 - 0.5 mg/l 0.02 - 2 mg/l	Cr
COD vario LR* (ISO 15705:2003-01)	420	Dichromate/H ₂ SO ₄ ¹	16 mm \emptyset	0 - 150 mg/l	COD
COD vario MR* (ISO 15705:2003-01)	620	Dichromate/H ₂ SO ₄ ¹	16 mm \emptyset	0 - 1500 mg/l	COD
COD vario HR*	620	Dichromate/H ₂ SO ₄ ¹	16 mm \emptyset	0 - 15000 mg/l	COD
Copper^{b)}	559	Biquinoline ⁴	50 mm \square 24 mm \emptyset	0.05 - 1 mg/l 0.5 - 5 mg/l	Cu
Cyanide	585	Pyridine-barbituric acid ¹	50 mm \square 24 mm \emptyset	0.005 - 0.2 mg/l 0.02 - 0.5 mg/l	CN
DEHA	562	PPST ³	24 mm \emptyset	0.02 - 0.5 mg/l	DEHA
Fluoride	580	SPADNS ²	24 mm \emptyset	0.02 - 1.5 mg/l	F
Formaldehyde	585	H ₂ SO ₄ /Chromotropic acid	10 mm \square 50 mm \square	1 - 5 mg/l 0.02 - 1 mg/l	HCHO
Formaldehyde	575	H ₂ SO ₄ /Chromotropic acid	16 mm \emptyset	0.1 - 5 mg/l	
Hardness-total	571	Metallphthalein ³	24 mm \emptyset	2 - 50 mg/l	CaCO ₃
Hazen (Pt-Co units, APHA)	455	Direct reading ²	50 mm \square	0 - 500 mg Pt/l	Pt-Co units

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⁵ Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond,

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the SP600

Reagent	Form of reagent/Quantity	Order-No.
VARIO Chlorine FREE-DPD/F10	Powder Pack / 100	53 01 00
VARIO Chlorine TOTAL-DPD/F10	Powder Pack / 100	53 01 20
CHLORINE HR (KI)	Tablet / 100	51 30 00
ACIDIFYING GP	Tablet / 100	51 54 80
DPD No. 1	Tablet / 100	51 10 60
DPD No. 1 HIGH CALCIUM ^{f)}	Tablet / 100	51 57 40
DPD 1 Buffer-Solution	Liquid reagent / 15 ml	47 10 10
DPD 1 Reagent-Solution	Liquid reagent / 15 ml	47 10 20
RT (Chlorid-51 / Chlorid-52)	Reagent test (Liquid reagent) 100 Tests	2 41 90 31
"PERSULF. RTG FOR CR", Chromium Hexavalent	Powder Pack / 100 Powder Pack /100	53 73 00 53 73 10
COD VARIO 0 - 150 mg/l	Tube test / 25	2 42 07 20
COD VARIO 0 - 1500 mg/l	Tube test / 25	2 42 07 21
COD VARIO 0 - 15000 mg/l	Tube test / 25	2 42 07 22
COPPER No. 1	Tablet / 100	51 35 50
COPPER No. 2	Tablet / 100	51 35 60
RT (Cyanid-11 / Cyanid-12 / Cyanid-13)	Reagent test (Powder, Liquid reagent) / 130 Tests	2 41 88 75
DEHA Solution	Liquid reagent / 100 ml	46 11 81
DEHA	Tablet / 100	51 32 20
SPADNS-Reagent	Liquid reagent / 250 ml	46 74 81
Fluoride-Standard ^{c)}	Liquid / 30 ml	20 56 30
Spectroquant® 1.14678.0001 ^{e)}	Reagent test / 150	42 07 51
Spectroquant® 1.14500.0001 ^{e)}	Tube test / 25	42 07 52
HARDCHECK P	Tablet / 100	51 56 60
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Legend

a) Wavelength

b) Determination of free, combined and total is possible.

c) User must re-calibrate the photometer with each new batch of SPADNS-reagent. Therefore the Fluoride-standard is needed

d) Determination of total chromium, Cr(VI) and Cr(III) is possible

e) Please order from your Merck local dealer. Spectroquant® is a Merck KGaA Trademark.

f) alternative reagent, used instead of DPD No.1 where turbidity in the water sample caused by high concentration of calcium and/or high conductivity

* Reactor necessary for COD (150°C), TOC (120°C), total -chromium, -nitrogen, -phosphate (100°C)

RT Reagent test: Includes complete set of chemicals necessary for this method.

TT Tube test: Includes vials and reagents.

Parameter, Ranges and Reagents for

Test	$\lambda^{\text{a)}}$ / nm	Method	Cuvette	Range	Display
Hydrogenperoxide	510	DPD/Catalyst ⁵	50 mm □ 24 mm ø	0.01 - 0.5 mg/l 0.5 - 1.5 mg/l	H ₂ O ₂
Iron (ferrous Fe ²⁺ , ferric Fe ³⁺) soluble	562	PPST ³	50 mm □ 10 mm □ 24 mm ø	0.01 - 0.5 mg/l 0.1 - 1 mg/l 0.1 - 1 mg/l	Fe
Iron (ferrous Fe ²⁺) soluble	562	PPST ³	50 mm □ 10 mm □ 24 mm ø	0.01 - 0.5 mg/l 0.1 - 1 mg/l 0.1 - 1 mg/l	Fe
Iron vario (ferrous Fe ²⁺ , ferric Fe ³⁺) soluble	510	1, 10- Phenantroline ^{1,2}	24 mm ø	0.1 - 3 mg/l	Fe
Lead (Pb ²⁺)	520	4-(2-Pyridylazo)-resorcin	10 mm □	0.1 - 5 mg/l	Pb
Lead (Pb ²⁺)	515	4-(2-Pyridylazo)-resorcin	16 mm ø	0.1 - 5 mg/l	Pb
Manganese	450	Formaldoxime ¹	24 mm ø	0.05 - 4 mg/l	Mn
Molybdate	366	Thioglycolate ⁴	24 mm ø	0.5 - 30 mg/l	MoO ₄
Nickel	443	Dimethylglyoxime ^{2,3}	50 mm □ 24 mm ø	0.02 - 1 mg/l 0.2 - 7 mg/l	Ni
Nitrate	340	2,6-Dimethylphenole ^{2,3}	16 mm ø	0.5 - 14 mg/l	N
Nitrite	545	NED ^{2,3}	24 mm ø	0.01 - 0.5 mg/l	N
Nitrite	545	Sulfanilic acid, Naphthyl-amine ¹	16 mm ø	0.03 - 0.6 mg/l 0.3 - 3 mg/l	N
Nitrogen-total*	340	2,6-Dimethylphenole ^{2,3}	16 mm ø	0.5 - 14 mg/l 14 - 140 mg/l	N
Ozone	510	DPD/Glycine ⁵	50 mm □ 24 mm ø	0.02 - 0.5 mg/l 0.1 - 1 mg/l	O ₃
Phenols	507	4-Aminoantipyrine ²	24 mm ø	0.1 - 5 mg/l	C ₆ H ₅ OH

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⁵ Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond,

□ Rectangular cell

ø Round vial

the SP600

Reagent	Form of reagent/Quantity	Order-No.
HYDROGENPEROXIDE LR	Tablet / 100	51 23 80
IRON LR	Tablet / 100	51 53 70
	Tablet / 100	51 54 20
IRON (II) LR	Tablet / 100	51 53 70
	Tablet / 100	51 54 20
VARIO Ferro F10	Powder Pack /100	53 05 60
Spectroquant® 1.09717.0001 ^{e)}	Reagent test / 50 Tests	42 07 53
Spectroquant® 1.14833.0001 ^{e)}	Tube test / 25	42 07 54
MANGANESE LR 1	Tablet / 100	51 60 80
MANGANESE LR 2	Tablet / 100	51 60 90
MOLYBDATE HR No. 1	Tablet / 100	51 30 60
MOLYBDATE HR No. 2	Tablet / 100	51 30 70
RT (Nickel-51, Nickel-52)	Reagent test (Powder, Liquid reagent) / 50 Tests	2 41 90 33
TT (Nitrat-111)	Tube test (Liquid reagent) / 24	2 42 07 02
NITRITE LR	Tablet / 100	51 23 10
TT (Nitrit-101)	Tube test (Powder) / 24	2 41 90 18
TT (Digestion reagent, Compensation- reagent, Nitrat-111)	Tube test (Powder, Liquid reagent) / 24	2 42 07 03
DPD No. 1	Tablet / 100	51 10 60
DPD No. 1 HIGH CALCIUM ^{f)}	Tablet / 100	51 57 40
DPD No. 3	Tablet / 100	51 10 80
DPD GLYCINE ^{g)}	Tablet / 100	51 21 70
PHENOLE No. 1	Tablet / 100	51 59 50
PHENOLE No. 2	Tablet / 100	51 59 60

Legend

^{a)} Wavelength

^{b)} Determination of free, combined and total is possible.

^{c)} User must re-calibrate the photometer with each new batch of SPADNS-reagent. Therefore the Fluoride-standard is needed

^{d)} Determination of total chromium, Cr(VI) and Cr(III) is possible

^{e)} Please order from your Merck local dealer. Spectroquant® is a Merck KGaA Trademark.

^{f)} alternative reagent, used instead of DPD No.1 where turbidity in the water sample caused by high concentration of calcium and/or high conductivity

^{g)} required for determination of ozone in the presence of chlorine

* Reactor necessary for COD (150°C), TOC (120°C), total -chromium, -nitrogen, -phosphate (100°C)

RT Reagent test: Includes complete set of chemicals necessary for this method.

TT Tube test: Includes vials and reagents.

Parameter, Ranges and Reagents for

Test	$\lambda^a)$ / nm	Method	Cuvette	Range	Display
Phosphate-total (PMB)*	690	Phosphomolybdic acid/ Ascorbic acid ²	16 mm \emptyset	0.07 - 3 mg/l 0.2 - 10 mg/l	P PO ₄
Phosphate-total (PMB)*	690	Phosphomolybdic acid/ Ascorbic acid ²	16 mm \emptyset	1.5 - 20 mg/l 5 - 60 mg/l	P PO ₄
Phosphate-ortho	710	Phosphomolybdic acid/ Ascorbic acid ²	24 mm \emptyset	0.05 - 4 mg/l	PO ₄
Phosphate-ortho (VM)	438	Vanadomolybdate ²	16 mm \emptyset	3 - 60 mg/l	PO ₄
pH-value	558	Phenol red ⁵	24 mm \emptyset	6.5 - 8.4	pH
Potassium	730	Tetraphenylborate, Turbidity ⁴	24 mm \emptyset	0.5 - 12 mg/l	K
Silica	820	Silicomolybdate ^{1,2}	24 mm \emptyset	0.05 - 3 mg/l	SiO ₂
Spectral Absorption-coefficient	436 525 620	Direct Reading ¹ ISO 7887:1994	50 mm \square	0 - 50 m ⁻¹	---
Sulphate vario	450	Barium sulphate, Turbidity ²	24 mm \emptyset	2 - 100 mg/l	SO ₄
Sulphide	668	DPD/Catalyst ^{3,4}	24 mm \emptyset	0.04 - 0.5 mg/l	S
Sulphite LR	405	DTNB	10 mm \square 24 mm \emptyset	0.1 - 10 mg/l 0.05 - 4 mg/l	SO ₃
Surfactants (anionic)	653	Methylene blue ¹	16 mm \emptyset	0.05 - 2 mg/l	MBAS
TOC*	596	H ₂ SO ₄ / Indicator	16 mm \emptyset	50 - 800 mg/l	TOC
Turbidity	860	Attenuated Radiation Method	50 mm \square	5 - 500	NTU
Zinc	616	Zincon ³	24 mm \emptyset	0.02 - 1 mg/l	Zn

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\square Rectangular cell

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the SP600

Reagent	Form of reagent/Quantity	Order-No.
TT (Phosphat-101 , Phosphat- 102, Phosphat-103)	Tube test (Powder, Liquid -reagent) / 24	2 41 90 19
TT (Phosphat-101 , Phosphat-102, Phosphat-103)	Tube test (Powder, Liquid -reagent) / 24	2 42 07 00
PHOSPHATE LR No. 1	Tablet / 100	51 30 40
PHOSPHATE LR No. 2	Tablet / 100	51 30 50
TT	Tube test / 24	2 42 07 01
PHENOLRED/PHOTOMETER	Tablet / 100	51 17 70
POTASSIUM T	Tablette / 100	51 56 70
SILICA No. 1	Tablet / 100	51 31 30
SILICA No. 2	Tablet / 100	51 31 40
SILICA PR	Tablet / 100	51 31 50
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VARIO Sulpha 4	Powder Pack / 100	53 21 50
SULFIDE No. 1	Tablet / 100	50 29 30
SULFIDE No. 2	Tablet / 100	50 29 40
SULFITE LR	Tablet / 100	51 80 20
Spectroquant® 1.14697.0001 ^{e)}	Tube test / 25	42 07 55
Spectroquant® 1.14879.0001 ^{e)}	Tube test / 25	42 07 56
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COPPER/ZINC LR	Tablet / 100	51 26 20
EDTA	Tablet / 100	51 23 90
DECHLOR	Tablet / 100	51 23 50

Legend

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* Reactor necessary for COD (150°C), TOC (120°C), total -chromium, -nitrogen, -phosphate (100°C)

RT Reagent test: Includes complete set of chemicals necessary for this method.

TT Tube test: Includes vials and reagents.